

# DEFENCE ACQUISITION

International Best Practices



Editors

Laxman Kumar Behera | Group Captain (Retd) Vinay Kaushal

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*International Best Practices*



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*Edited by*

Laxman Kumar Behera  
Group Captain (Retd) Vinay Kaushal



INSTITUTE FOR DEFENCE STUDIES & ANALYSES  
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## Foreword

The international seminar on defence acquisition (held at IDSA in July 2011) aimed at examining the best practices in defence acquisitions. It was a platform to bring together functionaries from the MoD, the Armed Forces, and the industry of major developed and developing countries and experts on the subject for a three day long discussion.

It was indeed a proud day for IDSA and we had an overwhelming response and participation for the first ever international seminar devoted to the myriad facets of defence acquisitions. The Honourable Defence Minister Sh AK Antony's presence for the inaugural session and his candid address set the sense of the purpose and professional focus for the deliberations over the 3 day period.

To our good fortune, we were able to bring together a significant number of highly accomplished speakers and chairpersons for the ten working sessions for this seminar. Together, they brought to the forum some unmatched, cross-country experiences and insights into the key concerns and policy dimensions in the realm of defence acquisition. The seminar offered unprecedented opportunity to India in particular and indeed equally to stakeholders and practitioners from all the countries represented for enhancing the effectiveness of policies, precepts and practices in this vital national empowerment effort.

The major issues that were discussed included: technical requirements and capability definitions; technical and commercial evaluation challenges; structural elements for efficient acquisition; contract and project management; IT opportunities in defence acquisition; empowering the defence industrial and R&D base; role of offsets in acquisition, and efficient logistics management.

The presentations made by the distinguished speakers exposed the participants to the need of having a mechanism for quick disposal of frivolous complaints and DPP deviations and the setting up of an Ombudsman or a regulatory authority to oversee the entire gamut of defence procurement. The technical and operational evaluation of a weapon system is a demanding exercise for all stakeholders and is best achieved through planning, discipline, rule-based execution and expertise. The importance of team composition and size for a time-bound evaluation campaign where the buyer and seller should designate respective team leader with the full responsibility, were highlighted for a successful conduct of evaluation. The discussions clarified that most cost growth occurs early in the development, although increases continue until the end of

production and the main sources of cost growth are in “errors” and “decisions”. Cost growth in system development can be controlled if high-risk technology has matured sufficiently before development. It was also brought out that total cost of ownership (TCO) is very important and the comparison of figures of different weapon systems and manufacturers is difficult. It was highlighted that SQRs should be framed in a comprehensive and holistic manner and there should be no change necessary in the SQRs once they have been framed. RFPs should be formulated with due care and diligence in consultation with all concerned. There should be no change in the terms or specifications of the RFP after its issue. RFPs should progressively include integrated logistics and maintenance programs for as extended a period as practically possible. The need to strengthen financial scrutiny of procurement proposals at each stage of the procurement process so as to obviate the possibility of observations at later stages when remedial action may be difficult was also highlighted. The need to reinforce the acquisition wing by personnel possessing the requisite skills and knowledge for benchmarking, cost analysis and financial analysis also emerged. Clearly, the ultimate goal should be for establishing a separate professional organization that would deal with all defence procurements in a holistic manner.

We received a very generous feedback from the participants and their suggestions have been forwarded to the MoD. One of the suggestions was for a copy of the presentations and papers presented. I had also mentioned in my address in the inaugural session that we propose to bring out the seminar proceedings including various papers contributed by the authors in the form of an edited volume. This volume contains the edited papers presented as well as papers contributed for the seminar.

Our hope that the MoD would consider seriously the need for establishing a dedicated acquisition institute with necessary specialisations for the lasting benefit of all the stakeholders and practitioners in this vital area of work appears to be on course and MoD had tasked the IDSA to prepare a feasibility cum detailed project report in this behalf. This work has since been completed.

We, at the IDSA, hope to carry this initiative further and the large Indian defence acquisition community would welcome similar initiatives to be undertaken on a sustained basis.

**VK Misra**

Former Secretary, Defence (Finance),  
Ministry of Defence, Government of India &  
Distinguished Fellow, IDSA

## Keynote Address\*

At the outset, before I share my views on the crucial issue of defence acquisition, I wish to welcome our foreign guests and hope you all have a pleasant stay in this country. Over the next three days, this distinguished gathering of the strategic community will discuss threadbare, various issues related to defence acquisition.

The Institute for Defence Studies and Analyses seeks to study and analyse the core concerns in the realms of diplomacy, defence, security and other related fields. Over the years, IDSA has been catering to the specialized needs of each of the Defence Services by providing inputs to policy planners in the realm of security. Given the complex range of the vital issues pertaining to national security and defence, it is important that think tanks like IDSA record and interpret events taking place all over the world, particularly in the realms of geopolitics, economy, security and diplomacy.

India has always been a votary of peace and advocated peaceful relations with all nations. We need to ensure optimum deterrence to fully safeguard the sovereignty and territorial integrity of the nation. Peace and security goes hand-in-hand with social and economic progress and depend upon one another.

Today, the nature of warfare has shifted and challenges range from asymmetric threats, terrorism, internal disturbances, as well as conventional warfare in a nuclear backdrop. On our part, we need to develop the latest strategic and conventional capabilities. However, in our enthusiasm to modernize and upgrade our security infrastructure, we must not allow our defence acquisition procedures to be manipulated, or corrupted. Our primary objective must be to stay competitive and yet remain cost efficient, as well as technologically and strategically reliable. For this to happen, defence industrialization will have to be accelerated.

We can realise our full potential in defence R&D only by achieving far greater synergy between the DRDO, defence PSUs, the Ordnance Factories, the private sector, academia and research-based institutions in the country. We must adopt the best R&D practices and strive to make our defence R&D establishments rank amongst the best in the world.

We would like the private sector to play a bigger role—in collaboration with the public sector. There is a lot of space for the private and the public

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\*Adapted from the Keynote Address delivered by Hon'ble Defence Minister, Sh AK Antony at the International Seminar on Defence Acquisition, Institute for Defence Studies and Analyses, New Delhi, (July 12, 2011)



sector to coexist. There is also a lot of scope in the defence sector in various spheres—infrastructural development, logistics, training, simulation and exports. The defence could also provide enormous scope for Indian businesses and industries in spheres such as infrastructural development, exports and for becoming an important constituent of the global defence supply chain. Joint ventures and technical collaborations would help the Indian defence industry to strive for greater excellence in defence R&D, design, engineering and manufacturing.

The objective behind our defence procurement policy is to provide a strong procedural framework for handling acquisitions. However, a few concerns remain. Cutting down on costs without compromising on quality continues to be one of the key challenges. Reducing the time frame for technical and user evaluations and effective project management in the implementation phase are other areas of concern.

With the latest defence production policy, we want to strengthen the defence industrial base—both in the public and private sectors. The offset policy has far more potential than has been hitherto tapped. Offsets need a far greater thrust to enhance R&D and logistic capabilities, as well as defence infrastructure. We need to clearly identify and define our priorities in defence technologies and manufacturing capabilities.

We want to achieve maximum synergy between our Armed Forces, Defence Public Sector Undertakings, OFBs, Indian industry and research & development institutions. For this to happen, we must encourage innovation and entrepreneurship. Our public and private sector entities must be cautious while exploring strategic acquisition of a strong defence R&D or manufacturing entities from other countries to strengthen our own defence industrialization process.

All the participants of our defence industry must strive to provide a long term thrust to boost the defence exports. At the same time, we must continue to nurture friendly, reliable, stable and long-term relationships with all our suppliers within the country and abroad. All this requires the highest degree of professionalism, transparency, accountability and a deep sense of commitment towards the defence sector and our country.

I am sure that this seminar will be marked by the highest quality of deliberations. The experiences and expertise of speakers from several countries will provide a unique insight into the different facets of decision-making in defence acquisitions. This seminar will succeed in its objective, if it can throw up fresh ideas in attracting the best international practices prevalent and accelerate defence industrialization and capacity development. We are not averse to making changes in our acquisition policy, without compromising with our strategic and security interests and the principles of transparency, accountability and fairness in all procedures.

I would like to congratulate the IDSA for organizing this seminar on an issue central to our Armed Forces and the Ministry of Defence. I am confident that the deliberations will provide quality interaction and inputs to the representatives from India and other participating countries. I wish the seminar to be stimulating and provide fruitful deliberations.

## Acknowledgements

This book is the result of the three-day international seminar on defence acquisition held in IDSA on July 12-14, 2011. The volume tries to contribute to the scarce literature on defence acquisition and we hope the international best practices discussed in the book are taken note of by the policy makers, and benefit the understanding of the broader strategic community.

Our gratitude goes to the Indian Ministry of Defence, Armed Forces and other defence establishments for their wholeheartedly support in organising the event.

We sincerely thank Dr Arvind Gupta, DG, IDSA for his constant encouragement and providing all necessary support in publishing this volume. We also thank Mr NS Sisodia, former DG, IDSA for his able leadership in organising the event.

We are greatly indebted to Mr VK Misra, former Secretary, Defence (Finance), Ministry of Defence and Distinguished Fellow, IDSA, for his able leadership that pushed us against all odds in organising the seminar and bringing out this volume.

We warmly appreciate the support rendered by the Brig (retd.) Rumel Dahiya, DDG, IDSA and Wg Cdr Hemlata Lohani, Assistant Director, IDSA.

We thank all the contributors of this volume and appreciate their timely revision of the chapters presented/circulated in the seminar.

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**Laxman Kumar Behera**  
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# Introduction

Defence acquisition is a complex task, involving expertise in military, technology, industry, contract/project management, and policy-making. Besides, it involves a significant amount of national resources running into billions of dollars. Efficiency in acquisition not only leads to higher defence preparedness but also provides value for money, impetus to industrial competitiveness and other economic benefits. With this in view many advanced countries, such as the US, UK and France, among others, have undertaken reforms in their defence acquisition structures and procedures. Although reforms in these countries have taken different form, some countries like the UK and France have moved towards an integrated acquisition structure, with relevant expertise under one roof and under one controlling authority, to oversee the entire process of acquisition, right from the planning process to the final disposal of the weapon/platform.

In India, the Ministry of Defence (MoD) has taken a series of reform measures, with the Defence Procurement Organisation in place since 2001. The Defence Procurement Procedure (DPP), which sets out detailed rules and procedures for capital acquisition, is revised at regular interval in a move to streamline the acquisition process. The DPP 2011, which is in vogue since January 2011, lays added emphasis on speedy acquisition and transparency and probity in defence procurement. The reform measures notwithstanding, there have been some problems affecting the modernisation process of the armed forces. One indication of lack of expeditious procurement is the recurring underutilisation of resources earmarked under the capital budget. As the defence budget for 2009-10 reveals, nearly 15 per cent of previous year's capital budget (Rs. 480 billion) remained underutilised at the stage of revised estimate. This together with an upward moving trend in the surrender of funds, observed in past few years, reveals certain inadequacies in the capital acquisition system that needs to be addressed to ensure that the armed forces are fully prepared.

With a view to examine the best practices followed by key countries in defence acquisition matters, the Institute for Defence Studies and Analysis organised the International Seminar on Defence Acquisition in July 2011. Functionaries from the MoD, armed forces, the industry and academic experts were invited for a three day long deliberations on a range of issues. This book is a compendium of papers presented and circulated in the seminar. It contains 29 chapters organised in nine key themes: technical requirement and capability

definition; technical and commercial evaluation challenges; optimal procedural framework; contract implementation and project management; logistics management; offsets; defence industrial and R&D base; oversight, organisational structure and Human Resource Development issues in defence acquisition.

### **Chapter 1: Categorisation Options: User's Dilemma**

*by AK Nagalia*

The author deals with the Service Headquarters' (SHQs) dilemma in the choice of categorisation options. Nagalia argues that the key dilemma faced by service headquarters, is the category to be recommended when forwarding an acquisition proposal. He also argues that the present policies have resulted in the order of preference for 'Buy' under Inter Governmental Agreement (IGA), followed by 'Buy & Make', 'Buy & Make (Indian)' and 'Make'. This has led to an import dependency of 70 per cent. To reverse the present situation in favour of 70 per cent procurement from indigenous sources, the order of preference needs to be reversed. For this to happen, Nagalia recommends a number of policy options, including the identification of Raksha Udyog Ratnas (RURs) or champions in the private sector, which could be organised into Tiers I, II & III, and given responsibility to take up various defence development and production projects depending upon their capabilities and areas of specialisation. He also recommends that there has to be a better accountability for time bound procurement and that a dedicated offset management body should be set up with the MoD. For expeditious procurement and resolution of complaints, free from undue hassles he suggests the creation of an Ombudsman or a regulatory authority directly under the Defence Minister.

### **Chapter 2: Challenges of Commercial Evaluation**

*by Harish Masand*

The author accounts his personal experience in dealing with the challenges in defence acquisition. The author convey how, for a country like India, which relies heavily on defence imports, it is extremely difficult to assess the true cost of such equipments given lack of reliable information and unwillingness of the Original Equipment Manufactures (OEMs) to provide the cost elements. In such situations, he suggests, research is the only answer. Historical data available with various domestic organisations such as SHQs, production agencies, the Defence Research and Development Organisation (DRDO) etc. needs to be accessed to arrive at a benchmark price. In addition, efforts need to be made to obtain itemised cost data including direct and indirect cost from the equipment suppliers. He cautions that there is no set formula for arriving at a reasonable price. Time, effort and experience needs to be invested to arrive at reasonable price, which may not necessarily be lowest. Masand reasons that successful negotiation and contracting requires thorough professional knowledge, cultural understanding of the suppliers and adequate preparation.

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### **Chapter 3: Cost Estimation for Determining Reasonable Price in Capital Acquisitions: MoD Experience**

*by Rajnish Kumar*

The author deals with the Indian MoD's experience in cost estimation for establishing fair and reasonable price in defence capital acquisitions. He mentions how India's present method of determining price has so far been based on a price-based acquisition approach (where the contract negotiating committee rely primarily on the quotes supplied by the vendors) and prior costing of proposals based on past purchases and annual escalation. However, this method is not scientific and there could be difference in perception between the buyer and the supplier in regard to what is a reasonable price. Drawing heavily from the best commercial and international practices, Kumar provides a model comprising of four estimating techniques—analogy, engineering, parametric and market intelligence—which could be used for benchmarking estimates for defence acquisition. However, Kumar cautions that these techniques are not exclusive. He argues that given the complexity involved in defence capital acquisitions, it is always better that all these techniques be used in combination with each other for arriving at a most optimal and reasonable cost for benchmarking purposes.

### **Chapter 4: Towards an Optimal Procedural Framework: The Indian Experience**

*by R.K. Ghose*

The paper begins by highlighting the uniqueness of the defence acquisition process adopted in India, i.e. procurement of items from a variety of suppliers and that the procurement framework has to be in consonance with the institutional framework that either exists or can be established. The paper discusses the various stages prescribed in the DPP and elaborates on the existing procedure, practices and their adequacies and the need for improvement. The paper recommends that an optimal procedural framework under the present dispensation should be framed in a comprehensive and holistic manner by Service Headquarters. Furthermore, there should be no change necessary in the SQRs once they have been framed and categorisation decisions should not be re-opened again at subsequent stages unless there are prima facie indications of important issues being overlooked or of serious omissions and commissions. It advises due care, diligence and consultation with all stake-holders in drafting of RFPs and there should be no change in the terms or specifications of the RFP after its issue. It suggests strengthening of financial scrutiny of procurement proposals at each stage of the procurement process and also a reinforcement of the acquisition wing by personnel possessing the requisite skills and knowledge for benchmarking, cost analysis and financial analysis. The paper concludes with suggestion of establishing a separate professional organisation that would deal with all defence procurements in a holistic manner. It could cover both revenue as well as capital procurements, which would also eliminate the present



disconnect between the initial capital procurement and the subsequent revenue procurements.

## **Chapter 5: Fine-Tuning Procedural Framework to Achieve Balance in Defence Acquisitions**

*by Alina Arora*

As with any large institutional process, the procurement of defence equipment suffers the vice of an occasional divorce between policy that the government intends to follow and the procedure that has been prescribed for implementation. The paper seeks to identify such areas where the procedure currently prescribed has been found either inadequate or lacking in addressing the issues faced by the parties involved in the procurement process. While the paper makes no claims of having exhaustively identified the procedural issues, it seeks to highlight some of the glaring issues that parties and practitioners in this fledgling field face at various stages of bidding for defence contracts such as the deficiency of a formalised bid-protest mechanism for military procurement, absence of guidelines for rectifications of bids, issues with agency provisions, etc. Additionally, the analysis goes beyond the confines of the Defence Procurement Procedure 2011 and government contracting to delve upon issues that parties face under various other laws while operationalising the contract in India. In highlighting the issues and in attempting to provide solutions, the paper cites systems in various other jurisdictions in recommending the best practices in India.

## **Chapter 6: Defence Acquisition: Indian Army's Perspective**

*by Viney Handa*

The paper describes the present state of the Indian Army (IA) as transformation, which demands capability development through acquisition of a wide range of armaments, weapon systems and platforms including electronic warfare and command and control infrastructure. It identifies the challenges in procurement and the series of steps that have been taken since 2001 including the setting up of an acquisition wing in the MoD and codifying the policy in the form of DPP. These well meaning changes have not addressed the problems and the acquisition process continues to result in delays and non-utilisation of allocated resources. The few success stories that can be credited to the current procedures are mainly the repeat procurements, which involve much lesser stages and a few high value procurements that have come about through inter-governmental deals. The paper then recommends areas for improvement in the procurement process and identifies; a changing process from being 'bottoms-up' driven by users to 'top driven'; the formulation of SQR needs to be handed over to technology experts and specialists; changes in the existing philosophy of field trials from "all terrain weapons" to "sector specific"; single to two stage trials, and from 'NCNC Trials' to reimbursing part/full cost of shipping/transportation to vendors who qualify in the 'preliminary' phase. The other major changes recommended are adoption of "Weighted Performance Evaluation Matrix",

integration of the defence acquisition wing, training of acquisition functionaries, harnessing of ICT capabilities and a host of measures to encourage participation of the private sector in defence R&D and the defence industrial base.

### **Chapter 7: Challenges of Defence Procurement: A User Perspective**

*by HS Jhaji and Aftab Khan*

The Naval HQs paper states that India's rapid progress in the economic front needs to be fully supported by a robust security environment, both internal and external, so that forces inimical to India do not derail the process of growth. It suggests that to effectively meet the challenges of ever expanding security conundrum, the Armed Forces need, at all times, to be operationally ready to deter the adversary, or defeat convincingly, should conflict be thrust upon India. It identifies the acquisition process as the single biggest catalyst (or impediment) enabling technologically-competent-battle-ready Armed Forces. The naval HQs appreciation is that despite putting in place a dedicated organisation for defence procurements and promulgating a comprehensive procurement procedure; reviewed almost annually, significant improvement on ground is yet to be felt. Large procurement delays still plague almost all major defence acquisitions. Recurring under-utilisation of the capital budget by the Ministry of Defence (MoD) in the past is a stark indicator of the state of affairs of 'defence acquisitions' in the country. This paper attempts through introspection to bring forward the way ahead for a responsive acquisition process and identify the areas where to undertake a holistic review, critically analyse the 'facilitators' and 'inhibitors' in each such area and suggest desirable reforms to make the process more efficient.

### **Chapter 8: Perspective of the Indian Air Force on Key Issues Of Defence Acquisition and the Reform Measures Needed to Expedite Defence Procurement**

*by SK Jha*

The Air Force paper brings out the harsh fact that the IAF today operates a lesser number of aircrafts than officially mandated and is also short of radars, sensors for surveillance and other critical equipment. It is in the process of a most comprehensive modernisation plan, to induct more fighters, transport, trainer aircrafts, helicopters, radars, accurate and advanced weapons, network centric warfare systems etc. to meet its assigned tasks. It identifies the deficiencies/drawbacks in the existing acquisition system namely the primacy of the procedures approach, the formulation of qualitative requirements, various levels of approval, the delays in grant of AON, rigidity in contract drafting, aversion to adoption of new concepts. It also identifies the organisational constraints viz. the organisation of the acquisition wing, staffing issues in the acquisition wing, and the approach to build diffusion in accountability. Lack of performance of Defence Public Sector Undertakings (DPSUs) & DRDO organisations are also identified as contributory factors. The paper then moves on to suggest remedial measures, namely grant of AON directly by DPB/DAC

after clearance by SCAPCC and creation of a separate integrated and professional acquisition organisation. It identifies the need for synergy and coordination between various wings of the MoD as essential to progress the different aspects of the induction. It calls for enhancement of delegated financial powers to service the HQs and flexibility in contract drafting as each contract has unique needs. It recommends adequate staffing, longer tenure and formal education about procurement procedures for personnel employed in the acquisition wing. It also recommends the provisions of an exit clause for DRDO/DPSU projects.

### **Chapter 9: A Critique of US Acquisition Process**

*by Terrence Elmendorf*

Elmendorf highlights some vital aspects of the U.S. Government's defence acquisition system. Elmendorf maintains that the US system provides flexibility, efficiency and affordability in the procurement of major defense systems and associated services. He maintains that these aspects are implemented into many key contracting terms and conditions that have resulted in the balancing of risk between the buyer and the seller. Elmendorf highlights that the rights of sellers are recognised in many areas such as limitation of liability, equitable price adjustments for contract changes, economic price adjustment and priced contract options. Elmendorf states that these policies have been adapted over time in a continual effort to provide best-value-for-money acquisition solutions to support US defence forces. He suggests that it may be equally beneficial for the Indian MoD to consider similar terms for incorporation in its acquisition policy framework.

### **Chapter 10: Complex Project Management in Defence**

*by Michael Christie*

The paper discusses key issues in the management of complex defence programmes in four parts. In the first part, he brings out the need for clarifying the programme's goal and purpose at the very onset of a programme and how the procurer and contractor should work together to ensure that the military goal is achieved. In the second part, Christie brings out the organisational and cultural issues in programme management. He argues that in managing complexity and ambiguity, there is a need for the managers to be equipped to deal with the former. He further contends that although this is a specialist skill set, a broader mix of skills is likely to be required including more conventional programme control skills and fundamental leadership skills. In the third part he brings out the issues of contracting mechanisms. He argues that since a contract, which is used to manage the programme has a significant effect on the behaviours of both procurer and contractor, it should be carefully considered and perhaps be subject to specific policy focus. Lastly, he discusses the control mechanisms where he strongly suggest the use of conventional techniques in addition to sophisticated project control tools for complex programme management.

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## **Chapter 11: Indian Experience in Contracting/ Post Contract Implementation and Project Management Challenges**

*by RK Arora*

The paper focuses on salient issues commonly noticed in ship-building, design and development, transfer of technology (ToT), civil works/hybrid projects, and information technology projects. The paper also discusses the important aspects that affect timely completion of projects within the sanctioned cost and scope of the project. These aspects include unrealistic qualitative requirements (QRs), poor cost estimation, contract management issues such as inordinate delay in conclusion of contract agreement, release of payments in anticipation/in excess of government sanction, significant additional financial liability post-government approval, complexities in integration of sub-systems with main platform, increase in profit/consultancy cost linked with project cost, inadequate infrastructure at shipyards, technological obsolescence and crash in prices associated with IT projects having long implementation period, etc.

The paper also dwells upon significant suggestions to improve the quality of project appraisal, monitoring and completion. These include realistic assessment of QRs, defining the scope of ToT and the extent of indigenisation envisaged in various phases, linking of payments to monitorable milestones and spending capacity of vendors, timely conclusion of contract agreement, regular monitoring of physical and financial progress by committees of stakeholders, capacity augmentation of shipyards, and training and capacity building. In addition, the paper also brings out a gist of salient features of the latest edition of Defence Procurement Procedure – 2011 issued by the Government of India.

## **Chapter 12: Logistics Management: The French Experience**

*by Alain Costes*

The paper at the outset states that the traditional approach for maintenance, based on purchasing of spare parts, stockpiling in central depots, delivering to bases and having maintenance of aircrafts on bases does not seem to work any longer. It shares the evolution of the French aeronautical maintenance system and identifies the constraints of lower defence budgets and increasing cost of complex aircrafts as the catalyst to initiate the process for change in France. The creation of SMMAND (Integrated Structure for Maintaining in Operational Condition the Aeronautical Material for Defence) in 2000 was the first major step. The paper identifies the other steps and highlights that the pressures for availability of spare parts and number of aircrafts in operational positions had forced explorations on new types of organisations and industrial contracts. The paper concludes that France has moved from the traditional contracts to stock availability: upkeep stock at a defined level (quantity of items), to fixed rate for maintenance operations; carrying out maintenance services in defined terms (repair duration, fixed rate price, time limits), to operational availability; ensure the ability of a fleet/system/subsystem, to be in a fit state to perform as required, under given conditions over a given interval and has now graduated to contracts

for capability; provide service operations whatever implemented resources are. The contractor is in charge of resources and ways to use them to fulfil service operations.

### **Chapter 13: Harnessing the ‘PPP’ Model in Defence Acquisition and Construction Works to be a Catalyst for Participation of the Private Sector**

*by Vinay Kaushal*

The paper focuses on the need of harnessing the ‘Public Private Partnership’ in defence acquisition and creation of infrastructure. The paper provides brief details about the increasing allocation in both the capital and revenue budget and the gaps in the infrastructure to support acquisition and its effect on the quality of life. The paper then brings out the limited share of the Indian private sector in defence acquisition, despite a decade of changes to encourage their participation. It provides the details of the role played by roping in the private sector investment in infrastructure and its impact on the growth of the economy. It briefly explains the PPP concept and provides details of how the “PPP” model has been used in other countries in various defence projects. It concludes that greater participation of the Indian industry in the defence sector is a must and recommends that MoD needs to harness ‘PPP’ to meet the twin objectives of defence acquisition and construction works, to be a catalyst for participation of the private sector and provide timely, high-quality infrastructure for the ‘state of the art weapon systems’ being inducted.

### **Chapter 14: Perspectives on Performance Based Logistics**

*by Shobhana Joshi*

The focus on the “availability” of a weapon system has reshaped logistics support and maintenance strategies particularly of complex platforms. Known as Power by the Hour or Performance-Based Logistics (PBL), it can deliver substantial performance improvements for both new and legacy systems over traditional “spares and repairs” sustainment models. The essence of PBL is buying performance outcomes, not the individual parts and repair actions. The paper analyzes the specific drivers for logistics transformation and the experience of countries like USA and UK, which have adopted PBL as a conscious policy of weapon sustainment. In the backdrop of the intent of PBL as a facilitator of public-private partnerships, the paper attempts to study the nature of sophisticated relationships, which would be needed for complex systems in the defence sector. It focuses on how to tailor the performance metrics to fit the operational role of the system, and the notion of what risk and cost sharing factors should be priced into the contract and the methodologies to design sustainable and competitively priced contracts that are fair to all parties. The paper finally examines how the experience of other countries can provide a template for India and the Indian Air Force in particular by suitably adapting the difference in defence industry environment and business practices. The paper finally concludes that even though some analysts have indicated the difficulty

in assessing PBL as a coherent strategy, the dominant view is that it creates a win-win situation for both the government and the defence industrial base.

## **Chapter 15: Review of International Offset Experience**

*by Thomas Mathew*

Despite the fact that economists are almost unanimous in their view that offsets are trade distorting and inefficient, more and more nations are ironically adopting the policy. This is evidence enough to conclude that nations find the policy dividend yielding. At the same time, there is no single strategy that is followed by nations. Nations accord differing priorities to the various components of the policy. The European nations in general impose more onerous conditions on seller nations and are able to wrench greater benefits from their offset policies. They do so by employing a repertoire of strategies including the imposition of higher levels of offsets, demanding coproduction, transfer of technology, and Research and Development (R&D), using multipliers to strengthen identified sectors, particularly, small and medium enterprises (SMEs) that are the building blocks of any capability. India too has an offset policy, but it is disjointed, unfocused and is at best a motley collection of obligations that sellers have to fulfil. But the aggregate of these obligations cannot lead to accomplish the larger goal of strengthening India's military-industrial complex. India's offset policy today lacks both the features that would make a successful policy and an ideal organisation to implement them. Consequently, sellers are having a joyride discharging their offset obligations. It is time for India to revisit its offsets policy and put in place a well-conceived policy and back it up with a credible organisational structure lest scarce resources are wasted in paying sellers more in the hope of achieving what the nation itself is found wanting in articulation.

## **Chapter 16: International Offset Experiences and Policy Prescription**

*by Kogila Balakrishnan*

The paper begins with the observation that offsets that was once a simple trade activity has transformed into a complex and sophisticated trade tool. Despite the increasing effort to reduce and subsequently eliminate offsets, particularly within Europe, evidence indicates that offset demand is on the surge around the globe, in one form or another. In times of economic turbulence and resource crunch, offsets are viewed as a catalyst to maximize returns for money spent, to create spin-offs and to balance the huge outflow of currency, especially in the defence sector. The question is as to how has the demand and supply in the offsets sphere changed to cope with the current shrinking defence market and increasing competition. How are the nations around the world able to cope with these changes and challenges? What are the suggested policy prescriptions to handle these situational demands in the current context? The paper discusses the international offset experiences, particularly since the late 2000 financial crisis. The paper also discusses the recent development in the offsets field and issues and challenges facing the offsets industry. The issues and challenges are

analysed through examples of offset experiences around the globe. Finally, the paper provides suggested policy prescription that could be considered to make offsets work better.

### **Chapter 17: Impact of India's Offset Policy on Military Industrial Capability and Self Reliance**

*by SN Misra*

The Ministry of Defence introduced an offset policy in the Defence Procurement Procedure 2005 for capital acquisition schemes exceeding \$66 million for bringing in foreign direct investment (FDI), joint venture (JV) arrangements, MRO capability and export promotion by leveraging its big ticket acquisitions. Till March 2011, 12 offset contracts had been concluded for around \$ 2.1 billion. An in-depth analysis of these contracts indicate that so far the offsets realised are for low end products and services, repair and overhaul facilities, training and simulators. The expected inflow in terms of long-term investment, JV arrangements, FDI and exports promotion have, however, not materialised. The major reasons seem to be inadequate incentive to the foreign investors because of the low FDI cap of 26 per cent, non-inclusion of technology transfer and multipliers in the ambit of offset policy. The paper suggests that to bolster India's military industrial capability there is a need to encourage joint venture arrangements in production with reputed Original Equipment Manufacturers (OEMs), joint technology development with major design houses and increase R&D investment. Increasing FDI cap to 50 per cent, technology transfer in preferred areas with multiplier and an empowered Defence Offset Facilitation Agency (DOFA) will facilitate the humungous opportunity for realising offset (around \$ 30 billion) during the 12th Plan.

### **Chapter 18: Explaining China's Improving Defence Industrial and Innovation Capabilities**

*by Tai Ming Cheung*

China has set its sights on joining the ranks of the world's advanced defence industries by the end of this decade to match its status as an emerging global economic and military power. A concerted drive has been taking place since the end of the 1990s to build a market-based and research-driven regime that would provide the discipline and competition required to nurture critical but neglected industrial and innovation capabilities. Reform measures included providing greater funding for research institutions, improving the integration of military and civilian technologies, far-reaching organisational changes to curb the authority and influence of a highly conservative defence industrial administrative apparatus, a revamping of loss-making defence conglomerates, and a more influential and direct role for the armed forces in the management of the defence research, development, and acquisition process. This has produced important gains in efficiency, profitability, and the development of more capable weapons. This paper will examine the key reforms and drivers behind the improving fortunes of the Chinese defence industry and address the question

of whether it has the organisational capacity, management expertise, risk-taking culture, and sufficient research talent to carry out sustainable long-term innovation.

### **Chapter 19: Self-Reliance Through Smart Acquisition**

*by Prahlada*

The paper analyses the perspectives of the various stakeholders in defence acquisition and highlights that how divergent policies, views and priorities of various stakeholders sometimes work at cross-purposes to the goal of self-reliance in defence acquisition. Furthermore, the difference between “acquisition” and “procurement” has been explained, highlighting the fact that what is happening today is more of “procurement” rather than “acquisition”, and thereby not driving self reliance at required speed. The paper makes a strong case for a “paradigm shift” in defence acquisition processes to move faster towards achieving the goal of self-reliance. The current focus of “Buy Global” has to make way for the “Make” category acquisition. The paper also explains some principles of “SMART Acquisition” and recommends that all stakeholders should come out of their respective silos, expand understanding, get-together, synchronise their own individual organisation’s policies, priorities and perceptions with those of the other stakeholders and also apply the principles of “SMART Acquisition” to work synergistically to achieve the national goal of “self-reliance” in the defence. The paper finally examines the inter linkages which need to be strengthened to bring synergy among the various stakeholders. Relevance to the Kelkar Committee recommendations and their status of implementation has been studied in the paper.

### **Chapter 20: Indian Ordnance Factories: An Agenda for Change**

*by Anuradha Prasad*

The paper makes out a case for restructuring of the Indian Ordnance Factories Organisation against a backdrop of increasing budgetary allocations for defence acquisition and a supportive policy framework with emphasis on self-reliance. The Indian Ordnance Factories (OFs) are the oldest and largest industrial set-up for the manufacture of defence hardware in India. Prasad argues that despite more than 200 years of experience and strengths such as a large asset base and skilled manpower, the OFs are constrained by weaknesses that prevent the organisation from realising its full potential and increasing its market share. While highlighting the areas of concern that have undermined the organisation’s competitiveness, an illustrative comparison has been made between the Vehicle Factory Jabalpur and Ashok Leyland (a private sector manufacturer), to highlight the low productivity of OFs. In regard to the way forward, Prasad contends that a phased reform may be more doable than a complete corporatisation. Towards this end, she recommends divestment of factories producing low technology dual use items along with a continuation of those producing weapons, ammunition and other high technology core ordnance items within the Government fold but to operate on commercial principles. To facilitate



commercial functioning Prasad suggests the creation of a marketing and export corporation.

## **Chapter 21: Defence Acquisition: A Shipyard Perspective**

*by PR Raghunath*

The initiative for indigenous construction of warships, which started with the acquisition of defence shipyards in 1960 has fructified into a well-established process of designing and building a wide variety of platforms. There are not many countries in the world which can claim to have comparable capability to produce such a wide variety of warships, starting from fast attack crafts to patrol vessels, missile boats, landing ships, cadet training ships, tankers, frigates, destroyers, submarines and finally even the aircraft carrier. The Indian Navy has long prided itself to be a builder's Navy. To this end, Mazagon Dock Limited (MDL) as the lead shipyard has been the backbone of the indigenous warship building and has provided the muscle through production of sophisticated world class stealth frigates, destroyers and submarines for the Indian Navy. Warships, being a high technology platform involving multidisciplinary activity, require a sound acquisition program to keep pace with the changing and challenging demands. A robust acquisition process therefore needs to factor-in the shipyard's inherent strengths and also address areas of weakness. This paper attempts to evaluate the extant acquisition process from the perspective of the shipyard and suggest a few avenues for improving the process for the benefit of the nation. The need of the hour is to deliver a succession of reforms to our acquisition process that will ensure cost optimisation, contain time slippages and at the same time taking a holistic, 'through life' approach to providing the required force capability.

## **Chapter 22: FDI in Indian Defence Industry**

*by Laxman Kumar Behera*

Since 2001, India has allowed foreign direct investment (FDI) up to 26 per cent in its defence industry. The policy has, however, not been so successful in bringing in any meaningful financial or technological inflows, primarily because of lack of incentivisation of the policy to the foreign investors. Although suggestions have been made in various quarters to increase the existing cap, there has been no consensus with regard to its precise limit. The chapter argues that keeping in view India's underdeveloped R&D and production base, and various defence industry-related policies and provisions whose success are contingent upon liberal flow of FDI, an increase in the foreign investment cap up to 100 per cent would be logical, instead of adopting a fixed cap-based method, which may be constrained in allowing some desirable inflows. However, given the sensitivity attached to defence-related FDI, the author contends that each of the investments should be subject to wider review and impact analysis, and a FDI percentage could be assigned based on the results of review / analysis, which may vary from zero to 100 per cent. The author also argues that an increase in the FDI cap alone is not sufficient to revitalise the

domestic defence industry and recommends various reform measures that India's Defence Ministry needs to act upon simultaneously.

### **Chapter 23: Transparency and Oversight in UK Defence Acquisition**

*by Tim Banfield*

The paper initially explains the role of NAO to provide independent information, assurance and advice to the Parliament on the use of public resources and to help promote better financial management and value for money. The paper elaborates on the aim of the NAO to apply the unique perspective of public audit to help the Parliament and the Government drive lasting improvement in public services. The paper then provides details about the organisational structure and the work they do. The paper thereafter elaborates on the 'value for money audit' (VFM). The paper gives details with specific reference to the MoD and their attempt to support parliamentary accountability and transparency and build political and public consensus for reform of the core business processes of the ministry through their work, and encourage change change. NAO also supports senior management when they are behaving in a positive way, consistent with value for money and reduce the perception of the NAO as a threat. The paper explains the focus of their defence work as getting at the causes and not the symptoms. The paper provides details of the reports that are rendered and as part of the reports; NAO validates and provides commentary on the data produced by the MoD. The paper also brings out that NAO also evaluates their MoD's performance as compared to others in terms of project control and successful projects.

### **Chapter 24: The Indian Defence Acquisition System: Improving Oversight and the System**

*by K Subramaniam*

As oversight plays an important role in helping the management attain value for money in defence acquisitions, there is a need for the oversight regime to act more as a positive reinforcement in improving the organisation, systems, procedures and policies. This would require the adoption of a balanced and risk based approach by the oversight authorities—balancing the cost and benefits of oversight with the risks involved. Oversight engagements should be sensitive to management needs and based on an appreciation of the overall context in which managerial decisions are made. There is a need for shifting from a mere "procedural irregularity focussed" approach to a "value for money" oriented approach. If oversight is to make value addition to the governance process, its outcomes should be taken to logical conclusions by ensuring that appropriate corrective action is taken by the executive.

Subramaniam contends that the defence acquisition system in India is fraught with sever delays and inefficiency. The system is not geared to assure value for money or to ensure that the right quality of weapon systems and capabilities are inducted. These problems can only be overcome by reconfiguring the acquisition organisation, the systems and the processes, so as to make them

more professional, scientific and objective, based on modern principles of project and supply chain management. Besides, there is a need to bring in an integrated acquisition organisation, which can be made responsible for the key functional areas, namely formulation of QRs, technical evaluation, vendor development and costing. The officers manning the acquisition should be trained in project and procurement management to make them acquisition managers in the real sense. Drastic changes in the defence acquisition regime are further necessitated by the increased emphasis on indigenous development and production of defence systems. Hence, the Indian defence industry in the private sector needs to be promoted in a big way to realise its potential. Mere tinkering with procedures which has been happening for a decade will not solve the problem.

### **Chapter 25: Defence Acquisition Systems: A Look at Selected Nations**

*by Mrinal Suman*

Although all countries follow different procedures to procure new weaponry and equipment for their armed forces, their primary objectives remain the same—equipment must meet performance criteria as specified by the armed forces, should be delivered in time and should cost the least. The United States is the most technologically advanced super power with a huge defence budget and it has an elaborate acquisition regime in place. It is characterised by centralised policies and principles and decentralised and streamlined execution of acquisition activities. Germany is a key military player of Europe and considers strategic partnership between the armed forces and trade and industry indispensable for maintaining modern and efficient armed forces. The industry is respected for its high speed of innovation and considerable work is outsourced to it. France has a unique model wherein all acquisition related functions have been assigned to a single centralised agency. The French system is characterised by the extraordinary technical competence of the acquisition staff. Finally, the British defence procurement regime is characterised by continuous reforms to improve acquisition performance through creating a more agile acquisition organisation system and managing capability through life. Despite above divergence of approaches, all successful acquisition systems are characterised by early incorporation of industry; unambiguous delegation of authority; highly qualified acquisition staff, and innovative cost controls. India will do well to take cognizance of these common factors to evolve a system that suits it the best. However, it will be inadvisable to attempt replication of any foreign model.

### **Chapter 26: Organisational Structure and Procedural Framework for Defence Acquisition in Brazil: The Challenge of Technology Transfer**

*by William de Sousa Moreira*

In a complex and changing world, the preparation and maintenance of the armed forces military equipment are great challenges. The institutions and leadership involved must optimize the part of the national expenditure allocated to the defence budget. Special interests, the power of the actors in the acquisition process and the vast amount of funds involved turns the decision-making

process into a political agenda, with high profile repercussions. For this reason, procurement of defence products requires an appropriate organisational structure, military knowledge, specific expertise, careful planning and appropriate methodology as it takes place in an environment marked by uncertainties. Uncertainties inherent in the decision making process are related to the technological options, choices of suppliers, the consistency in budgetary allocations, the capacity to absorb and maintain knowledge of new technologies, and the ability to meet the operational and the interoperability requirements, among others. This paper will explore the main issues related to the changing Brazilian organisational structure and procedures for defence acquisition, and the main reasons that are leading the process towards one, which is more integrated and centralised. Also, this work will approach a discussion on the challenge of technology transfer, a major requirement for all future defence acquisitions.

## **Chapter 27: Capacity Building for Defence Technology Acquisition and Oversight**

*by Ravinder Pal Singh*

The paper examines the assumption that advances in military effectiveness are chiefly driven by advancements in science and technology (S&T), which may increase the effectiveness factor by manifold. To what extent may military security threats to India balance its arms acquisition strategy with building up of advanced technologies in national S&T and defence sectors? At the minimum, India's leaders have yet to come up with a comprehensive advanced technology development strategy, which includes: an integrated long term plan for key technologies development, and a dedicated agency to develop India's advanced engineering and S&T enterprise to compete with world class standards. It is evident from India's continuing dependency on arms imports, that effectiveness of India's major weapons systems is not sustainable without building competitive national R&D capacities in advanced technologies. As weapons technology innovation requires a creative interface between the users and weapons development engineers, the armed forces have to be led by technology savvy combat leaders who can innovate and exploit emerging S&T for building sophisticated systems to meet the challenges of the battlefields of the future. This capability is feasible only if their academic training is grounded in advanced engineering disciplines. Instead of an arms acquisition approach, India's planners have to develop technology capability building approach. And for leveraging emerging technologies, Indian military leader's education has to grow out of prevailing minimal user concept to technology intensive maximal user concept.

## **Chapter 28: Defense Acquisition Workforce Management in the United States**

*by Greg Beckham*

The Defense Acquisition Workforce (DAW) in the United States is managed in accordance with US law. The Defense Acquisition Workforce Improvement Act

(DAWIA) created the legal foundation for central management, planning, and development of the DAW. The DAWIA also established the Defense Acquisition University (DAU) that provides approved training to the DAW. After nearly 20 years, the DAWIA has proven very important in developing and maintaining a well qualified, professional acquisition workforce in the U.S. Department of Defense (DoD). This paper discusses details of DAW management since the time the DAWIA went into effect.

Some specific areas of discussion in the paper are as follows:

- Career Fields have been established under the DAWIA for 13 workforce categories. Each Career Field has certification requirements necessary to achieve recognition at Levels I-III.
- Training is one element of the requirement and it is DAU, in conjunction with senior Career Field subject matter experts, that develops the course material to meet the DAW trainings needs.
- Competencies necessary for effective job performance underpin all training courses.
- There is a two-tiered management structure in the DoD for dealing with the DAW; one at the oversight level, and one at the execution level.
- Training for the DAW uses three different formats: Continuous Learning, Distance Learning, and Residence Courses.

## **Chapter 29: Best Practices in U.S. Defence Procurement**

*by Richard P. Rector and Dionis M. Gauvin*

The paper begins by outlining the complexities of defence acquisition and acknowledging that no country has so far perfected the same. It highlights the need for a single set of Government-wide procurement laws, which were formulated in the US in 1984, and gives an overview of the Federal Acquisition Regulation (“FAR”) and Department of Defense FAR Supplement (“DFARS”). It then addresses the importance of the acquisition organisations located within each major defence service and the need for well-trained acquisition professionals within these organisations. The paper thereafter focuses on competition as a cornerstone of the US acquisition system and a critical tool for achieving the best possible return on investment for taxpayers. It describes three common methods used to acquire goods and services: (i) sealed bidding, (ii) orders under Indefinite Delivery, Indefinite-Quantity (“IDIQ”) contracts, and (iii) negotiated procurement. It provides detail on the process for negotiated procurements, where the award is made to the responsible offeror that provides the “best value” to the Government in accordance with technical, costs, and other factors set forth in the tender. The paper then focuses on methods used to achieve transparency of the procurement process, including a debriefing of bidders and a forum for challenging procurement decisions. The goal of transparency is for unsuccessful offerors to have clear visibility of why they lost the procurement and whether the award decision was consistent with procurement law and the terms of the tender. The paper notes that the US system for challenging procurements has recently been reviewed by the US Government Accountability Office and was determined to be worth the costs associated with such a system.

# Categorisation Options: User's Dilemma

*A.K. Nagalia*

## **Introduction**

The defence procurement procedure (DPP) requires a capital acquisition proposal/scheme to be processed under one of the five defined categories. The acquisition proposal is initiated by individual Service Headquarters (SHQ) and forwarded to HQ IDS. Simultaneously, copies of it are forwarded to Administrative, Finance, Defence Production and R&D wings of the Ministry of Defence. After parallel examination of the case, a meeting is convened of the Services Capital Acquisition Plan Categorisation Committee (SCAPCC). All the stake-holders are invited to this meeting and necessary clarifications are provided by the concerned SHQ regarding various aspects of quantitative and qualitative requirements, commonality and interoperability and recommended categories of the scheme. All the views are recorded and the case is presented to the higher categorisation committee (SCAPCHC) for acquiring acceptance of necessity (AON), having the final category of cases falling within the delegated powers of SHQs and to make final recommendations for approval by the Defence Procurement Board (DPB) or Defence Acquisition Council (DAC), as applicable, for cases with higher cash outlays<sup>1</sup>.

At the time of forwarding any acquisition proposal to the MOD, SHQs are faced with the dilemma of recommending a category for the scheme which would ensure that the required defence capability would be acquired without any compromises and within the desired time frame. The paper endeavours to cover various categorisation options and the user's dilemma/considerations at the SHQ for recommending categories for various capital acquisition schemes. In this paper, the author has given examples of mainly Air Force related projects based on his personal experience. The experiences of the other two services are expected to be similar.

## **Indigenous vs. Imported**

First of all I would like to dispel a popular myth that SHQs want only imported top of the line weapon systems. Having spent better part of my service career in various IAF Establishments and Directorates at Air HQ connected with capital acquisition, flight testing and evaluation, I can categorically state that reality is far from it. SHQs are fully conscious of the axiom that; “No nation can achieve great power status on bought out weapon systems and second hand military technology”. They are also fully aware of the perils of imported weapon systems. The buyer may have all the money but he cannot decide what technology he will get, rather, it is the seller who decides what technology to release. In the cold war era, buyer’s “Block” affiliation and geo-strategic considerations invariably decided the level of technology to be released to him. For a non-aligned nation like India, more often than not, technology verging on obsolescence was released. The cutting edge technologies were reserved by the Super Powers for themselves or their close allies. After 1962 war with China, India was promised large military aid by the US. However, when it came to specific equipment, the buyer had no say. India wanted to buy F 104s but they decided to release only F 100s, whereas F 104s had been given to the next door neighbour, Pakistan. That is what appears to have prompted India to seek the MiG 21s and the follow on weapon systems from the former Soviet Union. Even when state of the art technology is offered, it may come with unacceptable strings attached, in terms of foreign or domestic policy dictates. Many times, the seller puts severe restrictions on the usage of weapon system itself. Not only that many countries also have very intrusive end use monitoring regimes, which may not be acceptable to the buyer.

India has one of the most varied and demanding operating environment comprising highly corrosive, saline and humid atmosphere of coastal areas, extremely high temperatures in the western sector, high mountainous terrain in the north and dense tropical forests in the east. Similarly, India’s population is varied in terms of ‘body measurements’. Thus the weapon systems need to operate over a very wide range of climatic and topographical conditions as well as ergonomically adjustable for a very wide range of the Indian population percentile. However, the bought-out equipment is optimised for the operating environment and population percentile prevailing in the country of origin, which may be quite sub-optimal for our operating conditions. The buyer is also vulnerable to sanctions and denial regimes, if he performs any act, which is perceived against the interests of the seller. Indian readers would readily recall the embargo on sale of military equipment including spares imposed on India by some western countries in the wake of the 1965 and 1971 wars and also various kinds of sanctions imposed in the wake of 1974 and 1998 nuclear tests. Economic woes of the western world and intense competition in the global arms market may have reduced the chances of recurrence of such measures, but they do have an important lesson for us.

Apart from the above contingencies, the buyer of an imported weapon system is fully dependent on the foreign OEM for the entire technical life of the

weapon system for various activities like logistic support, major repairs and overhaul, obsolescence management and design support for flight safety related issues. He must also rely on the OEM for periodic upgrades, which are vital for sustaining the required capability at the desired level of readiness and operational relevance under changed threat environment. In fact, once a weapon system has been imported, the buyer becomes a captive customer of the foreign OEM for the entire technical life of the weapon system. The OEM can demand any price and the buyer has to pay if he wishes to use the bought out system. Even then the Foreign OEMs are reluctant to commit to lifelong Performance Based Logistic (PBL) support. Thus serviceability level or combat readiness of the bought out fleet can never be taken for granted and will depend on the goodwill of the seller.

### **Imperatives for Timely Acquisitions**

Indian Armed Forces have the onerous responsibility to defend the territorial integrity and sovereignty of the country, which is located in perhaps the most hostile neighbourhood. India is faced with two nuclear-armed neighbours who continue to occupy large tracts of her territory. In a little over six decades of independence, India had to fight three major and one minor war with Pakistan and one major war with China. Innumerable rounds of talks have been held with both the neighbours but the boundary disputes remain unresolved. Some of them are even providing covert support to terrorism and insurgency in India. Cross border terrorism appears to have become a foreign policy tool for one of them, which the revelations in wake of 26/11 attacks in Mumbai bear testimony of. On the maritime front, India has to protect a large coast line and its vast Exclusive Economic Zone (EEZ). India's import dependence for energy resources and other raw materials and imperatives of global trade are vulnerable to hostile interferences and require that the sea lanes of communication be kept free from interference as they pass through piracy infested areas.

India has a very large Diaspora, spread across the globe. As recent events in the Middle East have shown, India will have to come to their aid in case of any trouble sparking off in the countries of their residence. Besides these, there are many other national interests for which the armed forces are required to be ready to act at a very short notice. These responsibilities demand that the Indian Armed Forces maintain a very high level of all round military preparedness to meet any eventuality at a very short notice. However, our archaic bureaucratic procedures have proved unequal to the task, leading to large scale obsolescence and deficiencies in force levels. Faced with this reality, SHQs can certainly not be faulted for wanting timely acquisition of capabilities which would match up to the weapon systems already in the inventory of the potential adversaries. It is with this back-drop that one needs to look at the user's dilemma in recommending categories for various acquisition schemes.



## Categorisation Options

DPP 2011 permits categorisation of an acquisition scheme under the following five categories:

- (a) **Buy**
  - (i) *Buy Indian*. Outright purchase from Indian vendors only. Hence RFP is issued to only the Indian vendors. With the current state of the Indian defence industry, a large amount of common user items fall in this category. However, in case the system is being integrated by an Indian vendor, the indigenous content must be at least 30 per cent.
  - (ii) *Buy Global*. Outright purchase from global vendors (Including Indian vendors).
- (b) **Make**. For systems to be designed, developed and produced in India
  - (i) *Strategic/Complex and Security Sensitive Systems*: These are required to be funded and managed by DRDO, using DRDO procedures with oversight by the Defence R&D Board.
  - (ii) *High Technology Complex Systems*: These are permitted to be undertaken by Defence Public Sector Undertakings (DPSUs)/ Ordnance Factory Board (OFB)/Raksha Udyog Ratnas (RURs)/ Indian Industry consortia on a level playing field and shared development cost basis.
- (c) **Buy and Make**. For out right purchase from a foreign vendor of limited quantity, followed by licensed production in India.
- (d) **Buy and Make (Indian)**. For procurements from Indian vendors or Indian joint venture with companies having production arrangements with the foreign Original Equipment Manufacturer (OEM) by licensed production. Such systems must have at least 50 per cent indigenous content on cost basis.
- (e) **Under Inter Government Agreement**. Para 71 of DPP 2011 provides for procurements from friendly foreign countries. These would not follow the standard procurement procedure but a mutually agreed one between the two countries.

## User's Dilemma

'Buy'. Once the RFP is issued, SHQs are reasonably sure of getting the desired capability in approximately two to three years. However, there are some problem areas which SHQs need to take into account before recommending this category. Buy Global recommendation invites most intense scrutiny at all stages. At the AON stage, detailed justification needs to be given for the quantities required as well as the qualitative requirements of not only the main equipment but also of the support systems, infrastructure and training requirements, etc. During the Categorisation Committee meetings, R&D representative resist this category and want the system to be developed indigenously. The DPSUs, on the other hand, want to supply it themselves, as Indian integrators of the system by

aligning with one of the global majors. If the scheme passes unscathed, all the problems given under the perils of bought out weapon systems still remain, including the release of the required technologies by the OEM's parent countries. There is also an apprehension of single vendor situation developing during the procurement process, which may require reissue of RFP<sup>2</sup>. Even after crossing these hurdles, any complaint from an unsuccessful bidder or any other party can cause serious delays in the procurement time frame. Once that happens, no one in the MOD wants to touch such a case, lest he be accused of undue haste or some other wrong doing. Wait for the 'all clear' signal may stretch to years. To avoid inordinate delays, SHQs are even informally advised to take up for cancellation of the present RFP and re-issue of a fresh one. There may also be occasions, which require some deviation from the provisions of the DPP, here too the procurement process may face inordinate delays. Every deviation has to be justified to the DPB and if it is convinced, the case is submitted with DPB recommendations for approval by the Raksha Mantri (RM). The remedy, one may argue, lies in an independent oversight of the entire procurement process by an empowered regulatory authority—say an ombudsman for defence acquisition, who should be directly under the RM, outside the normal bureaucratic setup of the MOD. An independent investigation by the RM would quickly establish the bona fides of the complaint or request for deviation. In case no malpractice or undue favour to any party is found, the complaint would be dismissed and the procurement process would be carried on in a time bound manner. Only those cases, where a malpractice has been detected, would be referred to CVC/CBI for further investigation and prosecution where warranted. Similarly, the bona fides of the request for deviation can be established without any delay and if justified, go ahead given for the deviation. Such an oversight would ensure better accountability of personnel and even organisations involved in the procurement process and ensure a time bound completion of various activities.

**'Make'**. Traditionally, such projects have been executed by DRDO or DPSUs. Recently, DRDO and DPSUs have also been venturing into joint development projects in collaboration with foreign OEMs. The DPP also provides for major private sector entities with RUR or 'Champion' classification to undertake such projects on cost sharing basis<sup>3</sup>. A closer examination of 'Make' projects being executed, or proposed to be executed, by various agencies would give a better appreciation of the user's dilemma in considering this category:

- (a) **DRDO Projects.** DRDO projects have generally been marred by time and cost overruns and invariably there is performance shortfall vis-à-vis the GSQRs. Reliability and maintainability have also not been receiving the attention they deserve during the design stage. Transfer of technology to production agencies has also not been smooth. Thus user satisfaction with the end product, as a complete system, has been rather low. The warranty service and product support have also suffered because of lack of single window approach. The examples are numerous

- but I will just cite IAF's less than satisfactory experience in the induction of Prithvi missile and Lakshya PTA.
- (b) **DPSU Projects.** The expertise of DPSUs is mainly in licensed manufacture. However, they have also undertaken several indigenous development projects, mainly of low technology products. Whenever they attempted development of medium or high technology products, they had to have hand holding by a foreign collaborator, e.g. MBB for the ALH and earlier Dr Kurt Tank and his design team for the Marut project. In any case all the DPSU projects have suffered from the problems I characterised for the DRDO projects, i.e. time and cost overruns, performance shortfall and low user satisfaction owing to poor reliability, maintainability and also poor product support.
  - (c) **Joint Development Projects.** DRDO has undertaken several joint development projects. While there has been fair success in these somewhat smaller projects, e.g. the Brahmos and EW systems, the indigenous content in them has been rather low. A number of bigger joint development projects with DRDO and DPSUs are on the anvil, e.g. the Fifth Generation Fighter Aircraft, Medium Transport Aircraft, Medium Range Surface to Air Missile etc. The jury is still out and only time will tell how they will fare.
  - (d) **Private Sector Projects.** Private sector participation in make projects has largely been limited to them acting as sub-vendors to DRDO or DPSUs. However, private sector entities have not been able to independently undertake large 'Make' projects on a cost sharing basis, as provided for in the DPP. The primary reason for that is that the first condition stipulated in the DPP for their participation, i.e. RUR/Champion classification has still not been fulfilled. Over five years have lapsed since it was first incorporated in the DPP and nothing has been done. It appears that this exercise cannot be left to the Department of Defence Production as there seem to be too many vested interests preventing implementation of this provision. Rather, it can only be enforced by an independent empowered body like an ombudsman for defence procurement.

The dilemma faced by the SHQs is that while a project with 'Make' recommendation would go like a shot through categorisation and approval process, it would have long-term implications for the force levels. There is no guarantee that you would get the combat capability that you require. Also, the development time frame and the final price tag may be quite different from what was originally envisaged. Even then one may have to contend with much lower level of reliability, maintainability and product support, which directly translate into lower combat readiness level. This perhaps explains the approach adopted by the Air Force of accepting the indigenously developed products in support and training roles as well as in less demanding combat environments. Even if they fail to meet the IAF requirements in full they insist on full compliance

with the Air Staff requirements for the front line equipment. Notable examples of this approach are acceptance of indigenous Tejas (LCA), Akash SAM, indigenous AEW project, ALH and IJT for less demanding combat support roles and training, while insisting on full ASR compliance for MMRCA, MR SAM, AWACS, etc for frontline requirements,.

**Buy and Make Projects.** These projects are progressed by the MOD in a manner similar to the 'Buy' projects, with the addition of TOT requirements in the RFP, as specified by the DPSU nominated for license production<sup>4</sup>. Therefore, GSQR compliance by the selected option is assured. The main/umbrella contract, covering overall framework, direct supply component, support equipment and training of operators, etc. is concluded by the MOD. Simultaneously, the TOT and license production arrangements are negotiated by the nominated DPSU/ OFB under the aegis of Department of Defence Production. Invariably, phased production is initiated from a few units in the fully assembled stage, followed by some from semi-knocked down and completely knocked down kit stages and finally the raw material stage. Delivery schedules for supply of these kits, raw material, jigs and fixtures, production processes, documentation and the associated infrastructure are finalised together with arrangements for training of various categories of personnel. Often TOT arrangements for MRO activities are also finalised at this stage itself or an enabling provision for the same is made.

The SHQs are faced with the dilemma that while GSQR compliance is ensured in this option, the DPSU work culture cannot be wished away, with attendant problems of poor product support and low reliability and maintainability. Also, TOT is normally contracted for mainly one time front end activities like airframe fabrication rather than for production of fast moving spares and lower technical life sub-systems and aggregates which require frequent replacement for lifelong exploitation. While more glamorous front-end activities are preferred by the DPSUs, the OEMs are also happy as this arrangement ensures user's lifetime dependence on them. The pretext used is that subsystems and aggregates are proprietary items of their sub-vendors who are not under their control. It was hoped that the defence offsets would catalyze the development of ancillary industry, which would take on the production of spares and short life aggregates and their repair and overhaul. However, the 'laissez faire' approach adopted in the implementation of defence offsets has belied this hope and no ancillary industry worth its name has taken on these tasks. Only a dedicated defence offset management organisation with ample representation of users and other stake holders can play a proactive role in directing offsets into the desired areas, to promote ancillary industry as well as to obtain critical defence technologies. It could formulate a system of multipliers and monitor faithful implementation of defence offset obligations and their banking and trading (when permitted). Today, despite license production by the designated DPSU, the user continues to be dependent on the OEM for logistic support of a very large number of items, ROH of major aggregates and sub-systems, obsolescence management, etc. During the exploitation of a weapon

system, unforeseen problems crop up from time to time and some of them may even require design fixes. Similarly, obsolescence of various computer-based systems requires periodic modifications and upgrades, to maintain operational relevance of the weapon system under changed threat environment. Since TOT for license production does not involve design related 'know how' and 'know why', design support for various flight safety related issues and periodic modifications and upgrades will continue to be sought from the OEM. Often the foreign OEMs charge exorbitant prices for this on one pretext or the other, e.g. MiG 29 and Mirage 2000 upgrade projects.

**Buy and Make (Indian) Projects.** The major difference between this and the 'Buy and Make' project is that this category hosts the choice of a foreign manufacturer while TOT and production arrangements are left to the Indian vendor—provided he absorbs critical technologies. Other procedural differences are that the AON is obtained through a Capability Definition Document (CDD) instead of Statement of Case. Likely vendors are identified by SHQs through RFI and the approved CDD is floated to the identified vendors. Vendors are then required to submit a Detailed Project Proposal giving details of foreign partner, development and production roadmap with work share, range and depth of technology and TOT details, indicating absorption of critical technologies, 50 per cent of which should be in category I & II specified in Appendix L to Schedule I of the DPP. These proposals are examined by a project appraisal committee constituted by the acquisition wing in which those found acceptable are short-listed. Thereafter, RFPs are firmed up and issued to the short listed vendors where further processing continues as per the procedure for 'Buy & Make' category<sup>5</sup>.

Depending upon the complexity of the case, the additional steps for this category could take one to two years. Even then the project could end up with a DPSU. Thus the SHQs have to ponder whether this delay in the procurement process really is worth it. The temptation would be to opt for the 'Buy & Make' category instead. I personally prefer this category, as this is a progressive step and in line with the practices followed by even advanced countries. If implemented forcefully, this can be a major catalyst in the broadening of the defence industrial base in India. Therefore, this category should be encouraged for all the schemes, where numbers justify license production in India. The 'Buy and Make' category in which only a DPSU is nominated for production should be reserved only for very large strategically important schemes like the combat aircraft, warships, main battle tanks etc. To avoid frivolous players vitiating the process, the private sector entities need to be segregated according to their product range and classified as per their production capacity and financial strength, into Tier I, Tier II and Tier III. RFIs and RFPs for various schemes could be issued accordingly to the appropriate entities. After say ten years when the private sector also has achieved the same degree of proficiency and capacities as the DPSUs, both the categories should be merged into one—'Buy and Make (Indian)'. High degree of competition generated by this approach will not only ensure better customer satisfaction and life time performance based logistic

support for the Armed Forces, but also ensure much better technology absorption, in house R&D and innovation and thereby much higher level of self reliance. It would also ensure rapid proliferation of ancillary industry for aerospace components as well as MRO, as seen for the automobile sector. To cut down delays due to additional activities, some simplification of the procedure with parallel processing would be necessary.

**Procurements under IGA**<sup>6</sup>. This provision has been the most preferred option for the SHQs to make good critical deficiencies in their force levels in the earliest possible time frame and with least controversies. Even the bureaucracy seems to like it as allegations for wrong-doing or chances of 'witch hunt' after change of regime are the least. However, the main difficulty is in convincing the powers that this is the best option, as it entails a single vendor situation with little transparency in the pricing mechanism. Initially, this arrangement worked wonders with the Soviet Union and its 'friendship' prices. Later this arrangement continued with the Russians sans the 'friendship' prices. In fact, the 'friendship' prices have recently given way to some very unfriendly price escalations, as seen in cases like Admiral Gorshkov's acquisition for the Navy and MiG 29 upgrade for the Air Force. Recently, the United States of America have joined the party with a flurry of acquisitions from them under their Foreign Military Sales (FMS) programme.

## **Conclusion**

In view of the imperatives of high military preparedness, the user is inclined to opt for a category, which will ensure acquisition of the desired capability, without any dilution and in the shortest possible time. The 'Buy' category, that too under IGA, has thus become the preferred option, followed by 'Buy Global'. Where numbers are large enough to justify licensed production, the preferred option becomes 'Buy & Make'. Despite licensed production, lifelong dependence on the OEMs has continued unabated due to misplaced priorities for TOT and 'laissez faire' in implementation of defence offsets. The 'Buy and Make' (Indian) category entails a much longer procurement timeframe due to additional requirements of preparing detailed project proposals prior to even the issue of RFP—thus it has not found favour with the SHQs. However, if implemented forcefully, it has the potential to revolutionize the defence industrial base. Uncertainties of GSQR compliance, development time frames and costs render 'Make' option the least preferred. No wonder, even after six decades of independence, India is yet to cross the 30 per cent mark for indigenous military equipment. The challenge lies in reversing the present order of preference to 'Make', 'Buy and Make (Indian)' and last preference for 'Buy' option, so that the ratio of 30:70 can be changed in favour of indigenous equipment and our combat readiness does not remain mortgaged to the goodwill of foreign OEMs. For this to happen, indigenous development agencies will have to become far more accountable and responsive to user requirements. Also, certain

organisational and procedural changes would be necessary in the defence procurements.

A number of committees have examined various aspects concerning indigenous design and development by DRDO as well as DPSUs and made valuable recommendations, which need to be implemented faithfully. As regards defence procurements, a defence procurement regulatory authority or an ombudsman needs to be created to faithfully implement various policy provisions and provide quick resolution of disputes and complaints and to bring about greater transparency and accountability. The 'Buy and Make' category needs to be reserved only for very large strategic schemes and the rest must be processed as per the 'Buy and Make (Indian)' category, with an aim to progressively phase out the former completely. Defence offsets also need to be directed and implemented better to develop an ancillary industry and reduce dependence on foreign OEMs

### **Recommendations**

An Ombudsman or Regulatory Authority, directly under the RM, should be appointed to oversee the entire gamut of defence procurement. Besides other regulatory functions, it should be empowered for the following functions:

- (a) To faithfully implement various existing policy provisions, i.e. classifications of the private industry, keen to enter the defence field into RURs/Champions, to facilitate meaningful participation of the private sector in 'Make' projects on cost sharing basis.
- (b) Further classification of the private industry based upon their expertise and product range and into Tier I, II and III, to enable issuing the RFPs to the most appropriate entities. This would also facilitate broadening the scope of the newly introduced category 'Buy and Make (Indian)' and provide level playing field for the private sector vis-à-vis DPSUs.
- (c) To resolve conflicts arising out of differing interpretation of DPP provisions.
- (d) Quick disposal of frivolous complaints lodged by vested interests or unsuccessful bidders, with an aim to delay/derail the procurement process. Only bona fide cases of deliberate malpractice or fraud need to go to CVC/CBI for further investigation and prosecution, as required.
- (e) Quick disposal of requests for deviation from the DPP.
- (f) Close supervision of functionaries and organisations in the acquisition chain to ensure better accountability and time bound completion of procurement process.

Following amendments should be made to the DPP:

- (a) The 'Buy and Make' category with nomination of only DPSUs for licensed production to be restricted to only very large projects of strategic nature. The rest of the 'Buy and Make' projects should follow the procedure for the 'Buy and Make (Indian)' category.

- (b) Merger of the two 'Buy and Make' categories into one after the private entities have achieved the requisite capacities and expertise, say in ten years.
- (c) Simplification and parallel processing of various requirements prior to the issue of RFP for 'Buy and Make (Indian)' schemes so that time delays vis-à-vis the 'Buy and Make' option are minimised.
- (d) Classification of the Indian defence industry into Tier I, II, III, based on their expertise, production capacities and financial strength, to direct the RFPs to appropriate entities only.
- (e) Whole life management approach, i.e. performance based logistics and life time design support, need to be built into all the RFPs.
- (f) For 'Buy and Make' projects, TOT arrangement must cover fast moving spares and low technical life aggregates and sub-system and not be allowed to be skewed towards one time front end glamorous activities.

An independent Defence Offset Management Organisation should be created, with participation of various users and other stake-holders. Besides facilitation, it should have the following functions:

- (a) To direct offsets into the desired fields to develop indigenous ancillary industry to provide life time product support and to obtain critical defence technologies.
- (b) To develop a system of multipliers to facilitate realistic evaluation of various offset offers.
- (c) To monitor various offset related issues, including their faithful implementation in letter and spirit.

#### NOTES

1. Par. 4-20 of DPP 2011 for 'Buy' and 'Buy and Make' procedure.
2. Par. 36, page 13 of DPP 2011
3. Par. 3, page 149 of DPP 2011, 'Make' procedure.
4. Par. 27, page 10 of DPP 2011.
5. Par. 25a, page 9 of DPP 2011
6. Par, 71, page 21 of DPP 2011



## Challenges of Commercial Evaluation

*Harish Masand*

### **Introduction**

Defence Acquisition, per se, is a complex process, covered as it is in layers of national security with the resultant lack of authentic published material, the limited number of manufacturers dealing with defence products in a narrow limited market and various national and international controls on sales of arms. It is certainly not an open or transparent market and the products themselves have become increasingly sophisticated and technologically complex of an increasingly proprietary nature. This paper would, therefore, be based more on personal experiences and perceptions within and outside the Indian Air Force and hope these will form a basis on which one could reflect and modify to suit one's individual environment, needs and experiences.

The author was a fighter pilot with no experience or training in Defence Procurements when put in charge of the MiG-21 Bis Upgrade Program in 1993 and had to learn everything to survive. Perhaps because of this, the events and experiences are deeply etched as unforgettable memories, which remain vivid even today as lessons well learnt. An apology, at this stage itself, would not be out of place if some of those episodes and their lessons upset anyone, individual or an organisation, or touch their sensibilities. It is not the intention of this paper to denigrate anyone and some of these experiences are being narrated first-hand only to emphasize the points made in the paper. It must also be clarified, at the outset that the views expressed are personal and not of any organisation.

When the author took charge of the Bis Upgrade Program in November 1993, as a young Group Captain, India was still in the throes of an economic crisis with its gold reserves pledged in 1991. It was, therefore, quite understandable when Mr Vinod Rai, then JS (Air), stated that a cabinet approval for this program at the then budgetary estimate of 850 million USD was not possible and some of our requirements needed to be trimmed to fit into Rupees 2000 crores, or 20 billion Rupees. We calculated this to be 626 million USD at

the going exchange rate on that day and Mr Rai got the Cabinet approval for this amount in US Dollars, for this long program of an estimated duration of almost eight years, which was unprecedented at that time. Together with Mr Vinod Misra, the then Additional Financial Advisor, we were fortunate to conclude all the contracts for the entire program in the sanctioned amount with some millions to spare without cutting any of the requirements and, in places, increasing the numbers for support equipment and weapons to meet the operational requirements of the planned number of squadrons. It is based on this experience and, later experiences as Director ASR, that the subject in hand is being approached.

### **Defence Acquisitions unlike Other Commercial Purchases**

At this stage, it is essential to highlight some of the differences between other general commercial purchases, even for defence related tasks like static computers or vehicles for general use, and pure defence acquisitions for weapon systems which are unique and far more complex for a number of reasons.

In what is termed commercial purchases for general use, even by armed forces, there are some distinguishing features which include the following:

- (a) **Variety of Products.** For general use, items for use by the armed forces, or other civilian purchases, barring exceptions for specialized equipment, there are generally a number of products at different levels of technology and sophistication available in the market, which could suit the individual needs, preferences or the budget. Also, prices for such products are well known, listed and advertised and all that may be required is some negotiations to get the maximum discount or maintenance support depending on the quantities being purchased.
- (b) **Multiple Vendors.** There is also a multitude of vendors to choose from in the competitive commercial market for similar products which makes it relatively easy to choose the required product of the right quality at a highly competitive price.
- (c) **Competitive Prices.** As stated earlier, due to the availability of multiple vendors and a choice of products available in the open commercial market with listed prices and discounts well-advertised, it is possible to get competitive prices with the knowledge that one has not overpaid for the chosen product, unless, of course, the vendors cartelize the product amongst themselves. Even then, historic prices are well known and it is possible to discern cartelization with a little diligence.

On the other hand, in the defence market for specialized weapon systems, there are a number of hurdles before one even gets to assess a reasonable price for the system. These are as follows:

- (a) **Limited Availability of Desired Products.** In this area, there is a limited range of products available which fully suit the needs of the buyer. This is essentially because defence-related weapon systems are built to suit

the needs of individual countries and to fit their specifications and environment. Some of the high-end products may not even be available for free sale to all other countries, particularly those perceived to be in the opposite camp, in the quest for military superiority over potential adversaries. Some of the more important technologies in the particular weapon system may be withheld even from friends and allies. Competitive or reasonable pricing in such a scenario becomes difficult, to say the least.

- (b) **Built to MIL Standards.** Defence systems need to be rugged to be able to effectively operate in a hostile and harsh environment and also have a much longer life than commercial systems. Due to these requirements, they are generally built to certain MIL standards. This involves use of MIL-grade components with extensive testing in the D&D process making the systems far more expensive from the component level itself, as compared to a similar system built with COTS components. A ridiculous example of this was, perhaps, the aircraft toilets, which some years ago were reportedly purchased at 3000 USD a piece. Lately, there has been a move to use commercial components where possible, particularly in defence electronics, to cut the costs and to keep pace with rapid advancements in this field.
- (c) **Extensive R&D in Design and Limited Production Run.** To be able to build the best possible weapon system within the existing or envisaged technological capability, the design requires extensive R&D effort, the costs of which have to be amortized over a limited production run due to limited markets as well as shrinking defence budgets. The systems also have to be designed to absorb mid-life upgrades to avoid obsolescence in this era of rapid technological advances coupled with the long-life requirements that the system is expected to meet. It is often said that, in this field marked by a constant quest for technological superiority, by the time the system is actually inducted in operational units, it is nearly obsolete and the designers have to start working on possible upgrades to keep it operationally effective through its envisaged life. All these design requirements further add to the costs of the systems. An example of this was the Chief Designer of Mikoyan, Mr RA Belyakov's visit to the MiG-29 Base in Poona in January 1988 when we had just inducted the MiG-29. The essential purpose of the visit was the Indian experiences and views on what could be done to further improve the MiG-29.
- (d) **Buyers' Demands.** Added to all this, each buyer country has its own peculiar requirements that they place on the vendor. Apart from long life and assured product support, each country demands a certain technical performance, delivery schedules, maintenance & logistic support, offsets, ToT, warranties including MTBF-linked warranty, bank guarantees, LDs and other contractual commitments etc. In a way, all these requirements involve a certain amount of work, and at times risks,

for the vendor which he naturally covers with added costs. So, the information on what the product was sold for to one country may not truly apply to another country due to different terms and conditions, which would hardly ever come to be known and are difficult to distinguish—unless the figures are analyzed in detail.

- (e) **Limited Open Information on Pricing.** Unlike commercial products in the open market, little authentic and reliable information is freely available on the system costs. For one, such information is commercially confidential for use in future bids in other competitions or other countries and is zealously protected by each manufacturer. Due to this reason, available information needs to be vetted carefully before acceptance and use.
- (f) **Bids may not be Based on True Costs.** In the defence market, pricing bids may not always be based on true costs due to many reasons, not excluding political. These may include the attempt to make lesser or larger than usual profits based on the opportunity or the envisaged competition as well as the overall financial health and compulsions of the manufacturing company. Demand and supply compulsions of the market also play their own role in this area.

### **Complexity of Commercial Evaluations and Principles**

Having seen the major problems in gathering information on a reasonable price for the system one is looking for, it may have become apparent that there is no simple sure-fire recipe for assessing reasonable prices in defence acquisitions and each case would, perhaps, be influenced by its own peculiar circumstances and demands. The situation and the task might be easier in a multi-vendor situation, due to the competition generated, but not necessarily so for some of the reasons elaborated on earlier and in the following example.

The example that readily comes to mind for the difficulties that one may encounter even in a multi-vendor situation is the case of procurement of the Inertial Navigation System in the MiG-21 Bis upgrade program. This was also the first of the acquisitions in the program for our small upgrade team and, therefore, the most valuable in the experience that we gained from it. Our requirement was for a Ring Laser Gyro with an embedded GPS while the most sophisticated systems in use in the IAF at that time were the mechanical gyro systems without a GPS on the Jaguar and the Mirage 2000, namely the French UNA-82 and 52 systems. The Jaguar system was under license manufacture in HAL while the Mirage system, including spares, was being procured directly, so we had a fair idea of the performance and likely costs. Initially, in the RFI stage in early 1994, we had estimated that the system might cost about the same as the old mechanical ones, albeit for a more modern and more capable system. However, we were on a shoestring budget and the likely costs of the system were not encouraging. We also wanted the system to perform the bus control function for the 1553 portion and interact with the GOST bus for the Russian systems instead of having a separate mission computer for this function. This

system architecture was complex, to say the least, but the only viable one for the Russian and Western systems mix we had chosen. The only other contender in the field that had shown some interest was Honeywell, which was also fitted on the experimental LCA under development at ADA in Bangalore. Honeywell then manufactured around 6000 units every year, as compared to less than 500 per year for the two French companies, so their prices were expected to be lower. However, there was a school of thought that Honeywell was not reliable enough to support the system in the long-term with the possibility of American sanctions at any time. Such fears were not overly misplaced since, in 1998, the American sanctions did come. Despite such reservations, we felt that we must have Honeywell participate in the competition not only to get the best prices but also to get the desired technological solutions we wanted without additional exorbitant costs. Fortunately, it all worked out and we finally purchased a French system at less than one sixth the initially estimated costs while also obtaining a guaranteed MTBF of over seven times the book value of the old mechanical system, which did not have such a warranty in any case those days. This was a huge saving and a tremendous experience, which set the pace for the rest of the Program and taught us the importance of choosing the right competitors.

Quite obviously, such an approach would not work in a single-vendor situation and the issue becomes a little more complicated in trying to establish reasonable costs.

In both situations, however, the only approach to this problem is through research, research and more research to enable one to assess a reasonable price and to arrive at a flexible strategy to negotiate this price with. Today, the research is eased to an extent by the Internet, a facility that we did not have in the 90s, particularly during the Bis Upgrade Program. The sources for this research that we used, and are still recommended, are the following:

- (a) **Historical Data.** Some historical data is generally available within the organisation on the same product or a similar product that may have been purchased or evaluated earlier. This may be useful to derive a reasonable price for the system under consideration. However, at times, the data is either misplaced or buried without the people facing the situation even knowing about it. The essential reason for this is a poor data bank system or under or non-utilisation of the collective experience of the organisation. This may sound strange but it does happen, if for nothing else than to prove Murphy's Law. Perhaps, a good example of this comes from the Bis program in those days of the paper organisation that we then had without any networking on computers within Air HQ and thus any meaningful exchange of information on the network. We were negotiating the armament package for the Bis upgrade in December 1995 when we reached a deadlock with the Rosvoorezhnie Team led by their head himself, Mr Felin. The Russians had quoted over 280 million USD for the package while the fair and reasonable price that had been worked out was 155 million. The JS (Air), Addl FA (M) and I had been at it with the Russians for about two weeks without

making any headway. The Russians kept asking for a counter-offer, something that we had been avoiding for a reason. Finally, around the 20<sup>th</sup> of December, the Russians again insisted we give them a counter-offer instead of just trying to convince them to bring their prices down. The JS (Air), as the Chairman of the PNC, agreed to this proposal and told the Russians to collect it from me that evening. I wanted Mr Rai and Mr Misra to see my itemized offer before I gave it to Mr Felin but Mr Rai said he trusted my assessment and to go ahead and give it. All he wanted me to do was to keep a negotiating margin of about 10 per cent for him. Accordingly, I went back and modified the itemized prices down by about 10 per cent and gave the counter-offer of about 140 million USD to the Russians in the evening. In this effort, I had assessed some of the items at 40 USD to a hundred, i.e. at 40 per cent of the asking price. These I trimmed down to around 36 in the counter offer to keep the required negotiating margin. The next day, instead of any negotiations, there was an uproar and total chaos with Mr Felin in an absolute rage at being offered almost one third of the asking price. Finally, Mr Felin walked out with his team and flew back to Moscow with a clear message that this was the end of any negotiations on the armament package for the Bis Upgrade unless we revised our attitude and offer substantially. Mr Vinod Rai was understandably upset since the whole upgrade program was now in jeopardy. I tried to explain my assessment methodology but could not really convince Mr Rai that we had done the right thing. Finally I left his office in the Ministry with some assurances, backed by feeble bravado, that the Russians would be back after the Christmas and new year holidays. Heart of heart, even I was worried that I may have overdone the reasonable pricing assessment and put the entire program in a limbo after two years of hard work. Anyhow, there was nothing to be done but to sweat it out in the winter holidays. I had already looked at the MiG-29 contract backwards to find some itemized pricing since some of the items that we were now fitting on the upgraded Bis had been in use on the MiG-29. Unfortunately, the main contract on the MiG-29 had yielded nothing because there were no itemized prices over there. On a hunch, I went and spent a few days in the Maintenance Branch in Air HQ and hit pay dirt a few days later while looking at some of the spares that Maintenance Branch had signed up for a few months earlier. In that list, there were three items that were common to our armament list, namely the pylons, missile launchers and the simulator plugs. These items, it was agreed, should be supplied at around 42 USD to a hundred minus 14 per cent discount which brought the price to around 37. I took a copy, highlighted just these three items and went to Mr Rai's office in the evening just after Christmas and, without saying a word, put this list in front of him. Mr Rai eyes lit up when he saw the highlighted items. The rest is history. The Russians were back in mid-

January as we had hoped and predicted and we finally negotiated the entire package for about 153 million against the 155 USD budgeted for this package. So, historic data for the same or similar items may be a good thing to research as a basis to derive reasonable pricing from. A good data bank is also a good thing to maintain and preserve.

- (b) **Historic Data: Similar Items.** One may not always have access to previous price data on certain items, particularly if these are new and being procured for the first time. In that case, data on a similar item that may have been procured earlier could be extrapolated to arrive at a reasonable price for the new system. An example of this was the RVV-AE, or what was popularly known as the Amraamski, air to air missile being procured for the Bis Upgrade. For this, we had researched the price of the R-27 missile variants, put an increased efficiency factor of around 40 per cent on the Amraamski and derived a reasonable price for this missile. During the negotiations, Mr Felin, on his own, came to the same point and repeatedly asked us to follow this method and put an efficiency factor on the Amraamski as compared to the R-27 that we had then operated for about 8 years. Unfortunately, in one of those meetings, then ACAS (Plans) and my boss, had come into the negotiating room for a short while and Mr Vinod Misra asked him how effective the Amraamski was as compared to the R-27 in his opinion. ACAS (Plans) told him that the Amraamski was at least 200 per cent better, maybe even 300 per cent, than the R-27. Because of this wide difference in our professional assessment, Mr Vinod Misra was naturally reluctant to open this avenue for negotiations. This carried on for some time when Mr Felin himself emphatically repeated the point and claimed that the Amraamski was 50 per cent more efficient than the R-27. Naturally, the gap between our 40 per cent versus 50 per cent claimed by Mr Felin was not unbridgeable and we could successfully negotiate the price for this missile.
- (c) **Historic Data: Friendly Organisations.** Another source for the needed historic data could be other friendly organisations within or outside the country, which may have procured the same or similar system earlier or may have some data on it. In our case, the two organisations that one could readily tap are HAL and DRDO though my experience in this area taught me to be cautious with their figures and assessment. I could give some examples of these but suffice it to state here that such data from other organisations should be treated with caution, particularly due to the circumstances under which it may have been obtained, and vetted against other methods of assessment before being relied upon totally.
- (d) **Other Open Sources.** One could also use other open sources and magazines which frequently report purchases by different countries for different weapon systems. While these may not give itemized and detailed pricing, one could still use the overall figure quoted as a base

to derive the likely price of the systems one is looking for. Of course, as stated earlier, these prices have to be viewed in the geo-political context of the purchase while also factoring in other peculiar circumstances that may or may not be applicable in ones own context to arrive at some reasonable pricing.

- (e) **RFIs.** The RFIs sent out for the same or even similar systems and the response received could also be a useful source on which to base ones assessment of reasonable and expected pricing.
- (f) **Cost Data from the Vendor(s).** To the extent possible, efforts may also be made to obtain the detailed itemized cost data from the vendors themselves, including direct and indirect cost, material, labour and overheads etc. to be able to analyze and compare these with other data and to validate the cost or price matrix. Obviously, while you could get a lot of this data from domestic vendors, it may not always be made available by international vendors, particularly in a competitive bid situation.

**Time, Effort and Experience.** It must be abundantly clear from the foregoing that there is no instant formula for assessing and arriving at an estimated reasonable price for the systems one intends to procure in this area of defence acquisitions. A lot of time and effort is required for the research, apart from the experience and an intuition to be able to direct the research in the right areas and then be able to sift through the maze of data to still arrive at a reasonable assessment. It is also my opinion, that particularly in the armed forces and in the Ministries, we do not pay adequate attention to benefiting from previous experience in the area of defence procurement. People from different background come and go with their fixed tenures and all the experience that they gain over time, having started from scratch, is lost with them. This is particularly true in the Ministries where people from different disciplines occupy important positions in defence and defence procurement without any previous experience in the field. I have always advocated that, despite the demands of the organisation for people to be exposed to different fields, there should be some continuity and sharing of experience in the form of formalized training where the previous experiences are stored, shared and discussed. In this way, a person does not have to start out to find his own way from scratch in such a maze and complex area like defence procurement where the stakes are pretty high; with lots of money afloat, complicated technological systems, little or no access to the costing data of the vendor, and where small possible mistakes could haunt the armed forces for many years. I personally recall my own experience at the beginning in this field where I was fortunate enough to take over the Bis Upgrade Program from my own pupil, then Wing Commander, Nalluri Motilal. Moti, as we called him, passed away in very tragic circumstances recently, and I am sure, all of us who knew him have a lot of respect for him, both as a professional and a human being. Let me humbly admit that he was my mentor in the acquisition field. It was the start that Moti gave me which enabled us to complete the MiG-21 Bis Upgrade Program within the sanctioned amount and in the



manner we did. For the same reasons, continuity of the experience in the program with the same team is also essential unless it is absolutely unavoidable to change the team mid-stream due to really unforeseen reasons.

**The Aim is a Reasonable Price Not Necessarily the Lowest.** At the same time, the ultimate aim should be to conclude the negotiations at a reasonable price and not necessarily the lowest price that one may be able to force the vendor into, due to a multitude of circumstances and reasons. If the price is too low without adequate margins for the vendor, the vendor may soon find that he is unable to profitably proceed with the supplies or support them adequately in the future, thus once again leading to problems or disputes on even minor issues which may not have been adequately addressed in the contract. I would go to the extent of saying that if a vendor has quoted very low prices, as compared to other vendors or the reasonable price estimate, the details need to be examined as thoroughly to ensure the vendor has catered for all aspects and would be able to fulfil the contractual obligations. The idea should be to get the best value for money and not how little or how much has been spent out of the budget.

### **Contractual Negotiations**

So, with time, effort, research and a lot of sweat, suppose one does arrive at a reasonable price or a benchmark for the costs for the desired weapon system one is looking for, or what is also called POV, Professional Officers' Valuation, now comes the even harder or more challenging part of being able to successfully negotiate this price and the desired contract with the vendor. After all, one may have a price in mind but the vendor may not have the same price in his mind, particularly in a single-vendor situation. One still has to find some meeting ground or convincing arguments to be able to successfully negotiate the contract.

Even in a multi-vendor situation, the L-1 may not quote the price you may have in mind due to a variety of reasons. If the L-1 quotes around what you were looking for and the price is considered reasonable, there is little problem as per our DPP. One just moves on and negotiates the contractual terms. However, if the price of even the L-1 is unreasonable, one is back to square one and the price negotiations could be arduous unless one has already done a lot of research and figured out how to negotiate the price.

In both cases, there is still a bridge to be built and crossed before coming to contractual negotiations. If one part will cross over to the other side, or if both parts decide to meet halfway, depends, once again, on a host of factors and considerations, including the negotiating strategy and the negotiating skills of the two sides. Of course, the chasm is best avoided by a number of precautions one could take since such divides can take forever to resolve and even then leave room for a lot of doubt and prevarication, sometimes even leading to a breakdown of negotiations. One instance of how close to a complete deadlock it was on the Bis upgrade has already been provided. Many other examples could be given where the entire program could have been jeopardized because

of disagreement in negotiations over a particular sub-system. Some of the steps to avoid such situations or, at least ease the negotiations thereafter, are as follows:

- (a) **Adequate Time.** One should always plan ahead to the extent possible and give adequate time to the vendor to respond with a proposal. Sometimes, in the urgency of the requirement, one tends to give very little time to the vendor(s) to submit their proposals. Making and submitting good technical and commercial proposals is time-consuming and requires a lot of coordinated effort from different departments of the company. Some countries actually recommend pre-solicitation dialog and meetings to the benefit of both the vendor and the buyer. Just tabulating the MTBF of systems and various sub-systems, as may be required, takes considerable time, particularly if the sub-systems have been procured from sub-contractors, which they usually are in today's world due to economies of scale. One may have the feeling that the company is in that line of business, must be submitting such proposals regularly and would just cut and paste the proposals together. This is far from true. Each country or buyer has its own peculiar requirements, if not in the main equipment, then in terms of the exact technical requirements, the support equipment, maintenance philosophy or spares, and other terms and conditions like offsets, ToT, warranties and guarantees etc all of which impact on the proposals. A very good example is that of offsets. The DPP today requires a minimum offset percentage of 30, going to 50 per cent in case of the MMRCA. That amounts to an estimate of offsets worth around 5 Billion USD for the MMRCA. To absorb such huge amounts in offsets certainly requires a solid and mature aviation industrial base in the country but more than anything else, just to make a good offset proposal requires a lot of time and effort, even for offsets worth just a few hundred millions. For this, generally a period of three months is given in our DPP, that too after submission of the technical and commercial proposals. None can disagree with the fact that to do a fair and thorough job on the offsets of this nature requires far more than three months unless the vendor ties up most of the offsets merely on paper, like many offset providers tend to provide for a fee. I do not intend to hit out at the business of such service providers but, sometimes, they include proposals, which bring no real benefit to the country in terms of the basic objectives of the offset policy. All such offsets are bought out or booked on a commission, the cost of which is naturally factored into the commercial offer. Genuine offsets require a lot of work, meetings, and agreements, perhaps even investments with potential offset partners, all of which has a certain cost. However, the current policy requires the commercial proposals to be submitted along with the technical proposals, three months before the offset proposal. So, the vendor cannot realistically factor in the cost of the offsets in the commercial proposal. All he does to meet the deadline is to factor in some risk of doing such business in

such an environment and puts an estimated cost on it which would normally be higher than what he may actually need, essentially to cater for any cost over-runs and to avoid losses. In the meantime, the commercial proposal sits sealed and locked in some office because it will not be opened for some time, if not years. All this ends up costing the buyer something extra even from the lowest bidder. And the vendor who is willing to take the maximum risk or take some shortcuts on the offsets would have the lowest cost for offsets added in the commercial proposal without offering the best value for money. The moral of the story is that, generally, any shortfall in time available results in extra costs for the buyer. It has also been reported that offsets add 15-20 per cent to the costs, which is a huge price to pay unless the offsets bring in value that cannot otherwise be got. Therefore, one should always give adequate time to the vendors to do their work and submit the best possible proposal and, perhaps, interpret the policy guidelines in a manner that brings best value for money to the table.

- (b) **Clarify Technical Details.** This may sound a little parochial, inviting comments like “we all do that”, “what is so special about this, all our technical requirements are listed in detail the RFP”, but its amazing how much doubt there still is in the minds of the vendors about some facets of the RFP including technical requirements. Meetings, after issue of the RFP, generally do not completely overcome this problem because of the paucity of time or some of the concerns tend to be brushed aside with comments like: “don’t question why the technical requirements are there, just meet them”. All this could be overcome with meetings and dialog even before the issue of RFP, as mentioned earlier, not only to be able to draw up the most comprehensive RFP but also bring in the best proposals. A simple hypothetical example based on the premise outlined earlier, that every country builds the equipment to its own requirements, which may not meet all your demands, may best explain this. Suppose one wanted DME in the aircraft and the competing product instead uses VOR, ILS, and GPS as navigational aids. To find a solution to this shortfall, add DME in the on-board equipment and have it integrated on the bus by the systems integrator who may be a sub-contractor, requires time to work out the technicalities and the costs involved, time which is unfortunately at a premium. Once again, in such a situation, the vendor adds costs, which are safe for him to quote. Each vendor may also have a different shortfall. The buyer finally ends up paying extra to one or the other vendor in some form or the other without even realizing it, which puts his reasonable cost assessment in some disarray. To get the best deal on the table, a few rounds of technical discussions with potential vendors are suggested even before floating the RFP so that the most optimum and, at the same time, easily and widely available characteristics of the system are chosen. This way, the developmental costs are minimal or, at least, more accurately assessed,

due to adequate time being given for such activities, and a more competitive bid is assured. This may sound impractical and time-consuming but tends to give better results in the end. The idea is to pitch the requirements at what is generally available or likely to be available to avoid unreasonable or unavailable specifications and also uncharted costs. Such an approach has the added advantage of avoiding a single vendor or non-compliance due to unrealistic QRs, which may lead to re-tendering with time and cost over-runs. The other complementary method could be to group some of the more demanding requirements under desirable instead of all requirements as essential or mandatory and then having a pre-determined graded cost matrix for these or the extras that the vendor may offer because these were already built into the system and it is sometimes cheaper and easier to offer them outright than to remove such items or features from the system.

- (c) **Clarify Work Content.** In a scenario where there may be more than one vendor to do the work or supply an integrated system, it is advisable to clarify the work and responsibilities in great detail before soliciting a bid to avoid ambiguity and risk-related inflated costs. In the Bis upgrade, we had to have separate technical discussions with each vendor and also tripartite discussions with the prime contractor, the Russians, to define the responsibilities, time-frames of each activity and the supplies down to the last screw or connecting cable to avoid hold-ups later in the program and also to obtain accurate cost quotes before inviting commercial proposals.
- (d) **Clarify Terms and Conditions.** This is another area where absolute clarity can avoid a prolonged or even deadlocked negotiation later. Clarity in this area also results in a better price quote from the vendor since he clearly understands the requirements and knows what it entails in terms of the work and risk involved and thus the costing. One has already seen the example of offsets; the other one could be that of MTBF-linked warranty. Vendors, who don't quite understand the requirement and the implications of such warranties, would either not be able to abide by the contractual terms later leading to disputes and under-utilized equipment or pad up the costs excessively to avoid the risks. The buyer finally ends up paying, particularly in a single vendor situation.
- (e) **Trials at Vendor Location.** Another issue that adds to the costs, and may put the entire cost matrix redundant or make it skewed, is the issue of having all evaluations and trials in the country. This not only leads to sub-optimal evaluations since the buyer team can never get to see everything of the system, particularly the maintenance and support systems behind the main system or even assess the ability of the vendor to fulfil the contractual requirements but also significantly adds to the costs since the vendor has to transport a fair amount of equipment and

people to support the trials in the buyer's country. Also, the vendor always tends to keep a margin in such estimated costs to cater for any additional unforeseen requirements.

### **Negotiating and Contracting**

As stated earlier, having evolved a fair and reasonable price for the system, the harder part is probably negotiating the price and the contractual terms with the chosen vendor or the single vendor, as the situation may be. Negotiating is certainly an art but it involves certain sets of skills that can be acquired through proper training and experience. One could find many books and articles on the art of negotiations so this paper would not dwell too much on this aspect except to briefly share some of the principles formed through experience. Some of the skills that one would need to be a successful negotiator are:

- (a) **Knowledge**, Professional as well as general knowledge to be able to talk of the system under consideration as well as other related and even unrelated matters depending on the situations while negotiating.
- (b) **Thorough Preparation**. There are no short cuts to hard work and research even here. One also needs to formulate a negotiating strategy and a reasonable price in advance before coming to the negotiating table. One also needs to vary the strategy for different vendors or different systems and situations to avoid being a predictable negotiator.
- (c) **Communication Skills**. Fluency in the negotiating language is always essential. Perhaps, a working knowledge and some proficiency in the language that the seller may be at ease with, and uses for communication amongst themselves, may also be desirable.
- (d) **Cultural Understanding**. Each culture has its own nuances, which one may like to keep in mind while dealing with groups from that culture. As an example, we extracted many commitments and resolved many issues with the Russians over a bottle of vodka than in mere formal negotiations.
- (e) **Patience and Perseverance**. One must always be patient enough to let the other side have a full say and clearly understand what was said before interrupting and making one's point. For example, the pace of negotiations with the Russians is slow and methodical with each word in writing being debated. Therefore, when negotiating an issue with the Russians, it is essential to let the interpreter finish the translation, clarify any misinterpretation before responding, even if you think you understand the language, before agreeing or disagreeing with the actual speaker. You may not have understood all the nuances of what was said and any hasty interruption will put you back by hours, if not days. So, it is important to be very patient and get to one's objective in a slow but sure method, once again depending on the language and culture. With some other cultures, in particular situations, a more direct approach may work more effectively as opposed to an indirect approach.

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- (f) **Demeanor and Sincerity.** Facial expressions, signs of agreement or disagreement, nodding, bored expression or fidgeting can all affect your negotiations. A poker face is generally the best unless one wants to convey a particular message. At the same time, it is essential that the other side is convinced of your sincerity and conviction in what you state.
  - (g) **Be adaptive and flexible.** Negotiations do not always go the way you would want them to go based on your pre-planned strategy. One must be adaptive and flexible to turn it around to the direction one wants it to flow and get to the desired objective even if it is in a roundabout manner or through a different or circuitous route.
  - (h) **Both sides must come away feeling they won.** Negotiations and mutual acceptance can never be a one-way street. They must cater to the position of both sides and agreement reached in a manner where both sides feel that they won something, even if in the give and take process, one had to concede some issues to get some other more important issues. Towards this, negotiations must not be viewed or approached as a zero-sum game.
  - (i) **Not Adversarial but a Partnership.** Above all, it is important to remember that negotiations lead not to an adversarial relationship but a partnership that would have to last 30 to 40 years, particularly in defence acquisitions, even after we are all gone from the scene. So, one must lay a good foundation and treat each vendor with the respect he deserves. An example is that of a loser writing to the Defence Secretary with all praise for the manner in which the negotiations were conducted in the MiG-21 Bis Upgrade Program in 1994.

## **Conclusion**

In conclusion, I wish to re-emphasize the complexity of defence acquisitions. I also hope the principles, skill sets and experience that I highlighted from my personal experience would be of some value, at least to reflect on if not to actually put them in practice when one has the opportunity, in addition to all the theoretical stuff one can find in books and papers. The importance of experience, research and continuity in this field of defence acquisitions cannot be over-emphasized, particularly for evolving a reasonable price matrix and for negotiators.

## Cost Estimation for Determining Reasonable Price in Capital Acquisitions: MoD Experience

*Rajnish Kumar*

Indian MoD procurement of high-value and complex defence-specific systems has traditionally been conducted using a price-based acquisition approach, in which Contract Negotiating Committees (CNCs) primarily rely on offered quotes given by various bidders and pricing data given by L-1 bidders during negotiations to establish a fair and reasonable price. Until recently, costing of a proposal was restricted to using past purchases data and some crude and often ad-hoc manner of applying annual escalation on it for arriving at a benchmarking figure. Recently, internal deliberations have taken place within the MoD on the manner in which benchmarking estimates had been done by CNCs and need for issuing professional guidelines on the subject has been felt. This approach paper is an attempt to place a model of benchmarking exercise in this direction, albeit based on best international practices.

The only reference to benchmarking in DPP-2011 is paragraph 51 Chapter-I, which states that CNC should establish a benchmark and reasonableness of price in an internal meeting before opening the commercial offer. But what is a reasonable price? The word “reasonable price” means different things to buyers and sellers. The buyer tends to think on the low side, and the seller tends to think on the higher side. The seller wants to make as much money as possible and the buyer wants to save as much as possible. As price of an item depends on several independent and dependent variables and is uniquely decided by individual bidder, it is simply not possible to give a definition or a formula for defining reasonable price. However, as CNC’s subsequent negotiation will depend upon the reasonable price determined beforehand, it is necessary to attempt the internal benchmarking on established practices on cost estimation methods being used widely by Government buyer and specifically defence buyers across the world. This will at least give CNC a moral authority for justifying their stand to L-1 bidders during negotiations and will also give them

a more realistic estimate of difference between what the Government ought to give (internal benchmarking) and what they may have to give (negotiated cost). This paper has leaned heavily from the best commercial and international practices in the area of Government acquisition partially also due to the fact that no detailed costing guidelines for benchmarking are available either in MoD or MoF.

Amongst the plethora of cost estimation techniques available in commercial world, there are four main cost estimating techniques, which can be used by CNC to develop benchmarking estimates for acquisition cases: Analogy, Engineering Parametric and Market Intelligence. In deciding which technique to use, CNC may have to consider several factors like:

- (a) Availability of historical data
- (b) Level of detail required
- (c) Adequacy of system description
- (d) Time/Resource constraints

The cost estimate must be defensible with well-reasoned analysis. A description of the four cost estimating methodologies follows.

### **Analogy Method**

The analogy method is the simplest form of estimating. When historical information is available for a similar or same program that has already been completed, that information can be used to estimate costs for the proposed program. In case of “similar” programs, CNC will additionally need to make a subjective evaluation of the differences between the new system and historical systems. In many cases, it may be necessary to compare subsystems of the new system to subsystems of several old systems in order to make the most accurate comparisons. The technical expert in CNC may typically be asked to make a technical evaluation of the difference between the new system and the old system. Based on this evaluation, the CNC may assess the cost impact of the technical differences. When using this method, it is important that differences between the existing system and the proposed system (e.g., software languages, development methodologies, complexity) are identified and their impacts estimated. However, in case of “same” programs, such additional technical analysis may not be necessary and use of price indices will suffice.

- (a) **Past records (LPP):** Prior to benchmarking, CNC should review: The acquisition history of the supplies and services, and a description of the supplies, including, when necessary for adequate description, a picture, drawing, diagram, or other graphic representation. This will ensure that prior prices are considered in estimating the proper price of the current acquisition. However, one must integrate this information with information from other tools and methods to enhance the accuracy of price estimate.
- (b) **Sources of Acquisition Histories:** Acquisition histories can be found in many sources. Typically, the best sources are buyer’s old contract



files, computerized data and manual item records. Usually, the best source of information on past pricing decisions is the original file of the contract action as detailed information and the rationale used to determine price reasonableness will be available in the file. This does not mean that past purchases of other Government buyers should be ignored: with some adjustments, their data may also be used in Analogy method.

- (c) **Researching Historical Acquisition Pricing Information:** Research of historical market information can tell us a lot about the acquisition situation for the product at some point or points in the past. However, for that information to be useful, we must be able to determine what the market situation was in the past and how it has changed since then. The following table presents issues that we should consider in our examination of historical acquisition information, before use in benchmarking.

**Table 1**

<i>Issues</i>	<i>Questions to be asked</i>
Trends in supply and demand	When did past acquisitions take place? Is there any indication of prevailing demand market conditions at that time?
Quantity	What quantities were solicited and what quantities were acquired?
Trend in prices	What was the contract price? How did the unsuccessful offers compare with the successful offer?
Composition of Pricing	Did the contract price include one-time engineering, tooling, or other start-up costs? Should future contracts include similar or related costs? Were necessary start-up costs paid for in a manner separate from the price for the item or service?
Level of competition	How many sources were solicited for the prior acquisition? How many sources offered bids or proposals? What specific sources offered bids or proposals? What sources replied to Request for Information this time?
Technical features	Are there any differences between the past and the current requirement in technical specs?
Delivery terms	What was the delivery period? When did the actual delivery take place? What was the INCOTERM used?
Ownership costs	What costs of ownership were associated with the acquisition?
Mode of tendering	Whether it was global, limited, single mode of tendering.

<i>Issues</i>	<i>Questions to be asked</i>
Contract terms and conditions	Are there any significant differences between terms of the last and present the due to changes in DPP?
Problems	What problems (if any) were encountered during the contract performance?

Depending upon the answers to the questions mentioned above, CNC should adjust the past data suitably.

- (d) **Use of Price Indices:** Once historical records have been established, the same will need to be extrapolated to future years for accounting the escalation factor. The use of “price indices” as mentioned in Appendix A may be used. The delivery period mentioned in the present case needs to be taken into account for extrapolating the historical records.
- (e) **Use of Learning curve:** If the items are same as compared to past purchase, then theory of the learning curve, as mentioned in Appendix B, may also be considered for application.
- (f) **Situations to be used:** Wherever Last Purchase Price (LPP) is available for similar or same items, this may be applied. Actual cost experience on prototype units, early engineering development hardware, and early production hardware for the program under consideration could also be used to the maximum extent possible.
- (g) **Advantages:** The analogy method is based on actual experience. It provides a valid tool to negotiate with L-1 bidder.
- (h) **Disadvantages:** In many instances, no truly similar programs exist.

Subjective evaluations may have to be made by the technical experts and CNC when determining the cost impact of the differences between old and new systems if the items are not same but similar. Current market conditions do not get reflected.

### Engineering (POV) Method

An engineering or “POV” estimate (Professional Officers’ Valuation as known in MoD) is a step-by-step, bottoms-up description of task requirements and estimated resources for labour, material and other direct costs, with descriptive rationale as to why resources are required and the considerations used by the engineer to develop the estimate. This technique involves associating costs to the lowest levels of a definable work within the Work Breakdown Structure. The direct labour hours required to complete the work are estimated from engineering drawings and specifications, using general industry standards. The Technical experts also estimate raw materials and purchase parts requirements. The remaining cost elements, such as tooling, quality control, other direct costs, and various overhead charges including systems engineering and project management are also factored in.

- (a) **Situations for use:** When historical records are not available for an item,

then this method may be used, provided the user representatives have intimate knowledge about the items in question.

- (b) **Advantages:** The Engineering method provides a detailed cost estimate and can be more accurate than other methods. It can be uniquely applied to the specific program and manufacturer, gives good insight into major cost contributors and also allows easy transfer of results to other programs.
- (c) **Disadvantages:** Since detailed information is required, the Engineering method tends to be time intensive. Historical data is not always available to support these estimates. It is also not flexible enough to answer what if questions. There is a tendency to rely extensively on judgment and assumptions being made by technical experts. The estimates made for items like material overheads, direct expenses, training, trials, profit, etc. are most likely to vary from the price bids as these items are priced uniquely by any bidder, keeping in view their internal policies and approaches towards bidding.

### **Parametric (Statistical)**

The parametric, or statistical, cost estimating method uses parametric models to derive cost data from key cost drivers such as product weight, complexity, inputs/outputs, software code types, historical data, etc. This method assumes that there is a relationship between some system parameter (such as speed, weight, thrust, etc.) and cost.

- (a) The goal of parametric costing is to create a statistically valid cost estimating relationship (CER) using historical data. The parametric CER can then be used to estimate the cost of the new program by entering its specific characteristics into the parametric model. It is always essential to have an adequate number of relevant data points, and care must be taken to normalize the dataset so that it is consistent and complete.
- (b) To develop a parametric CER, first the cost drivers that most influence cost ought to be determined. CER can be developed with a mathematical expression, which can range from a simple rule of thumb to a complex regression equation. Parametric cost estimates use regression analysis (branch of applied statistics) to attempt to quantify the relationship between variables and then describe the accuracy of that relationship. Regression analysis has two parts: (1) quantifying the relationship between the variables using a mathematical expression, and (2) describing the accuracy of the relationship by computation of various statistics that indicate how well the mathematical expression describes the relationship between the variables.
- (c) **Situations for use:** The parametric method is appropriate for those cases where detailed design specifications are not available, but a database of like systems, performance specifications and costs is available. This

method often serves as a useful check of an estimate made using another method.

- (d) **Advantages:** Parametric estimates are fast to use and easy to change.
- (e) **Disadvantages:** This method relies heavily on the timeliness and accuracy of the database. Parametric estimates must rely on correlations between cost and performance features and characteristics. Historical data is not always available to support these estimates.

## Market Intelligence Method

Market intelligence method requires collecting and analyzing of information about capabilities and costs within the market to satisfy buyer needs. Market research policies and procedures should be designed to arrive at the most suitable approach to ascertain cost of acquiring, distributing, and supporting supplies and services.

- (a) **Information for Market Research:** When conducting market research, we should not request potential sources to submit more than the minimum information necessary. Most firms will gladly support Government market research as long as the result will benefit the firm. Most will provide complete information about how the products that they can provide will meet Government requirements. However, they are unlikely to provide information about problems with their products or about other products that could better meet the Government's needs at a lower total cost. Generally, information on a particular product or industry should be obtained from many sources other than potential bidders. These sources could be as following:
  - (i) The results of recent market research undertaken to meet similar or identical requirements.
  - (ii) Government data bases that provide information relevant to acquisitions, e.g. the DGS&D website.
  - (iii) Source lists of similar items obtained by other Government agencies.
  - (iv) Catalogues and other generally available product literature published by manufacturers, distributors, and dealers. It could be collected during defence exhibitions or visits to OEM premises.
  - (v) Web sites of major vendors and OEMs dealing with the item in question.
  - (vi) Budgetary quotes of leading vendors.
  - (vii) Specialized search engines on the Internet.
- (b) **Factors to Consider in Researching the Market:** Each time we conduct market research, the process will be different because of differences in defence requirements, market conditions, and other factors. The following table identifies issues and the related questions to provide a basic framework for our market research. However, not all of the questions identified in the table will be valid for every acquisition.

**Table 2**

<i>Issues</i>	<i>Questions to be asked</i>
Pricing history	What information is available concerning past prices paid for the product and changes in the product or market since then? Have there been historic differences between prices paid by the Government vis-à-vis other buyers? Why?
Current competitive conditions	How many sellers and buyers are in the market?
Current overall level of demand	What is the relationship of the level of demand quantity we intend to buy vis-à-vis the quantities that others buy? Will our volume justify a lower than market price due to the seller 's increased economies of scale? Will our volume be so large as to drive the sellers to or beyond full capacity, resulting in unanticipated inflation?
Trends in supply and demand	Will demand be higher or lower at than supply at the time of award than now? Will supply capacity keep pace with demand?
Pattern of demand	Is there a cyclical pattern to supply and demand? Would awarding six months from now result in lower prices than an immediate award? Or would it be better to stock up now at today's prices?
Other market forces expected to affect contract price	What forces might drive up prices in the near future; strikes; labour shortages; subcontractor bottlenecks; energy shortages; other raw material shortages? What forces might lead us to expect lower prices in the future?
Pricing strategies	What are the pricing strategies of firms in the market? What are the implications for expected prices?
Sources of supplies or services	Which firms in the market are the most likely to submit offers to our RFP?
Technical features	What features distinguish one product from another? Which commercial products match most closely with the RFP specificities? What is the apparent trade-off between features and price?
Delivery	What are the commercial lead-times?
Ownership costs	What are the historical repair costs for each product? What are the historical maintenance costs for each product?
Contract terms and conditions	What terms and conditions are used in commercial transactions? What terms and conditions have been used in other Government acquisitions?
Problems	What has been the historical default rate by firms performing similar contracts? What performance problems have typically been encountered? Have similar acquisitions been characterized by claims or cost overruns?

- (c) Results obtained from market research needs to be analyzed with caution. In particular, estimates obtained from potential bidders do not reflect the actual pricing likely to be achieved in bidding process. It would be necessary to broad-base the market research as much as possible i.e. taking inputs from several sources, carefully analyze them to see the trends, discount them if necessary and then come to a proper estimate for benchmarking.
- (d) **Situations for use:** When cost estimation cannot be done by any of the three methods mentioned above, then Market Intelligence method remains the only option to find a way out. Through this method, cost estimation can be done either for whole projects or parts of it, depending on their market availability.
- (e) **Advantages:** As it reflects the current market reality, to that extent it provides a more realistic estimate than Analogy method. It also provides tools to CNC for better negotiation with L-1 bidder at a later stage.
- (f) **Disadvantages:** Market prices need not match the pricing approach of a bidder in competitive environment.

## **Conclusion**

The cost estimation methods mentioned above need not be exclusive. While Analogy method may provide linkage with past records, benchmarking in the same case may need to be supplemented with Market Intelligence method for incorporating current market conditions. Similarly, in the same case, some items may qualify for the engineering method or the parametric method, while others may require help of the analogy method or the market Intelligence method. In fact, considering the complexity involved in capital acquisitions, it is expected that all these methods will be used in combination with each other for arriving at a most optimal reasonable cost for benchmarking purposes.

## ANNEXURE A

### Price Index Numbers

1. Price index numbers measure relative price changes from one time period to another. They are so widely used that discussions related to index numbers in contract pricing normally refers to price indexes. However, other index numbers could be used in contract pricing, particularly indexes that measure productivity. It is important for buyers to know how to use price index numbers to make the price adjustments necessary for analyzing price and cost information collected over time.
2. **Type of Price Index Numbers:** Price index numbers can indicate price changes for one or several related supplies or services over a period of time.
  - a. Simple index numbers calculate price changes for a single item over time. Index numbers are more accurate if they are constructed using actual prices paid for a single commodity, product or service rather than the more general aggregated index.
  - b. Aggregate index numbers calculate price changes for a group of related items over time. Aggregate indexes permit analysis of price changes for the group of related products, such as price changes for apples, oranges, plywood, or nails. An example of an aggregate price index is the Producer Price Index that provides information on the changes in the wholesale price of products sold in country over a given period of time.
3. **How to Use Price Indexes:** One can use price index numbers to:
  - a. Inflate/deflate prices or costs for direct comparison. One can use price index numbers to estimate and analyze product prices and costs today using the price/cost of the same or a similar product in the past.
  - b. Inflate/deflate prices or costs to facilitate a trend analysis. One can use index numbers to facilitate trend or time series analysis of prices and costs by eliminating or reducing the effects of inflation so that the analysis can be made in constant-year rupees (rupees free of changes related to inflation/deflation).
  - c. Estimate project price or cost over the period of contract performance. Prices/costs of future performance are not certain. One effect that needs to be considered is the changing value of the rupee. One can use index numbers to estimate and negotiate future costs and prices.
  - d. Adjust contract price or cost for inflation/deflation. When price/cost changes are particularly volatile, one may need to include an economic

price adjustment clause in the contract. The use of index numbers is one of the most popular methods used to identify and define price changes for economic price adjustment.

4. **Constructing Price Index Number:** If our activity involves repeatedly buying the same types of services or supplies, we may consider developing our own price indexes to track trends in price over time. The steps below demonstrate the procedures for developing a simple price index. To develop an aggregate index, one may follow the same basic steps using data from the various products selected for index development. There are four steps to developing a simple price index number:
  - a. Step 1. Collect data for each period.
  - b. Step 2. Select an appropriate base period.
  - c. Step 3. Divide each period price by the base-period price.
  - d. Step 4. Multiply by 100 to produce an index number.
5. **Selecting A Price Index For Analysis:** One needs to use published indexes carefully, because a published index will usually not exactly fit the pattern of price changes for the product or service that you are analyzing. The data are usually not from a specific contractor or location, but represent national or regional averages. Nevertheless, pre-constructed index numbers offer a practical alternative to the costly and time-consuming task of developing index numbers from basic cost data. When using published indexes, we need to choose the index series that best fits our specific analysis effort. Usually, the closer the chosen index series relates to the item that we are pricing, the more useful the number will be in our analysis. If we are buying a finished good, indices representing raw materials and purchased components may not necessarily provide an accurate basis for projecting prices. The finished good price may also be strongly influenced by trends in direct labour, cost of capital, etc. Accuracy can be improved through use of a weighted average index, which represents changes in both labour and material elements of price. Many contracting organisations develop weighted average indexes for major products or major groups of products, which can be used.
6. **Sources of Published Indexes:** We may not have the time or data required to construct the price indexes that we need for price or cost analysis. Fortunately, there are many sources of previously constructed price indexes that we can use to estimate price changes. These sources include:
  - a. Ministry of Labour, Bureau of Labour Statistics;
  - b. Ministry of Industry;
  - c. Ministry of Finance;
  - d. Other Government agencies;
  - e. Other Government contracting organisations;
  - f. Commercial forecasting firms;
  - g. Industry or trade publications; and
  - h. Financial Newspapers.



## 7. Adjusting Price/Cost For Analysis:

- a. Compensating for Inflation or Deflation—The changing value of the rupee over time can complicate comparisons and other analysis using price or cost information collected over time. We can use price indexes to adjust prices and costs to compensate for inflation or deflation in order to facilitate direct comparisons and further analysis.
- b. Calculating Relative Price Change Between Two Periods—Index numbers indicate the percentage change in price relative to the base year. To adjust prices for inflation or deflation, we must be able to determine how prices changed between any two-time periods. To calculate the percentage price change between any two-time periods, we may follow the same procedure that we would if we had actual price data.
- c. Estimating Price/Cost Using Index Numbers—We can use index numbers to adjust prices or costs from any time period for inflation or deflation. These calculations can be formalized into a simple equation as described below:

$$P_2 = \frac{I_2}{I_1} \times P_1$$

Where:

- $I_1$  = Index in Time Period 1: the index for the period for which we have historical cost/price information.
  - $I_2$  = Index in Time Period 2: the index for the period for which we are estimating.
  - $P_1$  = Price/cost in Time Period 1: historical cost/price information.  $P_2$  = Price/cost in Time Period 2: cost/price estimate.
- d. Adjustment Period Selection—When adjusting historical prices for inflation, we need to take care in selecting the period of adjustment. There are two basic methods that we can use in adjusting costs/prices:
    - (i) Adjustment based on period between acquisition dates: This is the method most commonly used to calculate the period of price adjustment, because acquisition dates are readily available. For example: An item being acquired in January 2011 was last purchased in January 2010. Using this method, the logical adjustment period would be January 2010 to January 2011—a year of inflation or deflation. If delivery schedules are similar, this method should be satisfactory. However, if delivery schedules are significantly different, we may be over or under the adjustment required. For example, if the January 2010 acquisition provided for delivery in January 2011 and the January 2011 acquisition also provided for delivery in the same time, allowing for a year of inflation or deflation would likely overestimate the adjustment required. The pricing of the first acquisition should have already considered the anticipated price changes between January 2010 and January 2011. Why make a second adjustment for the same price changes?

- (ii) **Adjusting Adjustment based on period between delivery dates:** This method for determining the appropriate period of adjustment is probably more accurate for the reasons described above. The problem with applying this method is the collection of accurate information on delivery dates. Application is further complicated by deliveries over an extended period of time. For smaller value material purchases in periods of limited price changes, the differences between acquisition date to acquisition date and delivery date to delivery date adjustment may not be that significant. However, as contract costs/prices increase or cost/price changes become more volatile, selection of the proper adjustment period becomes more important. In this method, labour rates should always be estimated for the time period in which the work will be performed.
8. **Adjusting Price/Cost for Pricing comparisons**—We can use price indexes to develop benchmarking estimates of current price or cost based on historical information. These benchmarking estimates can be used for a variety of purposes including comparison with an offered price or cost as part of an evaluation of reasonableness. Steps in using price indexes to analyze price/cost reasonableness are given below:
- Step 1. Collect available price/cost data.
  - Step 2. Select price indexes for adjusting price/cost data.
  - Step 3. Adjust price/cost for inflation/deflation.
  - Step 4. Use adjusted price/cost for pricing comparisons.
9. We should not attempt to determine whether a price or cost is reasonable based this type of analysis alone. We must consider the entire contracting situation, including any differences in quantity, quality, delivery requirements, or other contract terms that might significantly affect price. Moreover, the vintage of data is also an issue to be seen. We should generally place less reliance on a comparison based on older data than we place on a comparison based on more current data.
10. **Identifying Issues & Concerns and Questions to Consider in Analysis**—As we perform price/cost analysis, we may consider the issues and concerns identified below whenever our analysis is based on data collected over time.
- a. Were prices/costs collected over time adjusted for inflation/deflation? Inflation/deflation can mask underlying price changes and thus price indexes should be used to compensate for the effect these general price changes generate.
  - b. Is it reasonable to use the price index series selected? The price index series selected for making the price/cost adjustment should be as closely related to the item considered as possible. For example, we should not use the Consumer Price Index to adjust for changes in the price of complex industrial electronic equipment.

- c. Is the time period for the adjustment reasonable? When adjusting historical prices for inflation, we need to take care in selecting the period of adjustment. There are two basic methods that are used in adjusting costs/prices, period between acquisition dates and the period between delivery dates. The period between acquisition dates is most commonly used because purchase dates are typically more readily available. However, we need to be careful if delivery schedules are substantially different.
- d. Is more than one adjustment made for the same inflation/deflation? For example, it is common for bidders to adjust sub-vendors' quotes to consider inflation/deflation between the time when the quote was obtained and the date that the product will be required. This is acceptable unless the sub-vendors already considered the inflation/deflation in making the quote.
- e. How far into the future can we forecast? We can forecast any period into future as long as we have a reasonable index estimate. However, the price forecast risk increases as the risk of developing a reasonable index estimate increases. The farther into the future that we forecast, the greater the risk that the economic factors affecting the index will change.

## ANNEXURE B

### Learning Curve Theory

1. Learning curve theory is a tool used when computing an estimate of production costs that accounts for efficiencies in labour doing repetitive tasks. The theory of learning curve states that as the quantity of a product produced doubles, the recurring cost per unit decreases at a fixed rate or constant percentage. The learning curve theory is best applied in situations where the following conditions exist:
  - a. Uninterrupted serial production (i.e. no production breaks)
  - b. Consistent product design
2. These conditions should lead to the decline of unit cost with increased production quantities due to:
  - a. Worker familiarisation with the required tasks (learning) and thereby more specialisation and labour efficiency.
  - b. Process improvements resulting from experience with the tasks e.g. more efficient layout of assembly line, simplification of method sheets, reduction of re-work, repair, and scrap, improved parts bin accessibility, new or improved tooling etc.
3. The learning curve technique is primarily used to analyze and estimate direct labour hours, specifically manufacturing labour hours in contracts that are labour-intensive. The learning curve theory states that each time cumulative production doubles, the total manufacturing time and cost falls by a constant and predictable amount. The focus here is on the constant reduction in time required over successive doubled quantities of units produced, which is called the rate of learning. The slope of the learning curve is the difference between 100 per cent and rate of learning.
4. The learning curve technique is based on the results of empirical studies that showed that the time required to perform a task decreases each time the task is repeated, the amount of improvement decreases as more units are produced, and the rate of improvement is consistent enough to allow it to be used as a prediction tool.
5. **Methods:** The learning curve can be used in two different models—the cumulative average cost curve and the unit curve. The cumulative average cost curve plots cumulative units against the average cost or average hours required per unit for all units produced. The unit cost curve plots cumulative units produced against the actual hours required to produce each unit.

## 6. Example:

Table for Learning Curve Illustration

<i>Units produced</i>	<i>Labour hours per unit as doubled quantities</i>	<i>Difference in labour hours per unit at doubled quantities</i>	<i>Rate of learning %</i>	<i>Slope of learning %</i>
1	100,000			
2	80,000	20,000	20	80
4	64,000	16,000	20	80
8	51,200	12,800	20	80
16	40,960	10,240	20	80
32	32,768	8,192	20	80

The first unit required 100,000 labour hours to produce. As the units produced doubles, the number of labour hours required to produce that doubled quantity is reduced by a constant rate, in this case 20 per cent. Thus, the rate of learning is 20 per cent, and the slope of learning curve is 80 per cent (100% minus rate of learning). It may be noted that although the amount of labour-hour reduction between doubled quantities is constantly declining (20,000. Then 16,000, then 12,800, and so on), the rate of learning remains constant at 20 per cent.

7. **Situations for use:** In several DPSU single tendering cases, regular productions are assured due to policy decisions taken in MoD to award contracts only to them. There is continuity in production in such large-value cases, which also generally happen to be labour-intensive. Learning curve technique might be useful in such cases.
8. **Questions to ask:** Before conducting a cost analysis using the learning curve method, some critical questions to be asked seeking confirmation of its utility is mentioned below:
  - a. Is there a significant amount of manual labour involved in the production process?
  - b. Is there an uninterrupted production process?
  - c. Does the production process involve complex items?
  - d. How extensive are major technological changes involved in the production process?
  - e. Is there a continuous pressure to improve production efficiencies?
9. While learning curve theory may be applied to the production of a system's cost estimate, the challenge will be in determining the appropriate learning curve to use for a particular system. Ultimately, the only way to know the "true" learning curve for a particular system is to observe it after the fact. Sometimes, estimates may be done by using historical data from other similar type systems to estimate the new system's learning curve. However, caution should be applied to the simple straightforward use of historical learning curve data. The primary concern is how well the historical data reflects the expected production condition for the new system. To the extent that such production conditions differ from the past, we should attempt to quantify the effects of the differences in the historical learning curve.

## Towards an Optimal Procedural Framework: The Indian Experience

*R.K. Ghose*

### **Introduction**

The concept note for this seminar begins with stating that defence acquisition is a complex task involving expertise in military technology, industry, contract/project management and policy making. The efficiency or lack of it in defence acquisitions has impacts on overall defence preparedness. This captures the basic context in which any discussion on defence acquisition procedures has to take place.

An optimal procedural framework has, at the outset, to take cognizance of the environment in which defence acquisitions are to be undertaken, the stakeholders involved, the objectives that are sought after and the parameters within which these objectives are to be achieved. In India, we are placed in somewhat of an unique situation in many respects.

Defence equipment in India is procured from a variety of suppliers and Original Equipment Manufacturers (OEMs) ranging from our own Defence Public Sector Undertakings and the Ordnance Factory Board, to private Indian industry and foreign Governments as well as foreign industry. Even taking into account the global nature of defence business and the fact that most major companies are system integrators and procure sub-systems and components from other sources world wide, we do not find such a variety in most major countries as we have in India. In USA, defence acquisitions by the US Government are almost entirely from private American companies based in USA. In Europe, defence procurements are largely from western companies, either European or American, which are also largely in the private sector. If we look at Russia, their procurements are mostly from their own industry. The business philosophies, the pricing practices and the regulatory and legislative framework of each of these segments are very distinct.

In India, we have the benefit of equipment being on offer from all major

OEMs/vendors of defence equipment worldwide. This creates its own challenges as any procedural framework for defence acquisitions by India has to take into account the differing requirements and regulations governing procurements from different countries so as to ensure an enabling framework that allows all to effectively participate on an equal footing. Not to do so would only result in narrowing the vendor base and perhaps denying the Services the best value for money.

Before we can define an optimal procedural framework, we need to define the objective of defence acquisition procedures. The objective of our Defence Procurement Procedure is to ensure expeditious procurement of the approved requirements of the Armed Forces within the stipulated time frame and ensure optimal utilisation of the allocated budgetary resources. The key tenets are thus (a) expeditious procurement of approved requirements, (b) timely procurements, and (c) optimal utilisation of allocated funds. The defence procurement procedure must also reflect (a) the national policy of progressive self-reliance in defence equipment, (b) transparency and accountability, and (c) fair competition.

The above may seem to be basically common sense but their implementation often gives rise to contradictory impulses that have to be balanced and reconciled. For example, promotion of self reliance may mean not only offsets but could also mean giving preference to procurement from indigenous sources even where the specifications of the equipment under consideration may not be the best available. Questions then arise of to what extent this compromise with operational capabilities can be acceptable to the user? There can be issues of time frame for delivery and even to what extent it is actually indigenous. It can be argued that if we are to eventually reach the desired level of technical sophistication in designing and manufacture of major defence platforms and equipment and reduce dependence of imports, then compromises at the initial stages may be inevitable. The counter argument may be that the operational requirements or security imperatives do not allow the luxury of such compromises. The point is that these become relevant while stipulating guidelines for framing of Service Qualitative Requirements and in categorisation of proposals that are the first steps in the procurement process. Similarly, provisions relating to transparency and accountability often entail additional costs. It is however obvious that we cannot forgo such stipulations. The issue then is to have stipulations that fulfil the requirement of ensuring transparency and accountability without unduly stifling the process or burdening it with unacceptable costs. Each of these competing aspects as well as others has to be taken into account while establishing a framework or guidelines for defence acquisitions.

A procurement framework has to be in consonance with the institutional framework that either exists or can be established. There is little use in designing a framework or stipulating guidelines unless there are matching institutional mechanisms that can effectively implement them. It could also be that an optimal procedural framework requires a wholesale re-look at the existing institutional

framework and contemplation of a substantially different institutional framework for effective implementation.

Ideally speaking, given the complexities involved in defence procurements, the skill sets required for evaluation of procurement proposals and conduct of negotiations and the magnitude of public funds involved, there should be a separate professional organisation for undertaking procurement of defence equipment for the Services. Many of the issues relating to the quality and credibility of the procurement processes and concerns relating to delay in procurements arise out of complicated procedures. Several levels of decision making could be substantially addressed by setting up such a separate professional and fully equipped organisation, drawing personnel from different wings of government (both civil and uniformed) who are equipped with the required skills and knowledge base. The setting up of the acquisition wing was an initial first step in this direction. But the acquisition wing remains a part of the administrative structure of the Department of Defence and is not really a separate organisation. Hence, the procedures that are discussed or suggested in subsequent paragraphs take into account this reality of an acquisition wing within the Department of Defence.

### **Stages of the Procurement Process**

The broad stages of defence procurement are as follows:

- (a) identification of operational capabilities and requirements, translation of operational requirements into definitions of equipment and framing and approval of Service Qualitative Requirements (SQRs);
- (b) approval for procurement of the equipment;
- (c) framing of requests for proposals;
- (d) technical evaluation of proposals received;
- (e) commercial evaluation of proposals received;
- (f) approval of the competent financial authority and conclusion of contract; and
- (g) post contract management and monitoring.

Despite the defence offsets are connected to and arise from defence procurements, the aspect of offsets and their administration has been excluded from the ambit of this paper since it is a separate topic.

### **Determination of Operational Capabilities and Framing of SQRs**

Operational capabilities and requirements flow from policy directives arising from an analysis of the security environment and the security and foreign policy objectives of the Government. This is not really within the domain of the procurement procedure per se but it is the starting point. It is for the Government of the day to decide the national policies in this regard which is then conveyed to the Services. Based on these policy directives, the Services would frame the operational capabilities required for operationalising or implementing the policy directions indicated by the Government.



In India, defining operational capabilities and requirements are the domain of the Services. This is closely linked with translation of operational requirements into definitions of equipment. There is a point of view that such defining of operational capabilities and its translation into equipment required should not be left entirely to the Services and there should be a separate mechanism that would undertake this activity albeit in consultation with and taking into account the view of the user Service. The reason put forth is that the user Service often tends to exaggerate the operational capabilities required and seek the most high end and best equipment available, which may not actually be required. Issues of ensuring a wide vendor base and a widest possible vendor participation, promoting self reliance by favouring procurement from indigenous sources and budget issues are not given the significance that they deserve in this process. In some countries, determining the operational capabilities required and framing of Service Qualitative Requirements (SQRs) that are really translation of capabilities into specifications of equipment is done by an agency separate from the user Services.

The counter argument would of course be that it is the user Service that is best placed to assess their operational requirements given the challenges that they have been tasked to cater for. They cannot be expected to unduly compromise their operational requirements in the name of ensuring wider vendor participation, development of indigenous industry, etc. It is argued that these may in fact endanger the men in the field or undermine their ability to fulfil missions assigned to them that was unacceptable.

Framing of operational requirements requires knowledge and understanding of the security imperatives, military strategy and tactics and available weapons technology. It should be accepted that the user Service must have a dominant voice in such decision-making. At the same time, one must also acknowledge the natural tendency of any Service to seek the best available without giving adequate importance to other factors.

The Defence Procurement Procedure (DPP) 2011 stipulates that the Service Qualitative Requirements (SQRs) should be broad based and realistic. The SQRs must express the user's requirements in terms of capability desired with minimum verifiable functional characteristics and its formulation must not prejudice the technical choices by being narrow and tailor made. The SQRs should be of contemporary technology available widely in the world and indigenous market. It mandates the requirement for issue of a Request for Information as well as seeking information from as many sources as possible while framing SQRs. The SQRs are approved by the Staff Equipment Policy Committee (SEPC), which should assess that the SQRs would result in a multi vendor situation. If a single vendor situation is likely to arise, then the reasons for formulation of such SQRs need to be recorded. The DPP further stipulates that if certain state-of-the-art equipment being manufactured by only one vendor is to be procured, then such a case should be specifically debated by the Defence Acquisitions Council after a technology scan is carried out by HQ IDS in consultation with the Defence Research and Development Organisation (DRDO).

The DPP thus actually recognizes both the streams of thought stated above in that it entrusts framing of SQRs to the Service Headquarters but simultaneously mandates them to consider all the relevant factors.

The present structure of the acquisition wing does not incorporate the expertise required to independently or autonomously assess SQRs. The DPP already provides that the draft SQR will be circulated inter alia to the technical manager who is a part of the acquisition wing and his inputs will be taken into account by the SEPC. If there is to be an independent framing of SQRs, it can be done only if and when we have an entirely separate adequately equipped and empowered organisation devoted to defence acquisitions and covering the entire defence acquisition process from initiation to conclusion.

Inclusion of non-government institutions, agencies or academia in the decision making process, often recommended by some, may not be appropriate given the extremely sensitive nature of the information that is involved. However, this does not certainly preclude the Service from seeking relevant inputs from these institutions while framing the SQRs. In fact, it may be worthwhile for them to do so. Taking all the above factors into account and given the present institutional dispensation, the determination of operational capabilities required and the framing of SQRs should be left to the user Service as at present.

However, the SEPC needs to scrutinize the proposed SQRs keeping in view the stipulations of the DPP. This is something that is not fully evident in every case at present. Further, though the DPP is quite clear on this aspect, it needs to be reiterated that there should be no change necessary in the SQRs once they have been framed and certainly once RFPs have been issued. Hence it is imperative that the SQRs are diligently and professionally formulated taking into account both the anticipated delivery period as well as the operational period of the equipment being procured. There should be no changes necessary subsequently in the name of advancements of technology or additional operational requirements. This would indicate inadequate due diligence at stage of framing of SQRs and is at times the reason for withdrawal of RFPs and consequent delays in procurement. SQRs have to be properly determined and fixed. Advancements in technology should be catered for through an upgrade process after due approvals and not through ad hoc revisions in SQRs. In other words, the procedural framework stipulated in the DPP 2011 is considered appropriate. We just have to work it better.

### **Approval for Procurement of Equipment**

Under the extant Defence Procurement Procedure, there is a three stage process for approval for procurement of equipment viz. the Services Capital Acquisition Plan Categorisation Committee (SCAPCC), the Services Capital Acquisition Higher Categorisation Committee (SCAPCHC) and the Defence Procurement Board (DPB) or the Defence Acquisitions Council (DAC). The Categorisation Committees and subsequently the DPB/DAC accord 'Acceptance of Necessity' (AON) for the procurement of the equipment. By very definition, consideration

of 'AON' covers the entire gamut of factors relevant for procurement of equipment including looking at the SQRs, the source of the procurement, whether it should be single vendor or can it be multi vendor, etc. This is arguably the most critical stage of the procurement process as all subsequent activities are essentially implementation of the decisions taken at this stage. The Categorisation Committees as well as DPB/DAC include representatives of all the stake holders involved i.e. the Services, MoD (Finance), HQ IDS, DRDO, Department of Defence Production and the acquisition wing.

These are high-level committees that should have the conclusive word in respect of the proposed procurement. However, the experience has been that issues that fall within the domain of these committees and that have been considered and dealt with by them are again raised ab initio at subsequent stages of the approval process. This not only delays the procurement process but also dilutes the authority of these committees. The argument of fresh or independent ab initio examination of cases cannot be taken to the extent of re-opening issues decided by the empowered high-level committees. In that case, the very existence of these committees is rendered superfluous. There must be finality to deliberations at each stage before the next stage is initiated and unless there are grave and apparent omissions or commissions or gross irregularities, decided issues should not be raised again and again particularly since the benefit of the information that was available to the committee may not be equally available to the authority raising the questions. This only delays the procurement without adding any real value. The committees and those servicing them must be responsible and accountable for their recommendations and decisions and subsequent scrutiny should be aimed at ensuring that the actual procurements are strictly in accordance with the approvals accorded.

It is felt that while there is no requirement for any change in the stipulated procedure for categorisation and approval of procurement proposals, we need to accord a greater degree of finality to the decisions of the DPB/DAC as it is on these decisions that the entire procurement process is based. If it is felt that the composition of the committee i.e. the DPB or the DAC should have outside representation e.g. of Ministry of Finance, in order to lend greater credibility and acceptability to its decisions, it should be considered.

### **Issue of Request for Proposals**

The DPP is quite clear as to the process of framing of Requests for Proposals (RFPs) and their approval and issue. The RFPs are based on the SQRs and the approvals accorded by the DPB/DAC. They are framed by the user Service Headquarters, examined by the technical manager concerned in a collegiate manner together with the finance manager and the acquisition manager and thereafter submitted to the director general (acquisitions) for approval before issue. There should be no change in the terms or specifications of the RFP after its issue—this is particularly important in multi vendor procurements. The RFP constitutes the first legal document of the procurement process of the equipment concerned.

While framing RFPs, care has to be taken to ensure that vendors from across the spectrum are enabled to participate. The effort must be to encourage the widest possible participation and the RFP should reflect that.

It is important that draft RFPs are circulated at the formulation stage to all concerned directorates and agencies including maintenance wings and agencies proposed to be entrusted with production (in cases of license production and/or with transfer of technology) or maintenance (in cases involving maintenance transfer of technology) so as to ensure that their requirements are incorporated and reflected in the RFP. It is also important that these agencies give serious attention to these draft RFPs at this stage. It has been the experience that adequate attention is not paid by all concerned at the stage of drafting of RFP with the result that changes or deviations are sought or necessitated at the later stage of technical evaluations or contract conclusion. This is neither desirable nor as a general rule permissible under the procurement procedures.

One issue that is often raised is whether maintenance and support for the life-time of the equipment being procured can or should be catered for and decided at the time of the procurement contract itself. There is logic as to why this should be done. Any equipment or weapon platform that is procured needs to be maintained over its life-time. The standard terms of contract only obligate the seller to provide product support for a maximum period that is to be stipulated. However, once equipment is procured and inducted into service, vendors may over-price spares and support services and there is limited leverage available with the Buyer at that stage to insist on reasonable costs due to operational imperatives. Thus, if life support could be negotiated at the time of the procurement itself, then obviously value for money could be better ensured. The problem, however, is that since the technical or operational life of any equipment can be even 20 or more years, how does one fix costs? One way is an index-linked formula assuming one can agree on the indexes to be adopted. However, given the dynamic nature and uncertainties in global economies and finances and the huge variations in costing philosophies and methods of calculating escalation factors and indices, predicting requirements as well as costs over such an extended period is inherently subjective.

The solution would perhaps emerge with new technology and maintenance philosophies and practices. For example, modern aircraft do not require the standard maintenance procedures necessary for older generation of aircraft. They are now on 'on condition' basis. Integrated logistics support and maintenance programs that have evolved and that can be contracted for extended periods also address this issue and mitigate some of the concerns. These could be asked for as part of the RFP for the procurement itself. Nevertheless, it may not be realistic to expect that support and maintenance for the entire technical or operational life of the equipment can be comprehensively and completely addressed at the procurement stage itself.

There have been instances of withdrawal of RFPs that are often cited as examples of deficiencies in the procurement process. Broadly speaking, withdrawal of RFPs have occurred where they have elicited inadequate response

from vendors resulting in either no-bid or single bid situation or where there has been an error in the RFP necessitating its withdrawal and re-issue. All such instances need to be viewed very seriously as they not only result in delay in procurement of equipment required by a Service but also have the potential of resulting in increase in cost of the equipment being procured. No-bid or single bid situations arising after issue of RFPs indicate an inadequate appreciation of the available equipment in the world or indigenous markets or of framing of narrow or unrealistic technical specifications or stipulating unrealistic delivery schedules—all aspects that should have been properly examined prior to framing of SQRs as specifically stipulated in the DPP. Errors in technical specifications incorporated in RFPs often come to light during the pre-bid exchanges between the Service Headquarters and vendors necessitating withdrawal of the RFP. These are issues of lack of due diligence or insufficient in-depth study before framing of SQRs rather than of any procedural infirmity. They need to be dealt with as such.

### **Technical Evaluation of Proposals**

Under the DPP, technical evaluation of proposals received in response to a RFP is conducted in two stages viz. (i) technical evaluation based on the documentation furnished by the vendors and (ii) field evaluation of the equipment offered by vendors. The entire technical/field evaluation process is validated by the technical oversight process that is conducted in selected procurement cases of over RS'300 crores in value. The rules and procedures are quite well defined in the DPP and what is required is scrupulous adherence to them. In order to enhance transparency and ensure a level playing field, the DPP 2011 mandates that the Trial Methodology for checking the SQRs are formulated and indicated upfront as an annexure to the RFP. All equipment on offer is evaluated in accordance with this methodology.

A question that is often raised is whether there should be a ranking of technical compliance in order to take into account equipment that may be technologically superior to another on offer while both meet the technical requirements stipulated in the RFP. The argument in favour of such a proposal is that it may enable acquisition of the technologically best equipment. However, the problem with such a proposal is the element of subjectivity that is introduced. Though we may have field evaluation teams and a staff evaluation process thereafter, what is the best is always a matter of judgment and differs from team to team and from individual to individual. Earlier, there was a concept of "Essential Parameters" and "Desirable Parameters" for technical evaluation of equipment. But even this was subsequently done away with since there were subjectivities in assessment that impinged upon a transparent determination of L1 vendor. Given our past experience, an important concern is the maintenance of transparency and fair play in defence procurements and this has to be maintained even if it reduces to some extent the possibility of better equipment through a more flexible procurement process.

It may be added that much of the concerns of appropriate levels of

technology in equipment being procured can be mitigated if we ensure a proper assessment and study of what is available and likely to be available and tailor it to our specific needs at the time of framing of SQRs and subsequently RFPs. We need not always aspire to have the best equipment. What we should procure is what we realistically need to counter the threat perceptions that we may have and the security contingencies that we may need to provide for.

Another related issue is whether a field team can evaluate and suggest optional equipment that in its view would enhance the operational utility of the equipment being procured. It is argued that it is not always possible to foresee all that may be available or the most optimal solutions or everything required at the stage of formulation of technical specifications and SQRs. Here again, the position has to be viewed through the twin glasses of maintenance of transparency and fair play in the procurement process and the established process of assessing what is actually sufficient to meet the operational objective for which the equipment is being procured. Any significant change in specifications of equipment may have cost implications and amounts to modification of the SQRs that have been formulated through an established process and approved by the SEPC. It thus has the potential of vitiating the level playing field. Given the level of due diligence envisaged in the DPP and the professional knowledge and competence that exists at each Service Headquarters, it can be reasonably expected that the SQRs as finally framed and approved by the SEPC captures all that is required for the equipment that is being procured. There can always be refinements or better equipment. This does not mean that they need necessarily to be procured. Hence, such changes should not be allowed.

Much of the time taken in finalisation of procurement cases is in the technical and field evaluations. Since equipment has to be brought into the country for trials and these have to be undertaken in different geographical and often climatic conditions, it inevitably takes a long time. However, it could be examined whether the system of hot weather and cold weather trials that is prevalent in procurements particularly of the Army is relevant for all type of procurements even today. If such year-long trials can be limited to only that equipment where it is essential, the time taken for trials and consequently the procurement process as a whole can be significantly reduced.

### **Commercial Evaluation of Proposals**

Like for the technical evaluation process, the procedure for commercial evaluation of proposals is laid down in the DPP. It envisages commercial evaluation, determination of L1, discussions as may be necessary and finalisation of contract in a collegiate manner by the Contract Negotiation Committee (CNC). The commercial evaluation is of the equipment that has been sought in the RFP and as evaluated and found compliant in the technical or field evaluation. There should normally be no addition of equipment or enhancement of capabilities at this stage. Nor should there be any change from the standard terms of the

contract particularly in case of those that has an impact on costing of the proposal.

The unique situation referred to earlier arising from procurements being made from vendors used to different costing and contractual terms gain prominence at this stage. The DPP requires the contract to be based on a firm and fixed price. Given the fact that the typical period for implementation of major procurement contracts ranges from five to seven years, many vendors would prefer a cost based on a base year, which is thereafter to be escalated as per an agreed escalation formula. Even if an escalation formula is considered, there are often different perceptions as to the appropriate indices to be adopted. Some vendors seek changes or additions to the standard contract terms stipulated in the DPP. These include, as illustrative examples, those relating to effective date of commencement of contract, applicability of laws and national jurisdictions, arbitration mechanisms and limitation of liability. Many of these discussions arise from what they consider standard commercial practice or global best practice or statutory requirements that they may be subject to in their home countries.

Contracts relating to defence procurements in India are entered into by a sovereign Government on one hand and a commercial entity on the other. It is not a simple commercial contract and thus not all the considerations and situations that govern commercial contracts apply. A primary consideration in defence procurements is that the contracting party must be held responsible for the performance of the contract under pain of stringent penalties for non-performance. This is so because non-performance is not just a matter of commercial liabilities but also impinges on the defence preparedness of the country. Hence, contract terms may inevitably be biased in favour of the Government. It may be added that certain safeguards and leverages are essential particularly in the Indian context since the procurements are from foreign companies based outside India. Hence, clauses seeking to enforce full and proper performance like liquidated damages, warranty clauses, performance guarantees, product support clauses, rights to terminate, etc. should not be diluted.

Furthermore, a sovereign Government has certain inherent powers that should not be abdicated through contractual provisions. An example would be to blacklist the company or decided not to do future business with it in case of default, persistent default or allegations or proven criminal or civil misconduct. However, all such exercise of sovereign prerogatives as well as invoking of penal clauses of contracts has to be within the realms of settled law and the principles of natural justice and these provide a balance to the contract and assurances against arbitrariness to the vendor.

Dealing with such issues requires knowledge of contract laws both in India as well as abroad. Under the present dispensation, the acquisition wing does not have an integral arrangement for legal advice or vetting of contracts particularly where there are issues requiring changes in the standard terms. This necessitates recourse to a rather elongated and time consuming process of reference to the

Ministry of Law represented by the legal advisor (defence) who in turn may not be entirely familiar with the intricacies of contracts or the details of the particular procurement case. This delays finalisation of procurement cases.

Under the present dispensation, it is envisaged that the acquisition managers would have the benefit of cost inputs from the advisor (costs), statistical inputs as to market trends and escalation indices from the statistical advisor and finance inputs from MoD (finance) while determining benchmarks and evaluating costs and assessing their reasonability. In practice, the inputs received are rather rudimentary and do not reflect the depth of analysis or the quality of input that should reasonably be expected given the huge volume of expenditures that are being dealt with. The offices of the advisor (cost) and statistical advisor are severely handicapped by lack of adequate personnel and it is not unusual to find the advisor (cost) personally hopping from one Contract Negotiation Committee (CNC) to another, providing whatever inputs he best can.

This lack of adequate legal backing as well as insufficient financial and costing inputs is a major deficiency in the present system. We clearly need procedures as well as institutional mechanisms whereby such inputs are provided to the acquisition managers so that they are not at a disadvantage when negotiating with representatives of vendors who are, more often than not, well qualified professionals in their respective fields.

In the firmament of Government, such expertise exists and needs to be tapped. The acquisition wing needs to be supplemented by personnel possessing the requisite skills and knowledge for benchmarking, cost analysis and financial analysis. Each acquisition manager should have dedicated personnel who would be part of the contract negotiation committees. Furthermore, the acquisition wing should have a dedicated legal advisor conversant with contractual law and relevant international law who can provide the requisite legal support to the acquisition managers.

### **Approval of the Competent Financial Authority and Contract Conclusion**

Approvals of the competent financial authority, and grant of expenditure sanction, are not only governed by the DPP 2011 but more so by the delegation of financial powers and the transaction of business rules of the Government of India. Broadly speaking, procurement proposals costing up to Rs 500 crores are sanctioned by the Defence Minister, from Rs 500 crores to Rs 1000 crores by the finance minister in consultation with the defence minister and beyond Rs 1000 crores by the Cabinet Committee on Security.

Given the extant rules that are actually beyond the purview of the Ministry of Defence, there is not much that can be suggested so long as the acquisition wing remains within the confines of the Ministry of Defence. However, one issue that is often seen as a factor delaying finalisation of procurement cases and conclusion of contracts is the observations on procurement proposals mainly from finance wing or the Ministry of Finance when finalized proposals reach them for comments/concurrence. While it would certainly neither be fair nor



accurate to hold finance responsible for delays, it is an issue that merits some deliberation.

The MoD (finance) headed by the Secretary (defence finance) exercises the financial check on all defence expenditure including of course procurement proposals. In addition, before a proposal can be considered by the cabinet, it has to be sent to the Ministry of Finance for comments and concurrence. It must be recognized that there is an inherent value in terms of checks and balances in scrutiny of expenditure proposals by an independent agency like the Ministry of Finance that should not be discounted.

The financial advisor (acquisitions) along with the finance managers are an integral part of the acquisition wing and are involved in the executive decision making at every stage of the procurement process from grant of 'AON' to seeking expenditure sanction of the competent financial authority. The whole acquisition process is envisaged to function in a collegiate manner with continuous and simultaneous scrutiny from finance point of view at every stage. The views and concerns of Finance are to be attended to and addressed at each stage of this process. Hence, it should be reasonably expected that all major financial issues are resolved before a proposal reaches the stage of seeking expenditure sanction of the competent financial authority. Thus, if major observations relating to finance issues remain unresolved at the late stage of seeking expenditure sanction, then it perhaps indicates a need to strengthen the financial scrutiny at the earlier stages of the procurement process.

Further, we need to acknowledge not only the existence and scrutiny of the Defence Finance Department but also the fact that issues of operational capabilities, usage, justification, etc. are considered by bodies like the DPB and the DAC headed by the Defence Secretary and Defence Minister respectively at the stage of initiation of the procurement process itself. The Secretary (defence finance) is a member of the DPB/DAC. Hence, generally speaking, observations by M/O Finance should be only in respect of issues of the cost of the proposals, reasonability of costs, adherence to all the stipulated procedures, etc. and should not normally extend to operational issues or questions of justification for the proposal itself which has been appropriately dealt with at the 'AON' stage.

### **Post Contract Management and Monitoring**

The DPP stipulates that while responsibility for contract administration and management would be that of the Service Headquarters concerned, post contract monitoring would be conducted by the acquisition wing. While simple projects involving one time off the shelf buys without any design and development shall be reviewed by the acquisition manager or equivalent service officer in the Service Headquarters, complex projects that require design, development and testing with likely transfer of technology should be reviewed by a steering committee headed by the director general (acquisitions) or principal staff officer at the Service Headquarters.

Contracts are signed by the acquisition manager and essentially post contract administration and monitoring is the joint responsibility of both the Service

Headquarters and acquisition wing. Contracts are to be implemented as per the terms and specifications of the contract. Where the contract represents the culmination of a diligently prepared procurement proposal, a comprehensive RFP and a well-managed technical and commercial evaluation process, there are generally no problems in implementation of the contract. Issues arise when either party to the contract seeks to deviate from the terms and specifications stipulated therein. This needs to be strongly discouraged unless there are extremely compelling circumstances necessitating change.

## **Conclusion**

The Defence Procurement Procedure has evolved over time into a fairly comprehensive and practical set of guidelines to manage defence procurements in a fair and transparent manner given the institutional structure that we presently have. The utility as well as effectiveness of the DPP is testified by the fact that procurement cases are proceeding at a relatively faster pace than before and where there are delays, they are attributable more to deficiencies in conceptualisation of procurement cases or in diligently progressing the case. To attribute them to procedures is not sustainable. Hence, while there may always remain scope for further streamlining and improvement, what is really required today is adherence to and implementation of the DPP in the intended letter and spirit. Hence, this paper does not really make a case for revolutionary procedural changes but for better implementation. It is axiomatic that a procedure is only as good as those who implement it.

In sum, an optimal procedural framework under the present dispensation would include the following:

- (i) SQRs should be framed in a comprehensive and holistic manner by Service Headquarters and there should be no change necessary in the SQRs once they have been framed;
- (ii) Once an issue that falls within the domain of the categorisation committees and the DPB/DAC has been duly considered and decision arrived at, they should not be re-opened again at subsequent stages unless there are prima facie indications of important issues being overlooked or of serious omissions and commissions. Subsequent scrutiny should be to ensure that the actual procurements are strictly in accordance with the approvals accorded;
- (iii) RFPs should be formulated with due care and diligence in consultation with all concerned. There should be no change in the terms or specifications of the RFP after its issue. RFPs should progressively include integrated logistics and maintenance programs for an extended a period as practically possible;
- (iv) There may be a need to strengthen financial scrutiny of procurement proposals at each stage of the procurement process so as to obviate the possibility of observations at later stages when remedial action may be difficult. Further, finance observations should not, a general principle, transgress into operational issues or questions of justification for the

- proposal provided it has been appropriately dealt with at the 'AON' stage; and
- (v) The acquisition wing should be reinforced by personnel possessing the requisite skills and knowledge for benchmarking, cost analysis and financial analysis. Further, the acquisition wing should have a dedicated legal advisor conversant with contractual law and relevant international law who can provide the requisite legal support to the procurement process.

It is however maintained that the ultimate goal should be for establishing a separate professional organisation that would deal with all defence procurements in a holistic manner. It could cover both revenue as well as capital procurements, which would also eliminate the present disconnect between the initial capital procurement and the subsequent revenue procurements. Its ambit should begin from the stage of seeking approval for procurement and all actions thereafter till contract conclusion. This organisation should also thereafter be responsible for contract administration and monitoring in consultation with the Service Headquarters and for reporting periodically to the DPB/DAC. It should be equipped with experts in costing, finance and law to deal with all procurement aspects. Till this is achieved, the present procedures provide adequate guidelines for a fair, transparent and efficient procurement process.

## Fine Tuning Procedural Framework to Achieve Balance in Defence Acquisitions

*Alina Arora and Yohan J. Balan*

“Defence Acquisition is a complex decision-making process that endeavours to balance the competing requirements of expeditious procurement, development of an indigenous defence industry, and conformity to the highest standards of transparency, probity and public accountability”

—A.K. Antony (Hon’ble Defence Minister)<sup>1</sup>

### **Introduction**

The Defence Procurement Policy 2011 (DPP) is a comprehensive procedural framework embodying the policy of the Government of India while procuring capital equipment for its armed forces. As admitted by the Hon’ble Defence Minister, these objectives may at times be viewed as competing against one another and it would be up to the procedure to bridge such gaps so as to achieve optimal results for all parties concerned.

Credit has to be given to the Ministry of Defence (MoD) in its maturity to acknowledge that the DPP is a ‘work in progress’. The efforts in revising the DPP on a regular basis, with each draft being more refined than the next is for all to see and is beyond reproach. However, beyond the print of the DPP lies a completely different experience of implementing the provisions contained therein.

The objective of this paper is to identify certain procedural areas and highlight the ramifications of their current form and/or practice on the procurement objectives sought to be achieved by the Government and to provide recommendations. The issues and recommendations highlighted are not based on an exhaustive analysis of all the data that is available with respect to defence procurements across the globe, but rather on the experience gained from practicing in this sector in India. For the sake of lucidity in the analysis that is

to follow, the areas to be examined have been categorized under two broad headings depending on the stage of procurement where each of these issues may arise:

- I. Pre-contract bidding; and
- II. Signing of the Standard Contract Document and its implementation.

## SECTION I PRE-CONTRACT BIDDING STAGE

### **(a) No Formal Bid Protest Mechanism in the Procedure for Defence Procurement**

A systemic issue plaguing the government procurement systems in India is the lack of a formal bid-protest mechanism akin to the US Government Accountability Office (GAO) bid protest mechanism<sup>2</sup> or the 'challenge procedure' recognized by the WTO Agreement on Government Procurement<sup>3</sup> or the 'review mechanism' as required under the UNCITRAL's Model Law on Procurement of Goods, Construction and Services<sup>4</sup>. It is essential for any mature procurement system to provide for an independent domestic review procedure which serves as a quasi-judicial mechanism for providing timely and effective remedies, whereby bidders can challenge contract-award decisions of public procuring agencies on the grounds of an alleged non-compliance with the procurement rules or suspected breaches of explicit or implicit duties of fair and equal treatment. The need for a specialised review mechanism for bidder grievances assumes even greater importance for India since much of the procurement, especially in the defence sector, aims at the transfer of state of the art technology into the country and that as such should be done at an optimal cost to the exchequer.

The framework of policies for government procurement, though scattered,<sup>5</sup> is commendable for the principles that it lays down, including those of fairness<sup>6</sup> and 'best value for money'.<sup>7</sup> This makes it all the more imperative that there exist an efficient mechanism to address the grievances of bidders at any stage of a tender in case of an alleged breach of the principles or rules of public procurement in India.

To say that India has no bid-protest mechanism would not be an accurate statement of fact. The Manual on Policies and Procedures for Purchase of Goods, 2006 (Manual), compiled by the Indian Ministry of Finance (containing generic instructions to all central governmental departments) provides that "A tenderer shall have the right to be heard in case it feels that proper procurement process is not being followed and/or its tender has been rejected wrongly. The tenderer is to be permitted to send its representation in writing which is to be examined by appropriate administrative authority of the purchasing Ministry/Department. But, such representation has to be sent within one month from date of placement of contract and to be replied (by the Ministry/Department) within one month from date of receipt of the representation"<sup>8</sup>. The aforesaid,

though applicable to all defence procurements, is not specifically provided for in the DPP or the Defence Procurement Manual, 2009 (DPM)<sup>9</sup>.

As to the implementation of the above provision, there have been instances of aggrieved bidders sending in representations alleging procedural lapses in the procurement process and in cases where the relevant department deemed fit, an enquiry was conducted into the allegations made against the concerned department involved in the decision relating to the award of the relevant contract. However, as per information available in the public domain, there appear to be no formal or informal rules that govern such intra-departmental enquiry process in the context of defence procurement. Hence, though a need for such a mechanism has been captured in the manual, it is not accompanied by a formal procedure in the current rules governing defence procurement.

Another recourse available to the bidders in case of criminal conduct by officials is to make a representation<sup>10</sup> to the Central Vigilance Commission (CVC), which is a statutory body constituted to exercise superintendence over all vigilance matters and implement anti-corruption measures in all central government departments. However, complaints to the CVC are meant to result only in punitive action against erring public servant(s), and are not primarily meant to redress grievances of an aggrieved bidder vis-à-vis the relevant government department. This is a deficiency that it shares with the monitoring powers of other external agencies that have the power to investigate irregularities in government procurement such as the Central Bureau of Investigation which conducts its own criminal investigation requiring conviction in a court of law and the office of the Comptroller and Auditor General of India (CAG), which conducts mostly post-hoc audits with observations which are non-binding in nature and are only placed before the Public Accounts Committee of the Indian Parliament<sup>11</sup>.

Hence, this leaves the most publicized recourse of protesting bids in India, which is to file a writ petition. An aggrieved bidder desirous of challenging the award of a government contract is entitled to file a writ petition in either the Supreme Court,<sup>12</sup> or in any high court where the cause of action has arisen<sup>13</sup>.

The writ jurisdiction of the Supreme Court may be invoked only for the enforcement of fundamental rights guaranteed by the constitution of India. Under Article 32 of the Indian Constitution, when a writ petition involves a challenge to the procurement process, a bidder would typically allege a violation of Article 14 of the Indian Constitution which guarantees every person the 'fundamental right to equality' (and is the source of the requirement that state action should not be arbitrary, but rather based on rational principles, which are non-discriminatory)<sup>14</sup>. The writ jurisdiction of the High Courts, on the other hand, is broader than that guaranteed by Article 32 of the Indian Constitution, and it may be invoked not only for the enforcement of a fundamental right but for 'any other purpose' as well.

As wide as these powers may appear, there are some self-imposed fetters on the courts with respect to the scope of any enquiry that may be made in relation to the award of a contract. The courts in India are concerned primarily

if there have been any infirmities in the 'decision making process'<sup>15</sup> and not the decision itself. Therefore, while courts can examine whether the decision has been made 'lawfully', i.e. the decision was reasonable, rational, not arbitrary or affected by mala fides or bias, they cannot, by way of judicial review, sit as a court of appeal or substitute their own decision for that which is taken by the Government. Recent case-laws indicate that before interfering in tender or contractual matters, a court should pose itself the following questions: (i) whether the process adopted or decision made by the authority is mala fide or intended to favour someone, or (ii) whether the process adopted or decision made is so arbitrary and irrational that the court can say: 'the decision is such that no responsible authority acting reasonably and in accordance with relevant law could have reached'<sup>16</sup>. As may be evident from the above, the burden of proof would lie squarely on the person alleging arbitrariness.

Further, it has also been recognized that evaluation of tenders and awarding contracts are essentially commercial functions, and so long as the decision relating to the award is bona fide, courts should not exercise their power of judicial review even if it is found that there has been a procedural lacuna in the procurement process<sup>17</sup>. Indian courts are also particularly conscious of the fact that their quashing a decision may impose heavy administrative burdens and lead to increased and unbudgeted expenditure and therefore tend to intervene only where there are overwhelming considerations of public interest<sup>18</sup>.

Having exhaustively examined all of the recourses available to bidders in the course of participation in tenders for defence procurement, it becomes apparent that there is no formal and efficient bid-protest mechanism that not only allows for expeditious procurements to be carried out but also maintains the highest standards of transparency and public accountability.

### **(b) No Detailed Guidelines for Rectification of Bids**

In the protracted time that it takes from the submission of bids to the award of a contract, it is possible that certain changes may be required to be made to the offers filed on account of a genuine mistake of the parties or due to changes that may have occurred in the intervening period. While minor changes, which do not change or affect the basic character/profile of the technical offers are allowed,<sup>19</sup> the DPP currently does not permit the correction of a commercial bid where there is a mistake, even if it is a genuine mistake. The DPP provides that commercial offers must be "firm and fixed"<sup>20</sup>. On the other hand, the DPM permits the rectification of bids in certain instances, primarily where errors are 'trivial'. For instance, errors such as omission to enter rates in words, initial any alteration in words or sign both the tender and the schedules may be rectified. Additionally, in the event there is a discrepancy between the unit price and total price, the unit price will prevail and in case of a discrepancy between words and figures, the amount in words will prevail<sup>21</sup>.

Although the DPM permits rectifications as stated above, it is pertinent to note that the Guidelines for Rectification (GFR) clearly stipulate that bids cannot be rectified after the expiry of the deadline for the receipt of the bids<sup>22</sup>. Further,

the DPM provides that the provisions in the manual are in conformity with the GFRs and in case of any variance, the same should be referred to the MoD for a clarification<sup>23</sup>.

Correction of bids where there has been a genuine mistake is permissible in a number of jurisdictions internationally. For instance under the Federal Acquisition Regulations (FAR), as applicable in the United States, before the award of a contract, mere clerical mistakes<sup>24</sup> can be rectified by the contracting officer. Furthermore, where there is clear and convincing evidence of both the existence of a mistake and the bidder's actual intent,<sup>25</sup> the agency that has sought the bid can permit the correction of a bid<sup>26</sup>. In Australia, if specified requirements have not been met with at the time of the opening of tenders, the tender must be excluded from further consideration (unless the non-compliance is due to an unintentional error of form), at which point the agency may permit a rectification of the error<sup>27</sup>.

The Hon'ble Supreme Court of India in the case of Siemens Public Communication Networks Pvt. Ltd v. Union of India<sup>28</sup>, held that in the case at hand, the bidding rules permitted modification or withdrawal of bids after the early bid submission but only before the deadline for submissions of the bids. In the instant case, the court here was going on a strict interpretation of the provisions of the instant request for proposal (RFP) issued by Bharat Electronics Limited. If there was a fair mechanism provided for rectification of bids, which would not prejudice the other bidders, there is no language in the reasoning of the court to state that a stand to the contrary may have been taken in this case.

While apprehensions of the MoD on grounds that vendors may misuse these provisions to stall the procurement process or gain unfair advantage over competition are understandable, with adequate monitoring and sparing use, changes to the technical and commercial offers must be allowed especially in cases where the mistakes and corrections made in the bid offer are genuine and that the company submitting the bid had not been negligent in preparing the same. This would ensure that there is probity in the procurement process while ensuring expeditious process and accountability to the public.

## **SECTION II SIGNING OF THE STANDARD CONTRACT DOCUMENT AND IMPLEMENTATION**

The DPP, under Chapter V, provides for a Standard Contract Document (SCD), which must be strictly adhered to by any Original Equipment Manufacturer (OEM) or authorized vendor while supplying capital goods to the MoD. The standard terms and conditions present therein, cannot ordinarily be deviated from, and any deviation from the prescribed standard terms and conditions has to be put to the Raksha Mantri (Defence Minister) through the Defence Production Board for approval<sup>29</sup>. Such an approach may be juxtaposed with the prevailing process in USA, wherein the policy clearly stipulates that development and testing of new techniques and methods of acquisition should not be stifled simply because such action would require a FAR deviation<sup>30</sup>. It



should be noted, however, that unlike the DPP, the FAR contains standard clauses to be incorporated into a contract depending on the nature of the goods and services procured and not a standard contract document and it is these clauses that may be deviated from. Accordingly, under Subpart 1.4 of the FAR, individual deviations may be authorized by the agency head<sup>31</sup>, and the justification for the deviation must be documented in the contract file<sup>32</sup>. In this section, certain issues and concerns arising under the SCD have been discussed.

### **(a) Uncertainty in the Liability of Vendors**

The value for money principle, which is at the core of defence procurement in several countries such as UK, Australia, and USA, has been accepted by the Indian financial rules (as provided in Rule 160 of the GFRs) and by the Indian courts<sup>33</sup>, to be an essential condition of public procurement in India. Currently under the SCD, liquidated damages, stipulated under Article 13 of the SCD, are provided only on delay or failure to supply goods by the vendor. However, under the SCD as well as under the Indian Contract Act, 1872 (Contract Act), uncapped damages may be imposed upon the vendors even after they have sold and delivered the goods to the Government for its use, and the same have been accepted after requisite inspection. Due to the possibility of multiple situations where a breach of the SCD would result in uncapped damages, governed by Section 73 of the Contract Act, such as under breach of warranty (Article 17)<sup>34</sup>, breach of confidentiality (Article 25)<sup>35</sup>, use of defence agents (Article 23)<sup>36</sup> or use of undue influence (Article 22)<sup>37</sup>, the risk associated with the supply of the goods does not pass wholly to the Government even after sale.

According to Section 73 of the Contract Act, compensation may be awarded for the loss or damage suffered: (a) which naturally arose in the usual course of things from such breach, or (b) which the parties knew, when they made the contract, to be likely to result from the breach. Thus, the first part of Section 73 of the Contract Act fixes liability for matters that arise naturally from the breach, and not for remote damages. The test for remoteness of damages is whether the damage is such as it must have been in the contemplation of the parties as being a possible result of the breach. The Kerala High Court, in the *State of Kerala v. K. Bhaskaran* held that, “a defendant is liable only for reasonably foreseeable losses—those that a normally prudent person, standing in his place possessing his information when contracting would have had reason to foresee as probable consequences of future breach”<sup>38</sup>.

The second part of Section 73 allows for consequential or special damages being awarded in cases where those losses were reasonably foreseeable by the parties at the time of entering into the contract. It is pertinent to note that in estimating the loss or damage arising from a breach of the contract, the means which existed for remedying the inconvenience caused by the non-performance of the contract must be taken into account<sup>39</sup>. Hence, the party claiming the damages has the duty to mitigate the loss caused by taking all reasonable measures, and damages are not awarded for those losses which could have been mitigated to the extent of the mitigation possible. In light of the above, given

the nature of defence products procured and the purpose of their use and depending upon the particular facts of the case and the exact nature of defence products involved, it may be considered to be reasonably foreseeable that in case of a defect or breach, the loss caused to the Government may be extremely high.

Owing to such high risks remaining vested with the vendor, even after the products are sold to the Government, the costs associated with insuring these products by the vendors are very high. The vendors usually pass on these costs to the Government, thus raising the price of acquisition of these goods by the Government<sup>40</sup>. Additionally, the possibility of levy of huge amounts as damages may result in many vendors being forced to exit the market<sup>41</sup>. Capping damages enables vendors to assess risk with greater certainty, an aspect which is currently missing from the SCD. A cap on liability may therefore induce more vendors to enter the market and the resultant increase in competition may possibly lead to a reduction in prices and an improvement in the quality of goods supplied<sup>42</sup>. It is understood that the counter-argument to capping damages emanates from the very nature of the defence industry in terms of the grave losses and damage, both to life and property, which may be caused if the goods or services do not comply with the standards guaranteed by the vendors. Thus, it may be advisable that such a cap on liability should not be absolute and should be made subject to certain exceptions.

### **(b) Issues with the Agency Provisions**

The term 'defence agents' in context of defence procurement is treated as an anathema. Clause 23 of the SCD aiming to minimize the role of defence agents, seeks a declaration from the seller that the seller is the OEM and that it has not engaged any individual or firm to 'intercede, facilitate or in any way recommend' to the Government in relation of the award of the contract to the seller. There are several issues with the implementation of this clause. For instance, this clause presumes that all sellers are OEMs. Though the term 'Original Equipment Manufacturer' has not been defined in the DPP, it has been defined in the DPM<sup>43</sup>.

The definition of OEMs under the DPM specifically excludes stockists, distributors or suppliers of equipment, from all of whom procurements are made by the MoD on a regular basis. Hence, such sellers submitting themselves to the current wording of the Agents/Agency Commission Clause would stand in breach of the concerned provision.

Furthermore, there is ambiguity in the phrase 'intercede, facilitate or in any way recommend'. Any third party assistance in terms of directly recommending to officials the products of a proposed vendor or negotiating on behalf of a proposed vendor would fall afoul of this provision. However, there may be other activities performed by third parties on behalf of proposed vendors that may or may not fall within the ambit of the restriction as provided above such as professional assistance taken by the vendor in course of the bid-filing process. The scope of this phrase is yet to be clarified by the MoD or by the courts in India. As with all ambiguous provisions of contracts, apart from introducing

unnecessary apprehension and uncertainty in performance, there is scope for misuse by the parties to the contract.

At a more conceptual level, it appears that there is no clear historical stand within the MoD on the use of agents by vendors. To state that the current policy framework does not allow for the use of agents may not be justified. The Department of Expenditure, Ministry of Finance, Government of India issued a circular, vide their Office Memorandum No. F.23(1)-E.II(A)/89 dated January 31, 1989, (1989 Notification), which stated that the policy on the use of Indian agents by foreign suppliers. The 1989 Notification states that "it is not the policy of Government per se to look for, encourage or engage agents. Wherever it is possible to secure supplies and ensure after-sales-services etc., on reasonable terms without the intercession of agents, there is no need for engaging any such agent. In all other cases, the employment of Indian agents by foreign supplies, as may be found necessary, on a case to case basis, shall be regulated by the following..." Hence, the 1989 Notification explicitly allowed for the use of agents by foreign suppliers.

However, since the instructions contained in the 1989 Notification were applicable only to all 'civil purchases' of imported stores by all government departments and public sector enterprises, the Ministry of Defence, issued certain supplementary instructions, vide Notification No. 3(2)/PO (Def) 2001 dated 2 November 2001, (2001 Notification). The 2001 Notification permits the appointment of an authorized representative or an agent by a foreign firm as long as compliance with certain specified norms are ensured. The 2001 Notification envisages the regulation of (i) representational arrangements through a system of registration; (ii) categorical and open declaration by the foreign suppliers of the services to be rendered by the defence agent; and (iii) the remuneration payable to the defence agent by way of fees, commission or any other method. It is important to note that the 2001 Notification marked a revision in the stance of the Government of India, given that the appointment of defence agents had been banned prior to the issuance of the 2001 Notification.

However, since the time of its introduction, and despite applications having been made to the MoD there is no information available in the public domain to the effect that any Indian agent of a foreign supplier has been registered to date. Further, the current language of the agents/agency clauses within the DPP and the DPM does not allow for suppliers to engage agents, whether registered or not.

The use of agents in defence procurement is a subject matter of considerable debate. However, it has been observed that agents would be required especially in cases where procurements are to be made from foreign suppliers who have no base in India so as to provide information on the latest products available, which would help in the formulation of the services qualitative requirements (SQRs), assistance in field trials, assistance in negotiations and after-sales support<sup>44</sup>. This combined with the stringent disclosures required under the 2001 notification for registration of agents and the support that the CVC and the

CAG have expressed in the past for the use of registered agents makes a compelling argument for the regulated use of such entities.

Having said that, deference is expressed to the wisdom of the MoD in issues in relation to the use of agents in defence procurement even if such are registered, in case the objectives of procurement can be met in the absence of such entities. However, it must be borne in mind that a notification (i.e., the 2001 Notification) that allows for the use of agents remains to be effective, while the internal policies applicable only to the MoD and its departments and entities (i.e. the DPP and the DPM) does not allow the use for such agents.

### **(c) Tax issues**

Going by past experience, most foreign OEMs insist upon tax grossing up for taxes payable in India on goods and services. Thus, any tax payable by them in India is to be borne by the Government. In other words, the Indian Government (or more specifically, the MoD, presumably in consultation with Ministries of Finance and Law and Justice) is willing to exempt the foreign OEM from paying any tax in India. The provisions of the SCD<sup>45</sup> and the standard contract drafts in the DPM<sup>46</sup> provide that in case of foreign vendors, all taxes, duties, levies and charges which are to be paid for the delivery of goods, including advance samples, shall be paid by the parties under the present contract in their respective countries. However, such exemptions are not recognized in practice by the tax authorities due to which the following issues arise:

- (a) Under section 10(6C) of the Income Tax Act, 1961 any income in the nature of royalty or fees for technical services accruing or arising to a non-resident from an agreement in connection with the defence of India, is exempt from tax. However, this exemption is available only when an application made to the ministry of finance is approved and a notification is published in the official gazette. However, this approval usually takes a significant amount of time (in our experience, as long as a few years), and it is limited to only royalty and fees for technical services. Consequently, all supplies made to the MoD and other services rendered to them could be held taxable. This has resulted in a number of cases being filed in courts, some continuing for more than a few years.
- (b) Additionally, certain activities, such as negotiation of contracts, may have to take place in India and the contract usually needs to be signed in India. In some cases, some services also may have to be rendered in India and due to contractual obligations; the foreign OEMs may have to set up a project office in India. The tax authorities have in the past attributed tax liability to these activities, which has resulted in litigation.

On account of the above referred uncertainties, most foreign OEMs include their potential tax liability in the price of the goods/services supplied, thereby increasing the price of their services and supplies.

In order to avoid any ambiguity, the Government may consider the introduction of a blanket tax exemption for all goods and services supplied by

foreign OEMs. This will bring about greater certainty regarding the tax treatment and accordingly, the foreign OEMs may be willing to pass on the benefit to the MoD by reducing the price of goods and services supplied. Alternatively, the Government may consider the introduction of a simple objective mechanism for computation and payment of taxes that should not leave any room for ambiguity or any other interpretation.

#### **(d) Implementation Delays due to Foreign Exchange Laws**

Due to the prohibition in using defence agents in India, as stated above, many foreign OEMs set up a liaison and/or project office in India in order to facilitate the bidding process, post-delivery implementation of the contract and to serve as a channel of communication between the parent/group company and the Government.

A liaison office functions as a channel of communication between the parent/group company. Having such a presence in India prior to the award of the contract is important when assisting with the filing of the bid, field trials, etc. As the defence sector is under the 'approval route', prior permission of the Reserve Bank of India (RBI) is required for the same to be established. In our experience, often the approval for setting up a liaison office in the defence sector takes a long time, often obviating the very purpose for which it is proposed to be set up.

It may be noted that general permission has been granted to foreign companies by the RBI for setting up a project office (Automatic Route) subject to satisfaction of certain conditions including inter alia: (i) the foreign company having secured from an 'Indian company' a contract to execute a project in India; (ii) the project being funded by inward remittance from abroad and having been cleared by an appropriate authority, etc<sup>47</sup>.

Where these conditions are not met, specific approval of the RBI would need to be obtained for opening of a project office. In the past, there have been instances where the RBI has taken the view that a procurement contract with the MoD is strictly not with an 'Indian Company' and hence falls outside the scope of the conditions provided for to set up a project office under the Automatic Route. Once an application has been sent in for prior approval to the RBI, the application is sent to various ministries, including the MoD in view of the proposed project office being in the defence sector—the entire process typically takes anywhere between nine to fifteen months. Further, an application would also entail the filing of underlying documents, which may, in turn, lead to the compromise of classified information. The aforesaid procedural delays further hamper the implementation of contracts awarded to the foreign vendor and the overall efficacy of the procurement process. Hence, it is imperative to have a system in place within the procurement policy of the MoD to assist vendors in the expeditious setting up of establishments in India to fulfil their obligations under their respective contracts.

### SECTION III SUGGESTIONS/RECOMMENDATIONS

As always, the exercise of identifying issues is futile if not accompanied by solutions. This section of the paper attempts to provide recommendations to the lacunae that have been identified and analysed above:

#### **(a) Setting up of an Institutional Mechanism to Handle Bid-protests**

As observed in the analysis in Section I (a) of this paper, the only institutional body that currently provides an enforceable remedy to bidders are the courts in India. While the Manual provides a very rudimentary framework for addressing protests, this has not been incorporated in the procedural framework as set out in the DPP and the DPM. Hence, it is recommended that an independent body or organisational framework be set up with the following objectives:

- (i) Efficacious remedy to vendors and other interested parties in relation to all aspects of procurement by the MoD; and
- (ii) Having the power to recommend corrections to the evaluation process and the decisions of the department.

It is worthwhile noting that such a body would not have the power to make binding decisions upon the actions of the MoD. Despite having such limited authority of making recommendations to the procuring department, it could however, play a crucial role in bringing about greater transparency in the procurement process with the procuring entity having to provide written reasons if the recommendations of such a body are not followed. Further, if the matter were to be litigated upon subsequently, the courts would have the option of drawing on the fact-findings and the expertise of such a body in the course of its own proceedings. Hence, the remedy of approaching such a body would run concurrently with the right to seek remedy from the concerned department as well as the option of approaching the courts.

Close parallels to the aforesaid recommendation can be drawn with the role played by the GAO in the United States, which apart from presiding over bid-protests also plays a role similar to that of the CAG in India<sup>48</sup>. Hence, there exists a scope for wider application (to procurements by all departments of the Government) of this solution if the CAG, in addition to its current duty of auditing the accounts of all Government departments, were to be empowered to preside over protests in relation to all procurements by the Government. Having said that, if such a body having powers over all procurement by the Government were to be established, care has to be taken that (i) the body has the necessary expertise and skill-set to adjudicate and assess procurement issues that are specific to the defence sector; and (ii) that such a body should not be used to de-rail/delay procurement of critical equipment or undermine other policy considerations driving procurements by the MoD.

## **(b) Mechanisms to Allow Changes to the Bid Documents in Certain Cases**

Against the blanket provision prohibiting changes to the bidding documents as provided in the GFRs<sup>49</sup>, it appears that the DPP and the DPM in allowing for minor modifications (only minor changes to the technical bid in the case of the DPP) seems to have taken a more realistic stand. It is of course a matter of separate analysis as to whether such deviation in the DPP and DPM from GFRs is within the scope of permissible deviation<sup>50</sup> and can be characterized as being in the nature of being supplemental or clarifying to the GFRs<sup>51</sup>.

While it is maintained by the authors that allowing changes to the bidding documents must be at the discretion of the MoD and that allowing for such changes must not affect the competitiveness of the bid vis-à-vis co-bidders, certain guidelines must be provided in the DPP and the DPM to provide guidance to the exercise of discretion by the MoD in such circumstances. This would allow for bidders to make some essential changes to the bidding documents post-submission/opening of bids and prior to the award of the contract, while at the same time providing a modicum of consistency in the requests that may be entertained by the MoD on this matter. By way of examples some of these guidelines could be as follows:

- (i) Changes when the reviewing authority believes there is an obvious error of form, such as non-inclusion of requisite declarations or annexures that have been referred to elsewhere in the bidding documents;
- (ii) Apparent clerical errors; and
- (iii) Allowing for a change of ownership or control in the vendor before the signing of the contract<sup>52</sup>.

The last point is of significance especially in critical purchases where the elimination of the vendor would be to the detriment of the security interests of the country. However, due caution would have to be exercised before such a change in the ownership or control of the vendor is allowed and the antecedents of the new entity would have to be confirmed including the identity of the management in control, relevant experience and the financial capacity of the entity to undertake the obligations in the contract<sup>53</sup>.

## **(c) Clarifying Liability under the Provisions of the SCD**

The preliminary concern of most vendors, when faced with the prospect of entering into a contract with the MoD, is the prospective liability under the SCD. On an examination of the relevant clauses and provisions of the SCD as provided in the DPP and DPM, we recommend that to bring about more clarity on the potential liability of the vendors, it may be advisable for the MoD, to clearly elucidate in the SCD those breaches:

- (i) Which will attract liquidated damages, i.e. capped damages: In this regard, whilst the existing clause<sup>54</sup> provides for liquidated damages in case of delay or non-delivery of stores. It may be worthwhile to re-

examine this provision to assess if its scope may be further expanded to cover such additional breaches that the MoD, in its wisdom, deems appropriate to be included within the specified limit for liquidated damages. By way of an example, as far as quality of the supplied goods is concerned, currently, in case of breach, the SCD imposes an obligation upon the vendor to repair the goods within a certain stipulated time period<sup>55</sup>. In case of the failure of the vendor to perform this obligation to repair the goods, the MoD would be entitled to claim general damages. Bringing breach under the head of liquidated damages would serve to possibly reduce the cost of acquiring such a product. Furthermore, instead of having a uniform cap for all kinds of breaches, a liquidated damages clause containing different caps for different kinds of breaches, based upon the reasonable estimate of the loss in each case, may be an option the MoD may examine further. While on the issue of capping of damages, given the importance of timely supply of defence products and the fact that it remains one of the most frequent areas of default, it may be advisable for the government to re- assess the current cap of 5 per cent of the value of the goods and ascertain whether the same may have to be revised upwards. A higher threshold would enable the Government to penalize cases of delay more stringently, thereby enhancing deterrence and as a corollary incentivizing adherence to delivery schedules.

- (ii) For which liability is uncapped: There may be certain breaches of the SCD for which imposing a cap on damages may not be feasible in view of the grave injury that may be caused to the Government on account of the breach, not merely in terms of economic loss but also in terms of posing a threat to the safety and security of the nation. Moreover, in many cases like breach of confidentiality, it may be virtually impossible to compute beforehand the amount of loss that may be caused. For these kinds of breaches, general damages may be the appropriate remedy. As a suggestion to enhance clarity, it may be pertinent to provide an exhaustive list of breaches that would make the vendor liable under the law of general damages, leaving a sundry provision for other damages capped to the extent of the value of the contract.

It is recommended that, keeping in accordance with the current stance in the SCD, the limitation on liability envisaged under the provisions for liquidated damages may cease to apply in certain specific situations like third party loss, death or personal injury, fraud or illegal acts etc. This is the position in various jurisdictions such as Australia,<sup>56</sup> which has a similar clause in its defence procurement manual. It also recommended that damages be left uncapped in case of fraud, wilful default or gross negligence.

- (iii) Special and consequential damages: It may be pertinent to note that Indian law generally does not support contractual claims for remote or indirect damages that may have been suffered by the parties<sup>57</sup>. Hence,



a clause clarifying the position under Indian law on special and consequential damages and its treatment thereof may be inserted to provide additional comfort to the vendors. We understand that a clause substantially similar to that provided in ANNEX A may have been used by the MoD in the past. It is urged that such be re-introduced in the SCD.

- (iv) Which attract penal consequences: Article 22 of the SCD and Clause 10.1 of the draft Pre-Contract Integrity Pact refer to “penal damages” as a consequence of any corrupt conduct by the vendors. It should be noted that these are technically not in the nature of ‘damages’ under contract law, but rather criminal sanctions that may be levied following criminal prosecutions. Indian law considers damages to be compensatory and not punitive. It is a fundamental principle of damages for breach of contract that they are awarded to place the injured party in the same position in which he would have been had he not sustained the injury on account of the breach<sup>58</sup>. Hence, these, though provided for in the form of contractual clauses, cannot be enforced as other provisions of contract. Rather, these would have to be enforced through normal criminal proceedings.

The specification of clear consequences for events of breach in the form of liquidated damages and identifying specific circumstances under which the law of general damages would apply may facilitate the vendor in undertaking an accurate risk assessment exercise, which would serve to potentially reducing the cost of insurance and thereby facilitate in achieving the objective of ‘value for money’ in government procurement, as enshrined under Article 299 of the Constitution and provided for explicitly in Rule 160 of the GFRs.

#### **(d) (Re)Introduction of an Indemnity Clause**

Another issue that many vendors have expressed on the SCD in relation to damages is that the provisions have been drafted clearly in favour of the purchaser with no clarity in case of damages arising as a result of actions of the purchaser itself. This issue can be addressed, while at the same time providing the government with extra protection, by the introduction of an indemnity clause with the parties mutually indemnifying each other from harm arising out of the actions of each other. Section 124 of the Contract Act defines a contract of indemnity as a contract by which one party promises to save the other from loss caused to him by the conduct of the promisor himself or by the conduct of any other person. The requirement of actual damages is not a precedent to recovery as long as the damage is imminent<sup>59</sup>. As with the provision on consequential damages, we understand that the MoD had provided for an indemnity provision substantially similar to a provision provided in ANNEX B in the past. It is recommended that such be re-introduced into the SCD. In order to promote certainty, the indemnity may exclude all remote injuries arising out of the breach.

### **(e) Negotiations and finalizing Contracts**

While several have questioned the wisdom of having a standard draft in the nature of an SCD, as opposed to system that prescribes a set of standard clauses that may be selected, as may be required, to formulate a contract,<sup>60</sup> a developing jurisdiction like India may be served better with the current system of prescribing a standard draft with the flexibility to eliminating/modify certain clauses that may not be relevant, on a case to case basis. While the DPM specifically states that Part III of the standard contract document cannot be deviated and that minor deviations may be allowed in Part IV if required by the vendor or if necessitated by circumstances,<sup>61</sup> no such clear provision has been provided in the DPP<sup>62</sup>.

It must be understood and appreciated that contracts can be standardized only to a certain extent and that it would be up to the relevant contract negotiation committee (CNC) to tailor the contract to suit each procurement and see the interest of all parties best served. In this regard the recommendations are two-fold:

- (i) Need to re-assess the constitution of the CNC: The composition of the CNC as provided in the DPP<sup>63</sup> and the DPM<sup>64</sup> constitute members who are public servants who have fixed tenure of services<sup>65</sup>. While appreciating the sentiment of the government not to have members in entrenched positions, as with any specialized activity, the hard and soft skills required for procurements can only be honed with experience, an essential criteria that the MoD seems to be denying to itself under the present regime by not setting up a specialized integrated procurement body, despite several bodies within the Government having recommended for such<sup>66</sup>. There are various disciplines that members of the procuring entity would have to specialize in and the officers may not have the expertise in all of these areas.
- (ii) Deviations required from the standard drafts: As mentioned before, there is very little scope for deviation from the standard drafts that have been provided in the DPP and DPM. Hence, there is little leeway to both the purchaser and the vendor in optimizing a contract to suit the conditions of each procurement. It is recommended that deviations from the standard terms be allowed subject to reasons for what is provided in writing by the purchasing officer. However, for proper implementation of such and to hold the purchasing officer accountable, it is acceded that the relevant purchasing entity should have adequate levels of skill and expertise to wield discretion in such matters with the aim of optimizing procurements for the government. Making available adequate resources such as access to legal assistance to these officers would go a long way in assisting them to make sound decisions in course of effecting procurements.

**(f) Single-Window Clearance**

Once the contract for supply of goods has been finalized and inked there are various other issues that are faced by vendors, especially foreign vendors, in timely and effective implementation of projects. By way of illustration, it takes foreign vendors almost a year to get prior governmental approval to set up a project office in India, which would be essential to enable it fulfil its obligations under the supply contract. This is primarily due to a lacuna in the foreign exchange regulations that allows for setting up of project offices under the automatic route only if the contract is awarded by an Indian company. Since, in the present case, the contract that is awarded by the Government of India prior to governmental approval has to be sought for setting up a project office. Such delay in setting up a project office impedes the process of obtaining visa for foreign technicians who will be seconded to such project office to train the MoD personnel or maintain infrastructure.

Furthermore, implementation of offset projects in India is bereft with its own set of issues in light of the 26 per cent Foreign Direct Investment restriction in India. Even this restricted investment in defence industries requires prior approval of the Government<sup>67</sup>. As mentioned earlier, specific exemptions may be required from tax authorities in India for tax waivers. All of these examples cited above are instances where approvals would have to be obtained from various departments of the Government. Also in relation to all of the above examples, the views of the MoD are sought for by the concerned department or ministry and the views thus expressed have a significant bearing on the outcome of the application.

In light of the above, and the fact that it is the MoD that would be best placed to assess the applications made, it is suggested that a mechanism be provided wherein the MoD provides a single-window facilitating cell to the vendors in order to enable them to obtain the necessary approvals, licenses and visas in a timely manner and fulfil their obligations under the relevant contracts.

**(g) Use of Defence Agents and other Third Parties**

In addition to the above, there are certain other recommendations including the following:

The MoD should take a stand on the use of defence agents by vendors and also clarify its stance on the use of third parties by bidders. If after deliberations, it is found that defence agents have no room in the procurement process, the MoD may repeal the 2001 Notification. If the MoD is of the view that defence agents are required and such would have to be regulated (to which the authors agree), then the 2001 Notification may be revisited to understand as to why the procedure prescribed therein has failed and revise such, so a feasible regulatory mechanism may be implemented.

As to the general use of third parties, the MoD may consider clarifying the scope of the term 'intercede, facilitate or in any way recommend' so as to enable

vendors to use third parties whose role will not be viewed as being that of a defence agent by the MoD.

## SECTION IV CONCLUSION

Given the sensitivity of the sector and the various constraints under which the MoD functions, it is appreciated that reforms cannot be effected or implemented overnight. Having said that, the MoD has to be commended for the efforts that it has made these past few years in seeking recommendations from the various players in this sector and modifying and improvising on the procurement process on a regular basis, balancing lofty yet often conflicting objectives. In order to do this, care has to be taken to ensure that the past efforts of the MoD do not go in vain due to loss of experience and domain knowledge. Institutional mechanism should also be set in place to ensure that the lessons learnt from mistakes of the past are used to ensure the country a better tomorrow.

## NOTES

1. In his forward to the Defence Procurement Procedure-2011 dated December 27, 2010.
2. GAO was granted bid protest jurisdiction by the Congress with the Competition in Contracting Act, 1994, which was enacted a part of the Deficit Reduction Act, 1984. Subparts 18.124 and 33.102(a) of the Federal Acquisition Regulations, 2005 provide for filing a bid-protest with the GAO.
3. World Trade Organisation (WTO), Agreement on Government Procurement (1996), Article XX (Challenge Procedures), available at [http://www.wto.org/english/docs\\_e/legal\\_e/gpr-94\\_e.pdf](http://www.wto.org/english/docs_e/legal_e/gpr-94_e.pdf).
4. United Nations Commission on International Trade Law (UNCITRAL), UNCITRAL Model Law on Procurement of Goods, Construction and Services with Guide to Enactment (1994) available at <http://www.uncitral.org/pdf/english/texts/procure/ml-procurement/ml-procure.pdf>. Chapter VI of the Text (Articles 52-57) deals with the review mechanism.
5. The power for the Government to enter into contracts is derived from Article 299 of the Indian Constitution. Furthermore, the executive instructions and directions in relation to procurement by all departments of the central government including the Ministry of Defence has been provided for in the General Financial Rules, 2005, The Delegation of Financial Powers Rules, 1978 and the Manual on Policies and Procedures for Purchase of Goods, 2006. The DPP and the Defence Procurement Manual, 2009 have been issued in consonance with the above instructions and directions.
6. As required under Article 14 of the Constitution of India.
7. Rule 160 of the General Financial Rules, 2005, which provides "All government purchases should be made in a transparent, competitive and fair manner, to secure best value for money. This will also enable the prospective bidders to formulate and send their competitive bids with confidence".
8. Paragraph 11.12 of the Manual on Policies and Procedures for Purchase of Goods, 2006.
9. This document lays down the procedure for certain types of revenue procurements that may be made by the MoD.
10. Such representation can be made by the bidders themselves or may be made on their behalf by the independent external monitors that may have been appointed under the integrity pacts that have been signed at the time of submission of the bid as required under paragraph 61 of Chapter I of the DPP. The procedures for implementation of the

Integrity Pacts has been provided by the CVC vide Circular No. 008/CRD/013 dated May 18, 2009.

11. OECD, Implementing the Anti-Corruption Action Plan for Asia Pacific: Reforms and Anti-Corruption Resources India 1 (2008), available at <http://www.oecd.org/dataoecd/8/0/40528776.pdf>.
12. Article 32 of the Constitution of India.
13. Article 226 of the Constitution of India.
14. Chairman, All India Railway Rec. Board and Anr. vs. K. Shyam Kumar and Ors, (2010) 6 SCC 614.
15. Air India Ltd. v. Cochin International Airport Ltd., (2000) 2 SCC 617.
16. Jagdish Mandal v. State of Orissa, [2006] Supp (10) SCR 606 citing precedents of the Supreme Court.
17. Siemens Public Communication Networks Pvt. Ltd v. Union of India, (2008) 16 SCC 215.
18. Ibid.
19. Paragraph 35 of Chapter I, DPP. "A technical offer, once submitted, should not be materially changed subsequently. However, minor variations, which do not affect the basic character/profile of the offer, may be acceptable. The following must be ensured:
  - (a) An opportunity for the revision of minor technical details should be accorded to all vendors in an equal measure to ensure fair play.
  - (b) No extra time to be given to any vendor to upgrade his product to make it SQR compliant.
  - (c) No dilution of SQR is carried out.
  - (d) The original commercial quote submitted earlier must remain firm and fixed".
20. Paragraph 32, Part III of Schedule 1 to the draft RFP Format.
21. Paragraph 4.21.1.(b) of the DPM.
22. Rule 160(xi), Chapter 6: Procurement of Goods and Services, GFRs.
23. Paragraph 1.51 of the DPM 2009.
24. Examples of clerical mistakes include obvious mistakes in decimal points, in designation of units or where a bit is so much lower than the other bids as to indicate a possibility of an error (FAR) 48 CFR 14.407-2(a) & (FAR) 48 CFR 14.407-3(g)(1)(i)).
25. Some examples of evidence that may be submitted to prove that the mistake was genuine include original worksheets and other data used in the preparation of the bid, sub-contractors quotations, published price lists etc. See (FAR) 48 CFR 14.407-3(g) (2)).
26. (FAR) 48 CFR 14.407-3(a). Please note that the agency is free to deny a correction as well if there is insufficient evidence (FAR 14.407-3(d)).
27. The Defence Procurement Policy Manual, April, 2011 contains some examples of "unintentional errors of form" which include:
  - corrections of inconsistencies in the submission where the area of error is clear and not critical to comparative evaluation;
  - the accidental omission of declarations; and
  - an attachment referred to in the body of a tender but omitted from the tender.
28. (2008) 16 SCC 215.
29. Paragraph 75 of Chapter I, DPP.
30. (FAR) 48 CFR 1.402.
31. The Director of Defence Procurement and Acquisition Policy, Office of the Under Secretary of Defence,(Acquisition, Technology and Logistics) is the approval authority for individual deviations in defence procurements. Subpart 201.4. Deviations from the FAR, Defence Federal Acquisition Regulation Supplement ("DFARS").
32. (FAR) 48 CFR 1.403.
33. N.G. Puttaswamy and Anr. v. State of Karnataka and Ors., 2009 (2) KCCR 1201 states "Since public resources are scarce, the efficiency of the procurement process is a primary consideration of every procurement regime. Open, transparent and non-discriminatory

procurement is generally considered to be the best tool to achieve 'value of money' as it optimizes competition among suppliers...A well-regulated Government procurement system, embodying the principles of transparency and non-discrimination, helps to ensure optimal value for money in public purchasing....Procurement systems have a significant impact on the efficiency of the use of public funds and, more generally, on public confidence in Government and on good governance. The attainment of value for money, public access to information on Government contracts, and fair opportunities for suppliers to compete for Government contracts, are all essential requirements of an efficient Government procurement system."

34. In case of breach of warranty with respect to quality or quantity of goods, or any deficiency or non-conformity with technical specifications, under Article 17 of the SCD, the MoD may (a) deduct the cost of the goods from the performance and warranty bond (5 per cent of contract value); or (b) ask the vendor to pay the claim amount through demand draft. In addition to the abovementioned claim for the cost of the defective goods, the MoD can also seek the remedy of making a claim for general damages for the actual loss suffered by it on account of the breach.
35. Although no specific remedies are available for the MoD for violation of Article 25 of the SCD, the MoD may claim general damages for violation of this provision by the vendor to obtain compensation for the actual loss suffered by it on account of the breach. Additionally, Section 5 of the Official Secrets Act, 1923 and the penal consequences therein would also be attracted.
36. In the event of a breach of this provision by the vendor, it is liable to refund to the MoD, the amount paid or promised to be paid to the defence agent. The MoD also has the option to (a) debar the vendor from entering into any supply contract with the Government for a minimum period of five years; and/or (b) cancel the SCD in whole or part without compensation and the vendor in this event would be liable to refund all payments made by the MoD in terms of the contract along with interest rate @ 2 per cent per annum above LIBOR rate for foreign vendors and Base Rate of SBI for Indian vendors and the MoD has the right to recover any such amount from any contract concluded earlier between the Vendor & the MoD.
37. If a vendor breaches the obligation under Article 22 of the SCD, the MoD may impose such liability or penalty upon the vendor as it deems proper, including but not limited to: (a) termination of the contract; (b) imposition of penal damages; (c) forfeiture of the Bank Guarantee; and (d) refund of the amounts paid by the MoD. Further, criminal consequences such as those under Prevention of Corruption Act, 1988, and Indian Penal Code, 1860, may also be attracted.
38. AIR 1985 Ker 49.
39. Explanation to Section 73 of the Indian Contract Act, 1872.
40. Vivek Lall, "Evolving Defence Procurement", *Economic Times*, 10th April, 2010, available at <http://economictimes.indiatimes.com/opinion/view-point/Evolving-defence-procurement/articleshow/5786175.cms>.
41. Vivek Lall, "Making Defence Procurement Work for India", *Economic Times*, 14th September, 2009, available at <http://economictimes.indiatimes.com/opinion/view-point/making-defence-procurement-work-for-india/articleshow/5007304.cms..>
42. Ibid.
43. Paragraph 1.4.14 of Chapter 1, DPM.
44. Maj. General Mrinal Suman, "Middlemen in Defence Procurements", Vol. 22.1, *Indian Defence Review*, 200, available at <http://www.indiandefencereview.com/defence%20industry/Middlemen-in-Defence-Procurements.html>.
45. Article 18 of the SCD.
46. Clause 14, Part-III of the Contract Format in Appendix E, DPM.
47. Paragraph G, Master Circular on Establishment of Liaison/Branch/Project Offices in India by Foreign Entities, released on July 1, 2010.

48. Robert S. Metzger and Daniel A. Lyons, "A critical reassessment of the GAO bid-protest Mechanism", 6 *Wis. L. Rev.* 1225, wherein the authors have pointed out that the origins of the GAO lay in a government department whose primary responsibility was to audit expenditure by the treasury.
49. *Supra* note 21.
50. Rule 6 of GFRs allow for a modification only with the express approval of the Ministry of Finance.
51. Refer to 1.5.1 of the DPM as modified by the Supplement 2010 to DPM-2009 which notes that the instructions issued by procuring entities must be in conformity with the GFRs, and in this light specifically makes an amendment to paragraph 1.5.1 of the DPM stating that changes may have been made in the DPM to meet the specific requirement of the Defence Services, the spirit of the rules/regulations/instructions (which includes the GFRs), which forms the basis of the DPM and have not been violated.
52. It may be pertinent to note that the SCD, while identifying the parties to the contract allow for the replacement of the vendor by its 'successors' and its 'assignee'.
53. These are broadly the considerations that are taken account in Australia as provided for in Chapter 5.4, paragraph 108 of Defence Material Organisation (DMO) (2011) Defence Procurement Policy Manual 2011, Australian Federal Government, Department of Defence.
54. Article 13 of the SCD.
55. Article 15, of the SCD.
56. Chapter 3.15, paragraph 27 Defence Material Organisation (DMO) (2011) Defence Procurement Policy Manual 2011, Australian Federal Government, Department of Defence.
57. Section 73 of the Indian Contract Act, 1872.
58. B.R. Herman and Mohatta v. Asiatic Steam Navigation Co Ltd, AIR 1941 Sind 146.
59. Alla Venkataramanna v. Palacherla Manqamma AIR1944 Mad 457.
60. As done in jurisdictions such as the United States in its Federal Acquisition Regulations and Defence Federal Acquisition Regulations Supplement.
61. Paragraphs 3 and 4 of Appendix D and E.
62. Paragraph 75, Chapter I of DPP states that any deviation from the procedure would have to be approved by the Raksha Mantri.
63. Paragraph 15 of Chapter I read with Appendix B.
64. Paragraph 4.13.4 of Chapter 4.
65. Laxman Kumar Behera "A critical review of the Defence Procurement Procedure 2011", available at [http://www.idsa.in/system/files/IB\\_DefenceProcurement.pdf](http://www.idsa.in/system/files/IB_DefenceProcurement.pdf).
66. Recommendation of the Group of Ministers constituted after the Kargil Conflict and approved by the Cabinet Committee on Security on May 11, 2001 (leading to the establishment of) the Defence Procurement Organisation on October 11, 2001 – Paragraph 2.5 of the sixth Report of the Standing Committee on Defence (2005-2006) available at <http://164.100.24.208/Is/CommitteeR/Defence/6threp.pdf> and Report Number 4 of the Comptroller and Auditor General titled 'Union Government—Defence Services—Army and Ordnance Factories—Performance Audit', available at <http://www.cag.gov.in/html/CAGReportSay/2007/PA-4.htm>.
67. Paragraph 5.2.5 of the Consolidated Foreign Direct Investment Circular for 2011.

## ANNEX A

### **Consequential Damages**

Nothing in this contract shall entitle any party to claim any consequential, remote or indirect damages provided that any compensation specified in this contract shall not be regarded as such damages.

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## ANNEX B

### **Indemnities**

The seller hereby indemnifies the buyer against all costs, claims and liabilities whatsoever arising from all damage to property of the buyer or death or personal injury whether to an employee of the seller or the buyer caused by the negligent acts or omissions of the seller's employees.

The buyer hereby indemnifies the seller against all costs, claims and liabilities whatsoever arising from all damage to property of the seller or death or personal injury whether to an employee of the buyer or seller caused by the negligent acts or omissions of the buyer's employees.



## Defence Acquisition: Indian Army's Perspective

*Viney Handa*

“Our defence forces require timely and cost effective acquisition of defence equipment to enable them to meet any challenge to the country's security. If they have to effectively meet these challenges, we must adopt a holistic approach towards defence acquisition right from the planning to final disposal of the weapon system without compromising transparency, fairness and probity at any level.”

—Shri A K Antony, Raksha Mantri (26 Oct 2009)

### **Introduction**

Procurement of new weaponry and equipment for the defence forces is a long, complex, intricate, and arduous process that endeavours to balance the competing requirements of timely modernisation of the armed forces and development of an indigenous defence industry, while concurrently conforming to the highest standards of transparency, probity and public accountability in the procurement process. Besides, it involves a significant amount of national resources, running into billions of dollars. Efficiency in defence acquisition not only leads to higher defence preparedness but also provides value for money, impetus to industrial competitiveness as well as other economic benefits. A number of reforms were instituted in 2002, based on the report of GoM after the Kargil War. Despite these reforms, only a limited number of acquisition schemes have fructified. Even in these success stories, what can be credited to the current procedures are mainly the repeat procurements, which involve much lesser stages, than a fresh acquisition. Also, a number of the high value procurements have come about through inter-governmental deals. Another indication of lack of expeditious procurement is the recurring under-utilisation of resources earmarked under the capital budget. The capital budget over the years has largely remained under-utilised, though there has been an improvement in its utilisation in the past few years. The existing deficiencies in critical weapon systems, technologies and under-utilisation of capital budget in the past few

years reveal inadequacies in our acquisition procedures, which must be addressed to ensure timely modernisation of the Indian Army (IA).

The Indian Army (IA) is poised at an inflection point in its transformation to a network centric force, relevant and effective across the entire spectrum of conflict and capable of functioning as a single entity or jointly with the other Services, in all five dimensions, including space and cyber-space. This transformation demands capability development through acquisition of wide range of armaments, weapon systems and platforms including electronic warfare and command and control infrastructure. Hence, we find ourselves in the midst of the largest procurement cycle that the Indian Armed forces and the Army in particular have undertaken in their history. The operational preparedness of the Armed Forces is intrinsically related to the country's capacity to deliver the material wherewithal indigenously or through imports. The material needs of the military can be seen at two levels: war fighting equipment, and the consumables, including essential support services. Our nation has a vast defence industrial base comprising of ordnance factories, Defence Public Sector Undertakings (DPSUs), and an ever growing number of private sector defence entities, most of which are part of Indian companies with proven and globally recognized expertise in non defence technologies and manufacturing. In addition, there are a large number of research laboratories under the Defence Research Development Organisation (DRDO), which are the engines of defence R&D in the country. In spite of such a vast defence industrial infrastructure, we are still some distance from establishing ourselves as a major defence equipment developer/production hub. Our dependence on foreign sources is substantial, both in terms of import of new weapon systems, as well as for up-gradation and overhaul of existing equipment and systems.

### **Operational Imperatives Driving Capability Development**

Future conventional wars are likely to be swift, short and intense with increasing use of the space and cyber dimensions, combined with a sub conventional or asymmetric component, which may generate its own dynamics. Additionally, in our context, any regional conflict is likely to take place against a nuclear backdrop. A few operational imperatives that will continue to drive our operational philosophy, and consequently the modernisation of IA, are as follows:

- (a) Operational obligations of the IA in view of the assessed current and future threats.
- (b) The need for an independent deterrent capability underscored by the fact that India is not part of any military alliance or grouping.
- (c) Need for possessing versatile capability to be able to operate across the entire spectrum of conflict, including the sub-conventional realm of conflict.
- (d) Resilience to confront unexpected challenges and non-conventional and asymmetric threats that may emerge in the future.
- (e) Necessity to play a constructive role in ensuring regional peace and stability.

## **Challenges in Procurement**

The DPP and accompanying policies have to balance the following three competing aims:

- (a) Facilitate expedient acquisition, scaling up of new technologies and capabilities for the IA.
- (b) Develop an indigenous Indian defence industry increasingly capable of providing autonomy in defence production.
- (c) Conform to the highest standards of transparency, probity and public accountability.

The major challenge for the Government is to synergise these competing aims. Their relative priority will change over time; hence it is only through regular monitoring and fine-tuning of the procurement policies and procedures that we must ensure that defence acquisition programmes achieve their intended purpose. During the last decade, the challenges and complexities of the defence acquisition process have been identified by the Government, and a number of measures have been introduced and implemented. The roots of these initiatives can be traced to the post-Kargil recommendations of the GoM on reforming the national security system. A few significant reforms are discussed in the succeeding paragraphs.

**Defence Procurement Procedures (DPP).** A rule based procurement system has been codified through a set of pre-defined steps starting from definition of system requirement to post contract management. Since its promulgation, the DPP has been periodically revised, to enhance its efficiency and imbibe the lessons learnt, through experience. With introduction of DPP 2011, and a new defence production policy, an endeavour has been made to provide a level playing field to the private industry. Apart from “Make” category already existing in the DPP, a new category termed “Buy and Make Indian” has now been introduced to facilitate the Indian private sector, wherein the ‘request for proposal’ is issued only to Indian companies, who can then enter into technology tie-ups with foreign companies to make advanced weapon systems. The indigenous content under this category has to be more than 50 percent and the three Services are proactively identifying procurement programmes to be processed in this category.

**Organisation Structures.** The setting up of the Integrated Defence Staff (IDS), the Defence Acquisition Council, the Defence Procurement Board, and the Defence Production Board have strengthened the planning, acquisition, production and R&D tasks of acquisition.

**Acquisition Planning.** The process of formulation of 15 Year Long Term Integrated Perspective Plan (LTIPP) from defence planning guidelines, a defence capability plan and a services capital acquisition plan from LTIPP are now in

place and their working is being monitored to identify aspects meriting mid course corrections.

**Defence Production Policy.** The focus of the new Defence Production Policy, which has recently been promulgated by the MoD, is to achieve self-reliance in design, development and production of weapon systems and platforms required for defence in as early a time frame as possible. It aims to create a conducive atmosphere for participation of private industry, including Small and Medium sized Enterprises (SMEs), thereby contributing to higher levels of indigenisation and a broadening of defence R&D base in the country.

**Technology Forecasting.** The IA has evolved perspective technology forecasts, e.g. 'Technology Perspective of IA—2025' and 'Technology Perspective and Capability Roadmap', which have been shared with DRDO and industry respectively so that R&D organisations may understand the vision and evolve a road map to support the capability development plan of the IA. Besides, in recent years, the IA has proactively organised and participated in a number of seminars and round tables wherein military technology forecasts, growth potential of diverse technologies and their possible exploitation has been deliberated upon.

**Refinement of SQRs.** DRDO and the industry have often criticised SQRs for being overambitious, unrealistic and even impractical. Delay and cost overruns in DRDO design and development have often been ascribed to 'SQR creep', wherein R&D organisations have often blamed the Services for periodically changing the SQRs. The officers involved in the formulation of GSQRs are not professionals dealing with development/production of defence hardware. Therefore, present day GSQRs are formulated using more logic and less 'technology available in the market' or what industry can offer. More than one year is spent in conducting series of collegiate meetings, taking comments from various agencies and then finally getting the GSQR ratified without the required technological competence given to it. The IA along with HQ IDS have put in place an effective mechanism involving technical scans and request for information (RFI) from the defence industry to ensure that the SQRs are pragmatic and achievable.

Defence acquisition, no doubt is a complex process. Notwithstanding the institution of comprehensive structural and procedural framework, inadequacies continue to impact our modernisation process. The revisions have attempted to address the requirements of transparency as well as timely induction. While we have come a long way, the procurement procedures can still be termed as 'work-in-progress', as some more aspects need to be revisited based upon experience gained. Refinements must ensure that the procedures offer a pragmatic process that facilitates capability induction in a time bound manner, while addressing the requirements that are important for a democratic country, in particular that of public accountability. The inadequacy of an integrated

approach by newly formed structures like IDS, defence acquisition wing and defence production board results in avoidable delay at various levels. Further, despite broad based and realistic GSQRs, there is lack of adequate response due to limited Original Equipment Manufacturers (OEMs), Transfer of Technology (ToT) issues or technology absorption issues due to the capital and technology intensive nature of defence industry. No Cost No Commitment (NCNC) trials for costly equipment, prevents minor players from entering the competition.

Our experience in defence R&D can be described as a mix of “successes” and “reverses”. Time and cost overruns have not only led to avoidable expenditures but also resulted in capability voids. Another problem with modernisation through indigenous R&D has been that several technology cycles occur within one development and procurement cycle, which invariably results in ‘the army getting yesterday’s solutions for tomorrow’s problems’. The experience of the past five decades provides valuable lessons in reducing the gap between design and development and its actual induction. There are also inadequacies in integrated approach to planning, development and production due to lack of single point accountability. Commercial and technical evaluations often take maximum time in completion of acquisition cycle. Also, as yet, the current procedures do not facilitate induction of the ‘state of art’ weapon systems in the Army. Rather, lacunae in the existing procedures result in procurement of mediocre equipment and common technology. All systems that meet SQR are considered at par and no priorities can be accorded. Lowest commercial quote (L1) gets the order. Better performance fetches no credit and is inconsequential. As a result, the Services are deprived of superior equipment that may be available for nominal and acceptable increase in cost.

The stress on enlarged vendor base and increased competition is well appreciated. However, it should not become the overriding consideration to have the Army opt for ‘run of the mill’ equipment. Moreover, the present day’s ‘widely available contemporary technology’ may approach obsolescence by the time the contract is finalised and full quantity of equipment inducted. Despite the well-structured and codified procedures in DPP and numerous cases of delay, nobody has been held accountable for the slip-ups so far. Defence procurement is a serious business, which costs the exchequer dearly and affects defence preparedness. The performance of Cost Negotiating (CNC) in almost all cases has been found wanting. Failure to negotiate fool-proof contracts with clearly defined provisions has caused immense damage to our interests. Foreign vendors exploit ambiguous and small print in contract documents, especially with regard to price fixation, delivery schedules, warranty, after sales support and penalties for default. Russia had unilaterally revised price and delivery schedule of Gorshkov aircraft carrier on more than one occasion—numerous such occasions are to be found. There is hardly a case in which a foreign vendor abides by the letter and spirit of the contract, yet they get away with impunity. The challenge continues to be, to get the ‘Right Equipment of Right Quality at the Right Time and at the Right Cost’.

## **Recommendations for Improving Procurement Process**

Recommendations for improving the procurement process with a view to enhance capability development in a time bound manner are elucidated in this succeeding paragraphs.

### **Expediting the Acquisition Process**

- (a) Top driven Process. The procurement of defence equipment in a time bound manner impacts our defence preparedness. IA's transformation to a network centric force, capable of operating across the entire spectrum of conflict is dependent on capability building. Presently, the procurement process is bottom driven by the users. In order to enhance capability development, we must identify few critical capabilities, which then must be top driven to ensure capability building in a time bound manner.
- (b) Formulation of SQRs. Formulation of SQR is a complex process which not only requires analysis of the technology available in the world market but also needs visualisation of futuristic technologies keeping in view the procurement cycle. At present, formulation of SQR, which is a Service HQ responsibility has been identified as a major weak link in the procurement process, causing foreclosure in substantial number of cases. It has been ascertained that a large number of cases have been delayed due to formulation of SQRs. The SQRs should be of contemporary technology and not unrealistic in terms of being too ambitious or futuristic in nature. It is imperative to have professional interaction with potential vendors at RFI stage for correct formulation of SQR. The eventual success of the acquisition process and responsibility of formulation of SQR needs to be handed over to technology experts and specialists. The role of Service HQs may be restricted to indicating the capability requirement.
- (c) Field Trials. Today, many vendors participate in trials to get "Trials in India" stamp to exploit their product in third world countries where such stringent DPP is not in vogue. Such vendors qualify in technical evaluation by giving false information, which results in avoidable delay and effort. To enhance the efficiency of field trials, the following is recommended:
  - (i) Trials in Two Phases. The field trials should be conducted in two phase's i.e. preliminary and main. In the "preliminary phase", all vendors who do not satisfy the fundamental or critical parameter (e.g. range of a gun) should be eliminated. The balance vendors are only allowed to take part in "Main" trials. This would save considerable time, effort and resources.
  - (ii) NCNC Trials. We may consider reimbursing part/full cost of shipping and transportation of those vendors who qualify in the 'preliminary' phase, to encourage better participation in trials.
  - (iii) Dedicated Trial Fmns. To usher in more professionalism and

objectivity in the process of field trials, it is recommended to earmark dedicated formations and units to conduct the field trials. This process is followed in some countries like USA.

- (iv) Sector Specific Trials and Induction of Equipment. Due to vast size of our country and varied threats, the equipment is required to meet SQRs in all types of terrain i.e. plains, mountains, deserts and sometimes in high altitude areas. It is felt that if an equipment meets the SQRs in a particular sector e.g. plains and deserts, it should be inducted in that particular sector and thereafter, the OEM could be asked to improve upon the equipment to meet SQRs in mountains. This would enable partial induction of equipment, rather than delaying the complete process.
- (d) Review of Fast Track Procedure. Our experience with the Fast Track Procedure has not been very encouraging. To increase its efficiency, the following could be considered:
  - (i) Statement of Case, RFP and TEC to be formalized in a collegiate manner.
  - (ii) Chairman empowered committee should be the final auth to approve RFP and TEC report.
  - (iii) It should be monitored "top down".
- (e) Increase in Financial Powers. The delegated financial powers of VCOAS must be increased from Rs 50 crore to 100 crore.

**Performance Evaluation Matrix.** Presently, all systems that meet the SQRs are considered at par and no priorities can be accorded on basis of performance. The lowest commercial quote (L1) may get the order, despite not being technologically superior. As a high technological performance system can never be cheaper than a commonplace system; the Services are deprived of the state of art equipment that may be available for nominal and acceptable increase in cost. The Services thus, get saddled with mediocre equipment. It is recommended to adopt a 'Performance Evaluation Matrix', a simple scientific matrix to evaluate the system during the trials. The matrix could be in a form wherein, the user spells out minimum required verifiable functional parameters. The functional parameters are projected with lower and upper acceptable limits specified. Additional credit should be given for better performance within the stipulated range. These parameters are assigned differential weightage as per their inter se criticality and a scientifically evolved matrix is prepared, which would result in a better equipment for the Services, may be at a slightly higher cost.

**Integration of Defence Acquisition Wing.** There is a need to create a separate integrated and professional acquisition organisation by incorporating all the acquisition functions under one head. The benefit of such a separate integrated acquisition organisation, which is in synchrony with international practices, lies in the fact that it will not only assist timely and effective acquisition but will also ensure a single point of accountability. The acquisition wing of the MoD

was established with the aim of integrating all acquisition functions. It can be empowered to lead this organisation by integrating all functionaries with a wider mandate. However, to bring all acquisition functionaries under the acquisition wing is a huge challenge, as it involves a complete reorganisation of existing organisational structures.

**Training of Acquisition Functionaries.** Reforms in structures and procedures can make only limited difference, unless acquisition functionaries are trained and equipped to translate progressive policies into tangible actions on ground. There are over 22 disciplines in which mastery is required by any defence acquisition organisation i.e. earned value management concepts, systems planning, research methodology, estimating techniques (parametric, analogies and improvement curves), business modelling (basic probability concepts, subjective probability assessment and basic simulation concepts), testing regime, logistic implications, sensitivity analysis and risk management etc. We barely possess any. This calls for a separate discipline of 'defence procurement' in defence studies. Most countries specify education, training and experience standards for all acquisition appointments. A well-equipped and trained acquisition force can speed up the process and save up to 15 percent in acquisition costs. To inject more professionalism in acquisition regime urgently, the following is recommended:

- (a) The subject of 'defence procurement' should be included in the strategic and military studies in all officer courses. Case studies on procurement cases should be encouraged. The setting up of a national defence university could further this process.
- (b) A separate QR for posting in the DTEs dealing with defence procurement should be drawn up. The QR could include previous exposure in equipment branch of line DTE (AHQ) or at formation level, and flair for the job. The army officers who are posted in acquisition DTE/wings must have an extended tenure with assured career progression.

**Role of 3 Cs.** A number of cases have been foreclosed or delayed due to injunction of CBI/CVC/CAG. It is agreed that probity, transparency and fairness must be ensured in all defence deals; however, at the same time, cases must be dealt with expeditiously to avoid time and cost over-run.

**Automation.** A major area for reforms concerns the comprehensive usage of ICT capabilities in defence acquisitions to monitor the procurement cases. This would entail development of elaborate data bases concerning prices of components, sub assemblies, assemblies, sub-systems and systems acquired by the Defence Services; developing an efficient MIS for monitoring time-lines of important stages of acquisition, commitment and budget, monitoring, the LCC requirements, offsets tracking, and contract monitoring. It should be possible to collaborate with best the of class Indian IT companies to develop the necessary



systems and application software, communication networking and data base management capabilities in a rapid enough time frame.

### **Defence Industrialisation Strategy**

Importance of self-reliance in defence is axiomatic to the country making progress as a rising economic power. Dependence on other countries for defence equipment makes the country vulnerable, reduces foreign policy options and impedes the country's growth as an independent power in its own right. In 1992, the Government had set itself a target to achieve up to 70 percent self-reliance in defence by 2005. Unfortunately, in terms of capital equipment procured, our self-reliance index today is less than 30 percent. However, the country is better placed today than it was before to progressively achieve the goal of self reliance, as our technical and industrial base and the need to develop is much stronger and it would be possible to achieve the stated aim if necessary policy framework and structures are put in place. The defence industrial policy must enunciate the role of DPSUs, OFB, DRDO, and private sector, and foreign OEMS vis-à-vis FDI policy, absorption of ToT and role of offsets. The public and private sector must engage in healthy competition and make India truly self-reliant in defence production. Given the multiple barriers to entry, a defence industry capable of competing on the global stage is unlikely to grow of its own accord in India and will need significant Government intervention and incentivisation.

**Participation of Private Sector in Defence R&D.** While the DPP 2011 encourages the private sector to enter into defence production, the Government continues to retain its own defence R&D through DRDO. It is important that the R&D potential of the private industry be fully exploited for defence related research. The defence industry is highly technology driven and globally the private sector has been known to rapidly adapt to changing technology. The private sector possesses business acumen to spot fleeting opportunities for long term survival and continued prosperity of their enterprise. Open and free competition compels companies to master frontier technology and strive for the limited orders available. It, in turn, helps the nation to build a reservoir of latest technology to give it an edge over its potential adversaries. Europe and US exemplify this capability. The benefits would be increased competition in R&D and encouraging a more result driven approach. The concept of Rashtriya Udyog Ratnas (RURs), which had been conceived must be implemented and these RURs should be treated at par with DPSUs. This would propel our transformation from an 'importer of defence technology' to the 'developer of defence technology'.

**Collaborative Defence R&D.** Integrated approach to planning development and production is the key. We need to form 'consortium' of DRDO, public and private sectors as also the defence forces to create a competitive defence technology edge and strengthen the 'defence R&D base' in our country. We could also look at technology transfer from foreign collaborators as India has

undoubtedly emerged as an attractive and favoured destination, for more cost effective production of defence items. As we look ahead, formations of joint ventures for 'Co-development and Co-Production' of defence items, both for indigenous requirements and for export is a very viable option, which should be exploited. The successful 'Brahmos' venture is a good model. Countries like Russia, which were known for their secretive military R&D are today proactively exploring collaborative relationships as it has been realised that beyond the vast sums invested by the US, resources—including domain knowledge, reach, infrastructure and finance—are seldom sufficient at a national level, to meet true aspirations of capability development.

**Multi Stage Development of Equipment.** The development of defence systems is often a multistage process with incremental enhancements progressing from Mk I to Mk II and so forth. It must be monitored at every review that our equipment and weapon systems provide a technological edge over the adversary. In case of delay in the realisation of the projects, the Services should exercise the option of 'exit' and follow 'Buy Global' for necessary numbers till indigenous production capability is established. Synergy among soldiers, scientists and industry is essential to bridge the modernisation gap in an operationally acceptable time frame.

**Offset Policy.** Offsets are universally accepted as a powerful leverage to obtain compensatory benefits by asking the seller to undertake well-designated activities to satisfy vital economic necessity or fill critical technological voids. Every country that strives to develop indigenous industry seeks technology through offsets to bridge the gap and use this as a platform for indigenous development of more advanced technology. For technology transfer, there is a need to adopt a two-step approach. Firstly, we need to identify critical technologies, and find the ability to absorb these technologies. Secondly, the vendors must be persuaded to offer required technology by various offset programmes. Under the present dispensation, ToT does not fall within the admissible components of offsets. However, as the underlying purpose of offsets is to develop and strengthen indigenous defence production capabilities, obtaining technology through the mechanism of offsets could be a legitimate objective. It would contribute to development of a stronger defence technological and infrastructure base.

**Private Sector.** In May 2001, the defence sector was opened for private sector participation, with 100 percent private sector ownership permissible and FDI of up to 26 percent. This led to a paradigm shift in the structure of the defence industry as private players were no longer restricted to supplying raw materials, semi-finished products, parts and components to DPSUs and ordnance factories. In terms of market share, the Indian private sector is still at a nascent stage compared to the private sector in other developed nations. Presently, the foreign companies account for the majority of procurement from the private sector in

India, with approximately 70 percent of Indian defence procurement coming from overseas. Of the 30 percent of orders placed in India, only an estimated nine percent is attributed directly to the private sector. Along with this, the private sector also accounts for 25 percent of the components provided to the DPSUs, giving them a 14 percent share in the overall market. This ratio is expected to change steadily with the growing participation of private players in the Indian defence industry that the Government is keen to encourage. Major Indian industrial houses like the TATA Group, Mahindra Group, Kirloskar Brothers and Larsen and Toubro have diversified into the defence sector, forming joint ventures with foreign companies on both strategic and product specific bases. To give further boost to the private sector, the following additional measures can be undertaken:

- (a) **ToT.** ToT, which currently is the exclusive remit of DPSUs, should also be allowed to be absorbed by the private sector.
- (b) **FDI Limit.** Increase in FDI from current 26 to 49 percent.
- (c) **Incentives.** Tax and funding advantages should be extended to the private players.
- (d) **Manufacture of Explosives.** Reliable industry partners must be given license to manufacture ammunition and explosives. The same is presently banned due to Act of Parliament, which must be amended with strict legal and penal provisions.

**Balance between Indigenisation and Capability Voids and Delays.** The attempt at indigenisation are appreciated and the necessity well understood. However, there is a need to maintain a balance between the goal of indigenisation and voids and delays in capability building by carrying out a realistic appraisal of the capability of DRDO, DPSUs and OFB. The private sector may have entered into the fray ten years ago, but the public sector infrastructure of DRDO, DPSU and OFB has been working towards this goal for a much longer duration. They have had the full policy and financial support from the Government by means of ToT, subsidised taxation laws and grants. However, the results have not been encouraging. The failure of DPSUs, to execute ToT in some big-ticket schemes after paying for it, calls for honest introspection.

## **Conclusion**

India's defence requirements in the 21<sup>st</sup> Century pose a wide array of challenges covering conventional, sub conventional, internal and external dimensions of terrorism, proxy war and out of area contingencies. We are at the threshold of emerging as a major player in the strategic and economic environment. Technology will be the force, which would catapult the IA to a modern net centric force capable of fighting across the complete spectrum of conflict. In our quest for modernisation and seeking new technologies, we need to understand the importance of science and technology. Science drives technology and technology drives weapon systems. Given our long development periods for major systems

and indigenous technical base, we need to evolve a user- scientist perspective for the future. Synergy among soldier, scientist and industry is imperative to bridge the gap between capability desired and its fructification in an operationally acceptable time frame.

The revisions have attempted to address the requirements of transparency as well as timely induction. The utilisation of the modernisation budget allocated to the defence forces has shown an improvement in the last financial year i.e., FY 09-10. The allocations were almost fully utilised and efforts need to be made to sustain the momentum. While we have come a long way, the procurement procedures can still be termed as 'work-in-progress', as some aspects need to be revisited based upon experience gained. Refinements would ensure that the procedures offer a pragmatic process that facilitates capability induction in a time bound manner, while addressing the requirements that are important for a democratic country, in particular that of public accountability. Issues and concepts of indigenisation, value for money, defence industry, research & development, joint ventures, as well as policy and procedural framework are inextricably linked to defence procurements. The utilisation of the modernisation budget allocated to the defence forces has shown an improvement in the last financial year FY 09-10. Efforts have been made at various levels to reduce the time taken in progressing acquisition proposals. Measures such as limiting the period for grant of extension for bid submission have been introduced. However, delays in the process continue to be a matter of concern. In addition to operational considerations, such delays often lead to financial and opportunity costs. In some cases, they can also result in technological obsolescence of the equipment being inducted. Pressing requirements in the field need to be kept in mind when processing acquisition cases. This would require timely initiation of the proposals by Service Headquarters, and speedier processing through the various stages. In some cases, delays also occur due to incomplete details furnished by the vendors in their bids, and subsequent correspondence and deliberations that ensue to seek clarifications. Provision of complete and accurate information in the technical and commercial bids is therefore equally important from the point of view of avoiding delays.

# Challenges of Defence Procurement: A User Perspective

*Aftab Khan and HS Jhaji*

## **Introduction**

Armed Forces require timely and cost-effective acquisition of defence equipment to arm them with the capabilities required to meet the national goals and thwart any challenges to national security. Defence procurement involves 'what to buy', 'where and whom to buy from', 'how to buy' and 'how to monitor'. Concepts and related issues such as indigenisation, value for money, defence industrial capacity, R&D, technological capacity, state of public private sector ventures, as well as policy, organisational and procedural frameworks are inextricably linked to defence procurements.

## **Peculiarities of Defence Procurement**

Procurement of defence hardware is a highly specialised activity requiring high professional skills and unique attributes. This intricate and multifaceted process can be performed effectively only by a motivated skilled team, which possesses intricate knowledge and exposure of the subject. Knowledge, pride, motivation, hands-on practical experience, commitment to the cause of national security, and above all the desire to ensure availability of the right-equipment to the man in the field are of essence. Some of the major peculiarities are as follows:

- (a) Funds involved are very large and the equipment selected has a profound influence on national security. A large number of platforms, especially ships and submarines have long gestation periods.
- (b) There are a limited number of defence equipment and platform manufacturers in the world, and still fewer who are willing to part with their top-of-the-line products. The problem gets compounded where technology transfer is desired as an essential part of the package.
- (c) Export of defence hardware by foreign countries is governed by strict

(and often restrictive) state regulations. In-depth knowledge of these provisions is an essential attribute expected of the acquisition planners/managers.

- (d) Complex choices have to be made, if sophisticated equipment has to be inducted from government-owned PSUs, private sector or imported from overseas due to lack of indigenous defence industrial capacity.
- (e) The risk associated and the responsibility related to the induction of a specific equipment or platform should be owned by the acquisition system. Failure to operationalise a 'critical sub-capability' of an equipment or platform could lead to disastrous results, besides being construed as wasted expenditure of the taxpayers' money.

### **Acquisition Enablers**

The defence procurement and management structures in the Ministry of Defence (MoD) were reviewed in 2001 based upon the recommendations of the Group of Ministers (GoM) on reforming the national security system, constituted in the wake of the Kargil conflict.

One of the first tasks undertaken by the Ministry was to codify the procurement procedures, earlier attempted a decade ago in 1992. The initial formulation in 2002 and subsequent revisions were to de-mystify the process and introduce increasing levels of transparency based on experiences gained in implementation and also to provide impetus to indigenisation, based on Kelkar committee recommendations.

A rule-based procurement system has since been well established, in which each procurement case has to be processed through a set of pre-defined steps. A basic organisational structure in the form of acquisition wing has been created in the Ministry. Manpower for similar structures within the Service HQs is still to be formally approved. Codification of the procurement procedure has brought-in transparency to all the stakeholders. It has also enabled the Armed Forces to bridge many capability gaps. Some of the significant comments on defence procurement processes are as follows:

- (a) The foreword by the Hon'ble RM in DPP 2011, emphasizes the need for expeditious procurement with transparency and probity in defence acquisition. While much success has been achieved in transparency and probity, the process has considerable distance to traverse to achieve the desired speed or become expeditious.
- (b) The Standing Committee on Defence (SCOD), in its twenty-third report, published in December 2008, has observed that "despite several initiatives taken in the recent past for promoting indigenisation and achieving self-reliance in the defence sector, there is still heavy dependence on foreign suppliers and the goal of achieving self-reliance remains elusive despite a well established network of defence industries in the country". Multi-pronged remedial measures have been initiated to meet the demands of the SCOD.

- (c) Defence Production Policy has been promulgated by the MoD in Jan 11 with the intention to boost self-reliance in defence technology. The DPP 2011, has incorporated various provisions and special focus has been accorded to promote and facilitate wider participation of indigenous defence industry. Additionally, to encourage wider participation by civil industry in defence acquisitions, all Requests for Information (RFIs) are being uploaded on the MoD website. Furthermore, the categorisation of Buy and Make (Indian)' has also been introduced.
- (d) To ensure that offsets become enablers of indigenisation, certain recommendations are under consideration of the MoD.

### **The Inhibitors**

Major concerns in the Defence Services relate to the inability of the Services to meet the requirements of the forward deployed troops, who are required to put their life in the line of fire. The establishment is often hard pressed to explain to the rank and file why a certain piece of operationally needed equipment cannot be inducted in a reasonable time frame. Civility invariably prevents hard questions being put to the bureaucracy who are, in any case, far removed from the front line.

**One-Size-Fits-All Model.** The procurement procedures are lengthy, time consuming and result in major delays, to say the least'. One size fits all' maxim is applicable for all capital procurement—be it a COTS tractor worth just over Rs 10 lakhs or 126 sophisticated MMRCA. Resultant delays, especially in life-saving equipment such as bullet proof jackets, helmets, traffic collision avoidance system fitted on aircraft etc. are hard to justify. Such long drawn out and cumbersome processes even for COTS items, often lead to delays, which invariably results in higher financial and opportunity costs. Further, prolonged delays in the procurement cycle often results in technological obsolescence of the equipment being inducted, resulting in reduced operational exploitation time, thereby negating the time, effort, and money expended towards the acquisition. Some salient issues are enumerated in succeeding paragraphs.

### **Capacity Constraints**

If descriptions of defence procurement processes are peppered with words like "reactive", "delayed", "lost opportunities" etc. it is primarily attributable to the severe lack of capacity in the system. A small segment of these are highlighted in the succeeding paragraphs.

**Too Few to Deal with the Task.** Firstly, let us examine the functionaries that are involved with the acquisition process. There is just one acquisition manager, technical manager and finance manager each, who are responsible for the acquisition of capabilities for the navy, coast guard and major systems for all the three services. It is humanly not possible for a single authority to efficiently deliver on such a heavy mandate and delays are a natural consequence. In order

to make our acquisitions more time-efficient, it is critical that the acquisition wing in the MoD is expanded, and responsibility between the bureaucracy and service officers of appropriate rank is shared in conduct of various processes. The organisation has no option but to grow with adequate empowerment at various levels.

**Need for Enhanced Delegation to Service Headquarters.** The recent five-fold enhancement of financial powers for capital acquisitions to MoD has made the task even more gigantic. Whilst the financial powers for MoD have been enhanced, there has not been any consequent enhancement of financial powers delegated to SHQs. When the topic of enhanced delegation is broached for consideration, the requirement to maintain parity with other ministries at the level of the Secretary is often quoted as the reason for that inability. We need to recognize the needs of individual ministries, and demand as per our requirements, instead of adopting a 'one-size-fits-all' approach.

**Need for De-centralisation of Approvals.** A proposal beyond Rs 50 crores currently, visits the desk of the acquisition manager 9 times and the technical manager 13 times from the stage of the SoC being forwarded for the first time. Every examination also begins at the lowest level in that organisation, thereby leaving very limited time for the lower functionaries (directors) to undertake independent tasks. The same proposal would also be routed to the level of DG(Acq) on 11 occasions<sup>2</sup>. Even though the current incumbents are extremely efficient, the process needs some reworking to enable decentralisation for facilitating speedy acquisition of capability.

**Need for Training.** Numerous functionaries are appointed to the Ministry for dealing with the acquisition process. They bring with them experiences and a working environment of their parent ministries and cadres. While cross-pollination of ideas is healthy, the lack of training, indoctrination and understanding creates undue hurdles. The inability of most functionaries to comprehend the nuances of the maritime environment, the typical requirement of the naval ships, submarines and marine assets are also responsible for substantial delays. Probably, greater integration of acquisition related functionaries with the field, through participation in a 3-month attachment for exercises at sea, field visits, interaction with operational commanders etc. would help them understand the typical requirements and consequently generate greater feel and ownership of the procurement process.

**Need for Single Point Responsibility.** The most significant drawback of the DPP 2011, is the lack of single-point accountability and ownership. In fact, numerous stages outlined in DPP do not even have a process owner. A large cross-section of the acquisition charter was expected to be fulfilled in a collegiate manner so as to compress time frames. This has helped in reduction of time, but certain segments are still being done in a non-collegiate manner due to lack



of empowerment among various functionaries. There is a need to assign a process owner to each stage with suitable accountability. But, how does one generate ownership? It certainly cannot be generated by a whip. Nor can it be enforced by a directive. It is something that comes from within an individual, from a feeling of belongingness to the cause. Perhaps, greater integration with the field will generate a feeling of ownership towards the procurement cases.

**Parallel Processing Options.** The present acquisition process is a series of 'sequential' steps. There is a need to institutionalise parallel processing of various stages in our DPP, to shorten the time-lines and absorb the time delays at any of the stages. Three stages in the acquisition process typically take the maximum time, and these should be accorded immediate attention for modification of the acquisition cycle. These are issue of RFP, conduct of TEC/TOEC and CNC. While the need for comprehensive evaluation at technical and commercial stages is essential, the delays are largely attributable to the capacity constraints deliberated above. The requirements of a fair, objective and transparent evaluation should be balanced with timely outcome.

### **Policies**

**'Make' Procedure.** The 'Make' procedure, which ought to have been the driver for self-reliance has not been able to see a single case reach the AoN stage in the last five years. Probably, there is a need to re-examine and further modify the process to facilitate economically viable business models in the 'Make' procedure, to enable private participation in this process right from the inception stage. The monetary advantages, FDI, tax benefits and other concessions to the defence industry would pave the way for increased involvement of the Indian private sector.

**Buy and Make (Indian).** Feasibility to categorise proposals as 'Buy and Make (Indian)' where possible, which allows participation by both Indian public and private<sup>3</sup> sector, having requisite financial and technical capabilities to absorb technology and undertake indigenous manufacture, needs to be simplified. This procedure would have an advantage over the "Make" procedure, in that the production and development by Indian Industry will be through transfer of technology and not through research and development. This is primarily aimed at encouraging a pro-active participation by the Indian Industry who could establish JV and production arrangements with any foreign manufacturer.

**Fast Track Procedure.** Fast Track Procedure was introduced to induct urgent capabilities required to meet unforeseen threat or to meet imminent threats. Case studies reveal that the procedure is rather ambitious under the present framework of processes and timelines, thereby reducing its effectiveness. It is significant to note that no case under FTP has met the laid-down time-lines in the last three years. Wide ranging delegation is necessary to the Empowered committee to meet requisite 'fast-track' timelines. Also, equipment that affects

the safety of lives during peace time operational deployments (life jackets, bullet proof jackets, helmets, VBSS gear, NBC protective clothing etc.) and those related to air safety international norms (TCAS for aircraft etc), should also be included in its ambit.

**G-to-G Procurements.** Government-to-Government (G-to-G) procurement of defence equipment enables nation states to leverage the sale for foreign policy benefits. There is a need to lay down guidelines with important countries like Russia, US, France, Israel etc. Increase in defence cooperation, coupled with incremental growth in procurement of defence hardware through G-to-G arrangements requires policy formulation to be undertaken at the earliest. Specifically, our procurement procedure should cater to these requirements since high technology, sensitive and lethal defence hardware from these countries would be available only through G-to-G arrangements. In this light, there is a need to examine options to dovetail the special provisions for G-to-G or hybrid cases into the framework of our DPP.

**R&D.** As a nation, if we desire to graduate from a 'buyer 's state' to a 'builder 's state', indigenous defence R&D would need greater focus, both in the public and private sector. Licensing conditions for eligibility for participation in defence production would require to be suitably reviewed to mandate this minimum percentage of capital allocated towards R&D for the industry, both for public and private.

**Offsets.** Linked to the capacity building for self-reliance is the concept of offsets. Offsets have attained acceptability in more than 100 countries worldwide. It was introduced into our defence procurement procedures from 2005 onwards. Many deliberations and organisational structures have been evolved to make the delivery of offsets sustainable. The offset policy has been revised to include offset credit banking, enabling foreign vendors to create offset programmes in anticipation of future obligations. It is believed that the recent examination of the subject, would have addressed various issues related to offsets in a comprehensive manner.

**FDI in Defence.** Despite the policy to permit FDI up to 26 per cent, the actual inflow to the defence sector has been only Rs 0.24 crs<sup>4</sup>. In comparison, FDI in coir was Rs 6.67 crs, dye stuff Rs 84 crs, printing of books Rs 951 crs, ceramics Rs1841 crs and services sector Rs 1,20,771 crs. The Department on Industrial Policy and Promotion (DIPP) has sought an increase in the FDI cap from its present limit of 26 per cent since it discourages OEMs from bringing in proprietary technology and OEMs are reluctant to license their proprietary technology to a company in which their equity is restricted to a minority of 26 per cent. This has prevented India from accessing the latest high-end technologies available. It has also been suggested that increase in FDI cap could provide a significant incentive for transfer of knowhow and technology and

will assist the government in its objective of achieving 70 per cent indigenisation and self-reliance in defence production. Whilst there is merit in this suggestion, any increase in FDI level beyond 50 per cent would imply management control with foreign investors and such ventures may fail to deliver at crucial junctures due to factors such as sanctions imposed by foreign governments etc. It may however be prudent to increase the FDI limit to 49 per cent.

### **DRDO/DPSUs**

The aspect of level-playing field for public and private sectors has often been debated. The Standing Committee on Defence has recommended that steps be taken to provide level playing field in areas like nomination for transfer of technology from foreign suppliers, tax and duty structures, and acceptance norms for collaterals. Defence PSUs (DPSUs) and DRDO JVs are extremely significant role-players in our defence acquisitions. Being an arm of the government, certain dispensations are allowed to these institutions in the DPP, which are not available to the private players. Assured orders, coupled with lack of adequate competition from private sector has adversely affected the cost competitiveness of equipment procured through these sources. Also, these organisations being 'primarily' "for the government, by the government and of the government", suffer from accountability deficit, which in turn results in large cost and time-overruns in projects attributed to 'organisational reasons' rather than individual, single-point accountability. Greater accountability needs to be built into these organisations to meet the aspirations of the Services.

Also, inter-twined with the issue of the DPSUs are their profit margins, which unlike private industry, are protected by government regulations and mandatorily payable by the Services over the basic cost calculations, almost akin to taxes. Assured profit margins and competition-free order books, coupled with weak accountability are the bane of our DPSUs. In the case of DPSU shipyards, where the selection of shipyard for construction of warships is through 'nomination' by MoD, this effect is most pronounced.

Greater private participation in defence industry would infuse competitiveness amongst the DPSUs and provide greater value for money for the Services. The Kelkar Committee had also recommended in its report that the "DPSUs should explore the possibilities of mergers and formations of consortia in order to achieve optimal level of synergy and become globally competitive".

The Armed Forces have nurtured the DPSUs and are willing to support any of their endeavours. In return, all they seek is timely delivery of capability, at a reasonable cost, at par with the efficiency of the private sector. This is certainly achievable by the DPSUs since a large chunk of their infrastructure costs have already been amortised by the Services and they have many years of experience, as compared to a Greenfield enterprise.

### **Role of Private Sector**

**Long Term Vendor Development.** Multi-vendor procurement for better price

discovery is a need reiterated by the finance wing in almost every case<sup>5</sup>. Coupled with this innate desire, is the reality that there are only a limited number of defence equipment/platform manufacturers in the world. The problem gets compounded when we are looking for such multiple vendors in India, in the zest to enable 'real price discovery'. We need to adopt an alternative approach of establishing an independent audit agency that will assure the Government that a fair price is charged for the sale of the equipment. Such a model has been successful in many countries, as it creates an environment of long-term partnerships with the vendors. This will also result in 'value for money' options and enable adoption of L1T1 model for induction of high technology systems and platform.

**Private Sector Participation in Maintenance Support.** Long term maintenance support and consequent infrastructure development is integral to almost all defence acquisitions. This activity, post initial induction of support hardware from the OEM, is almost completely undertaken by the Armed Forces themselves. In view of the growing complexity and rapid advancements in technology with every new induction, the SHQ would find this task increasingly difficult and cost-ineffective. Public Private Partnership (PPP) models, as has been achieved in provision of public services like aircraft and equipment MROs and airport etc. in the country, are some models that could be considered for inclusion in our acquisition procedures.

**Performance by Private Sector.** The entire thrust is based upon the faith placed on the capabilities of the private sector to deliver quality product with life-time support. In order to establish itself as a key player in the defence industry in India, private sector participation can be boosted directly through demonstrated performance through strict compliance to quality.

### **Other Issues**

**SQR Formulation.** An SQR is the basic building block on which the complete edifice of the procurement is based. The entire procurement process is directed towards acquiring the capability, which satisfies the laid down SQRs. SQR formulation is a very stringent and specialised process<sup>6</sup>, which requires detailed professional competence and high level of domain knowledge and practical experience. Under the existing norms, deviations to SQRs can only be sanctioned by the Defence Minister on the recommendation of the DPB and is a highly complex and time-consuming process. Poorly conceived and formulated SQRs create confusion, lend themselves to misinterpretations by the vendors, generate arbitrariness and fail to segregate 'apples from oranges' at the evaluation stage, thereby either compromising the capability inducted or immensely delaying the induction process. At times, the whole induction process may need to be aborted at an advance stage or a number of special dispensations obtained to regularise infirmities. Suitable manpower should be identified and positioned

in directorates dealing with the formulation of SQRs and those dealing with the acquisition process.

**Re-Defining Transfer of Technology.** Modern military systems are complex, based on multiple proprietary technologies. The development, manufacture and induction of these systems have a long gestation period for imbibing the technology. This adds to the complexity of ToT for military technology as against other technologies. Indian industry has been involved in ToT with overseas partners. Analysis reveals that critical technologies (golden parts) are rarely transferred under ToT or are exorbitantly priced. It is, therefore, essential that ToT adopts a technology based approach rather than the current system specific approach<sup>7</sup>. This would require the identification of strategic technologies where indigenous capability needs to be built up.

**Economies of Scale.** In the context of maritime systems for the Indian Navy, the numbers required of any equipment would be extremely limited, depending on the class of ships in which it is envisaged to fit the equipment. With the likely size of the Indian Navy at 130-140 ships for the foreseeable future, we can envisage about 3-10 ships of a class. Building warships involves a huge array of machinery, equipment, weapons and sensors, most of which are to be made in different capacities, sizes and to varying specifications for different applications and classes of ships. Expecting the industry to develop and continuously upgrade items in such quantities is unrealistic, unless we are content with always being behind the state-of-the-art. Clubbing of the requirements for new ships spread over large time frames has the inherent problem of obsolescence. This is more so in the case when majority of current day systems have a large 'COTS Content'. The Navy has tried to maximize economies of scale through standardisation<sup>8</sup>. The investment once made should not warrant a multi-vendor procurement process for real price discovery.

**Export Norms for Defence Hardware.** The need to selectively permit the industry to export their military hardware assumes significance to ensure that the R&D and development costs are amortised, besides over-coming the small economies-of-scale<sup>9</sup>. Concurrently, there is a need to put in place safeguards in procurement procedures that help nurture capabilities created in key areas. Modalities for upgrading and developing the capacity of the Indian industry, through means such as joint ventures and state funding (with appropriate oversight mechanisms) would need to be drawn up.

**Capability Gaps and Exit Clause.** In trying to attain self-reliance, there should not be any compromise on capabilities—which invariably happens in many developmental projects. Whilst some developmental equipment have been successfully inducted into the Services, others have resulted in platforms being inducted with gaps in operational capabilities, since the developmental project has been unsuccessful or delayed. Under such circumstances, if indigenous item

is not available in the requisite time frame, imports to avoid capability gaps must be allowed. Every developmental project must have an 'exit clause' inbuilt, wherein if the project is behind the mutually agreed developmental timelines, then at a pre-defined stage, the Services should have the option to induct the capability in part/full through alternate means. This would prevent undue pressure on the developmental activity and allow the R&D agency adequate time to iron out the rough edges, whilst at the same time not compromise capability induction of the Services.

## **Conclusion**

As highlighted earlier, the present defence procurement and management structures in the MoD is a consequence of the recommendations of the GoM, post Kargil conflict. One could say that, it took us a war and associated loss to human lives to galvanise us to take a holistic look at the acquisition process. It is now near a decade ago since that study. While we have undertaken many revisions to the acquisition process, we are yet to take a holistic review of the concept, practices, elements, human resource qualifications and accountability in defence procurement. It is probably time to take a holistic review of the acquisition setup, by an elaborate study, which also examines present acquisition organisations of few other countries, and see if some of those practices are suitable for adoption in India.

The Kelkar Committee undertook this exercise in 2005 and put forth recommendations from these international practices, which could be imbibed in our system. It may be worthwhile to re-visit these recommendations since incremental refinements in the DPP, have successfully addressed the issues of probity and transparency in defence acquisitions, whilst timelines still remains a grey area.

In the preceding year, a holistic review of the acquisition process was undertaken in USA by the House Armed Services Committee, responsible for congressional oversight on military matters. UK too, undertook an independent audit by Bernard Gray, whose report could be an eye opener for the acquisition set-up of any country. A similar exercise by our MoD may be the best way forward.

Whilst we have been consolidating the procedures all these years, its consequent demands on the human element of the authorities have been overlooked, thereby adversely affecting the timelines. At the threshold of a decade of these initiatives, it is time that a holistic review of our entire acquisition process and set-up is undertaken with a view to implement major course corrections where required, so that all bottlenecks are ironed out. This review should not be confined only to the MoD but also to SHQs, who are major stakeholders and end recipient of the acquisition chain.

## **NOTES**

1. The views expressed in this article are the personal views of the authors and do not constitute the official viewpoint of the Indian Navy.

2. The number of times counted herein is based upon the premise that no deviations or complication would arise in the case while processing.
3. Statistically, a majority of the defence equipment is manufactured by private sector across the world, duly supported by the Government in terms of policies and incentives.
4. As per fact sheet on FDI available on the DIPP website <http://www.dipp.nic.in>
5. This example is based upon the case pertaining to the replacement of equipment in a submarine. An item from vendor A, which reached its end of operational life was replaced by an item from vendor B due to the requirement of multi-vendor bidding. 8 years later, in a similar procurement for another type of submarine, the item from vendor C was replaced by that from vendor A. This was once again due to the requirement of multi-vendor requirement. In the bargain, shore maintenance facilities of both vendors had to be setup and product support, spares, training etc had to be created for both types of equipment.
6. The RFI process has been made mandatory for formulation of SQRs since Nov 2009. Further, the SoC for the proposal also includes salient details of SQRs, which are deliberated in the Categorisation Committee meetings (SCAPCC, SCAPCHC & DBP/DAC) at the stage of accord of AoN and categorisation. SQR formulation at Service HQ is a very stringent and specialised process, which requires a very high level of professional competence, domain knowledge and practical experience. Within SHQ, Draft SQRs are initially prepared based upon the operational requirements. These draft SQRs are vetted by field formations through a system of peer review, and inputs are duly factored prior to conversion of the draft SQRs into outline staff requirements. At this stage, the SQRs are vetted through a process of consultation at various levels of design organisations, DRDO, DDP, QA agencies and other organisations. After due process of examination and collegiate vetting the single service SQRs are approved under the aegis of the Services Equipment Policy Committee (headed by Vice Chief/Deputy Chief). Similarly the JSQRs are vetted and approved by the Inter-Services Equipment Policy Committee (ISEPC) under HQIDS. In addition, the personnel branch of the Indian Navy appoints the brightest officers in the directorates associated with the formulation of SQRs and acquisition process.
7. Today, ToT in the Indian context implies the ability to 'replicate as existing wheel, not the ability to make a new wheel after replicating the old one'. The problem is that while ToT can be bought (with some exceptions), invariably at a huge cost, the human expertise to interpret, use and subsequently modify the ToT is not available. An example is the SRGM ToT to BHEL by M/s Oto Melara where the PA is still dependent on the OEM for providing product support and upgrades. A possible solution lies in developing human resource and expertise in public/private sectors, where ToT has occurred and support for subsequent variants/models developed by the public/private sector company. This approach will require assured funding support and special measures such as international collaboration, JVs between DRDO/DPSU and the private sectors, and generous funding for R&D in public/private sectors.
8. One of the most successful indigenisation projects undertaken by the Navy (in partnership with the Coast Guard) has been the Kirloskar-Pielstick Diesel Marine Engines, a total of 24 of which were manufactured to licence. Such a number is still not sufficient to justify the continuous research costs that total indigenous development would require and therefore even now a substantial number of critical components of these engines, viz, crankshafts, machinery control electronics etc have to be imported.
9. The induction of indigenous batteries for submarines is an apt example.

# Perspective of the Indian Air Force on Key Issues of Defence Acquisition and the Reform Measures: Needed to Expedite Defence Procurements

*S.K. Jha*

## **Introduction**

The Indian Air Force is a major 'component of national power'. Furthermore, it is to be understood that the air power, which can be applied quickly and decisively, will be a decisive factor in shaping the outcome of any future conflict. The IAF today is in the process of a most comprehensive modernisation plan and over the next few years, the IAF will induct more fighters, transports and trainer aircrafts into their operations. The IAF is also in the process of introducing various types of helicopters and radars to meet the Air Defence's requirements of accurate and advanced weapons, network centric warfare systems, etc.

Defence acquisition, is a complex process. Despite several institutional and procedural improvements, some problems continue to occur. These are manifested in time and cost overruns of some of our important acquisition projects.

The aim of this paper is to highlight key issues of defence acquisition, from the perspective of the Indian Air Force, and suggest reform measures needed to better expedite defence procurements.

## **Preparedness of the Indian Air Force**

The Ministry of Defence (MoD) has over the years strived hard to put up a set of guidelines to streamline arms acquisition. However, these guidelines (presently in the form of DPP-2011) have not fully succeeded in expediting arms acquisition, despite their nearly two-decades of evolution. Therefore, the MoD, year after year (except the last financial year) has surrendered a hefty amount



of its procurement budget to the exchequer. It is a harsh fact that the Air Force today operates a lesser number of aircrafts than officially mandated and is also short of radars, sensors for surveillance and other critical equipment.

### **Causes for Delays in Acquisition Process**

Defence capital acquisition is a long, complex and arduous process, and needs expertise in “technology, military, finance, quality assurance, market research, contract management, project management, administration and policy making.” However, the same is not true in the Indian context. It is in this perspective that a close examination is needed to get into the genesis of the causes for delays in acquisition process and suggest solution that promotes efficient acquisition, which is in tune with the best international practices.

### **Procedural Issues**

**Provisions of Defence Procurement Procedure (DPP).** DPP-2011 came into force on 01 Jan 2011 and incorporates important changes aimed at simplifying procedures, speeding up procurement and enhancing benefits for the Indian defence industry. However, like its previous versions, DPP-2011 too has not focussed on strengthening the acquisition structure and enhancing the quantity and quality of acquisition functionaries. It also does not focus enough attention on adopting a more dynamic offset policy and enhancing foreign direct investment in defence. In the absence of reforms in these areas, DPP-2011 is unlikely to achieve its stated objectives of expeditious procurement.

**Primacy of Procedures.** Procedures are established as means to an end. However, in our acquisition process, the procedures have become the end in itself. For example, anything additional at even a meagre cost is a big no-no. It is to be understood that a finite period elapses from the time a Statement of Case (SoC) is raised to the time Contact Negotiations Committee (CNC) until it is formed to actually negotiate the contract. However, as per the current procedures nothing can be added even at this stage. Furthermore, during the period of contract implementation, many shortcomings are noticed which were probably not visible at the time of formulation or signing of the contract. Also, due to the rapid changing technologies, certain items are at times required to be replaced even before they are delivered or certain item need to be added to the existing. However, because of the rigidity of procedure, these changes cannot be negotiated, more so if they entail any additional cost.

**Formulation of Qualitative Requirements.** Formulation of Qualitative Requirements (QRs) of weapons, platforms and systems is one of the most critical aspects of defence acquisition and has a strong bearing on defence capability and costs. In fact, the Services Headquarters (SHQs) are often criticized for formulating so called narrow, unrealistic and inconsistent QRs with the available technology, which previously has led to time and cost overruns. However, the aspect of QRs formulation has undergone tremendous improvements in the

recent past. Nevertheless, the SHQs should continue with this trend and pay more attention while formulating QRs.

**Levels of Approval.** The aspect of transparency tends to throttle the acquisition process as people are wary of exercising judgement and hence decisions are sought with the issue being pushed upstairs. For the fear of committing an error, all cases go to very high levels for approval, thereby delaying the acquisition process.

**Delays in Grant of AON.** For grant of AON, a scheme has to go through various stages of approval e.g. the SCAPCC, SCAPCHC and the DAC/DPB. Presently, the SCAPCHC approves the cases of the three Services under the delegated powers to the three services up to Rs. 50 Crs and recommends cases between Rs. 50 Crs and upto Rs. 100 Crs to DPB and beyond Rs. 100 Crs to DAC for final approval. However, even if a proposal has been completely concurred by DRDO, DDP, MoD and MoD (finance) during the SCAPCC, the proposal still has to route through SCAPCHC before being put up to DPB or DAC as the case may be. This is time consuming and in turn delays the acquisition process.

**Rigidity in Contract Drafting.** It is to be appreciated that not every possibility can be foreseen and planned for at the time of Contract formulation. This at times leads to logjam during the contract implementation phase. Therefore, it is desirable that the contract includes some flexibility as well as latitude for incorporating changes even if it entails some financial implications.

**Immune to New Concepts.** The contracting procedure stipulates a negotiated delivery schedule for the deliverables to be supplied. Adequate provision exists in the DPP e.g. the Liquidity Damage (LD) clause to penalize the vendor for late deliveries. However, no provision exists that encourages the vendors to deliver ahead of the schedule. Furthermore, no incentives are awarded under the DPP to a vendor to perform beyond the agreed performance metrics. A case in point is the delivery of the contracted C-130J-30 aircraft, delivered to the IAF by the Lockheed Martin Aeronautics Company (LMAC) before the delivery dates. Some system of award points could be formalised to benefit such vendors in future contracts.

## **Organisational Issues**

**Organisation of Acq Wg at MoD.** Presently, the acquisition wing of the MoD merely performs the procurement functions and is detached from the other functions of the acquisition process. This at times leads to gaps in the decision making process and is undesirable.

**Staffing.** The complex task of capital acquisition is performed by the acquisition wing at the MoD and at the Service HQs, with very limited staff. Moreover, the personnel involved in acquisition tasks lack "adequate training or exposure to

procurement or contract management". In the developed countries there are professional bodies which are responsible for all crucial aspects of the acquisition cycle, from planning, design, delivery, and upgrade to the final disposal of assets as defence acquisition is increasingly performed by large and highly professional and integrated bodies like France's General Directorate for Armament also called General Delegation for Armaments (DGA) and Britain's Defence Equipment & Support (DE&S), etc. Besides, members of these bodies are given continuous education and training to become competent in their respective fields.

**Lack of Accountability.** In India, defence acquisition is performed by different organisations accountable to different functional heads. As a result, each acquisition process has to go "through numerous approvals and submission points". This not only creates cross-validation with respect to overall planning and requirements but also generates different views and approaches among the organisations at each stage of acquisition, making it difficult to perform the critical acquisition functions in an efficient manner. Similarly, the acquisition wing provides little value addition as it merely performs the procurement functions and is remotely placed from the planning process, defence R&D, defence production, quality assurance and test & evaluation, leading to lack of a single point of accountability which is critical for efficient acquisition.

**Lack of Awareness at the Ancillary Wings of the MoD.** Lack of awareness on part of the ancillary wing of the MoD e.g. PCDA, MoD (finance) etc. causes lots of delays in processing new as well as running contracts. For example, the LOA for the acquisition of six C-130J-30 under the Foreign Military Sales (FMS) route allows re-imburement of taxes paid by the vendor for construction of infrastructure. However, it has taken the PCDA almost one and a half years to clear only the test case for reimbursement and that too after repeated chasing by the SHQ. In fact even after clearing the test case, the balance re-imburement is still pending with the PCDA.

**Lack of Integral Legal Advice.** Presently, there is no integral legal advice available at the MoD unlike the vendors who would have certainly sought legal advice before any contract signature. It is therefore crucial that an integral legal advice be made available to the MoD for effective and efficient contract formulation.

**Suspicion, Fear and Trust Deficit.** In our procurement system there is no possibility of ignoring any complaint, be it genuine or otherwise. At times, a spate of allegations or complaints follow once a vendor becomes aware of the rejection of his product. This leads to wastage of time on part of the staff in explaining the lack in merit of the case. Sometimes these complaints can get personal and is demoralising.

**Post-Contract Management.** While the responsibility for post contract

management is that of the concerned SHQ, the post-contract monitoring rests with the acquisition wing of the MoD. However, even during this phase, all changes in the contract, even without any financial implication, are effected only at the level of the MoD. This process is time consuming and tends to delay the acquisition process.

**Implementation & Monitoring of Offsets.** The aim of the defence-specific offset policy is to enhance indigenous defence industrial capability, as also to usher in transparency and responsibility. The offset policy is expected to benefit the Indian industry through technology inflows, foreign investment, partnership with foreign companies and investment in Indian companies.

The concept of offset implementation is new to India. Broad understanding of the offsets prevail at all the levels. However, clarity on the implementation aspects of offsets is lacking. The roles and the mandate of the Indian Offset Partner (IOP) and the foreign vendor are not clearly defined. The mode of transfer and the ownership of the assets are left to the commercial arrangement between the IOP and FV.

An extension of this problem is the role of the IOP. The IOP is a silent spectator in the scheme of things. The FV does most of the actions stipulated in the offset contract while SHQ has to constantly guide and monitor these actions. The IOP on its part expects the FV and the SHQ to facilitate the implementation of the offsets while the IOP enjoys the benefits with minimal investment.

**DOFA.** The DOFA is scarcely manned to afford any advice on the matters of offsets. Generally, evaluation and monitoring of offset offers are undertaken by SHQ and the acquisition wing respectively, with minimal involvement of the DOFA.

**Manpower and Infrastructure Related to Procurements.** Defence acquisition is an all-encompassing function which involves procurement of equipment, recruitment of manpower and building of infrastructure and facilities to harness the equipment. The DPP addresses the equipment procurement, which is handled by the acquisition wing in the MoD. However, authorisation of the manpower, the infrastructure and facilities is processed and approved by the general wing of the MoD. The inherent ethos and priorities of the general wing do not match up with that of the acquisition wing, resulting in both manpower and infrastructure authorisations accorded after the equipment is inducted. This is a classic case of disjointed acquisition of the equipment.

### **Miscellaneous Issues**

**Limited Vendors.** There are very few manufacturers of defence systems in the world with cutting edge technologies. Additionally, the market for state-of-the-art defence equipment and platforms is circumscribed by denial regimes. Many countries either deny export licence or impose unacceptably stringent conditions for sale.

**Lack of Feedback and a Data Bank.** Perhaps India is the only country that maintains no data bank of the past track record of the vendors. We do not maintain an institutionalised arrangement to refer to the past performance of vendors to determine their suitability for newer contracts. Once a contract is signed, the case slips out of the acquisition wing's focus. Little attention is paid to obtaining performance details for future contracts. Taking advantage of this infirmity of the system, smart vendors remain confident in the knowledge that their indifferent past performance will never be a hindrance to their business prospect. That is the reason that regular defaulters like Rosoboron export (mainly in terms of delayed deliveries and cost escalation) continue to obtain new orders.

**Economic Dynamics of Defence Markets and the Industry.** Defence technology has its own peculiarity and its consequential economic dynamics in the defence market and industry. It obviously does not fall into what may be called 'Perfect market place' as the market forces of demand and supply are not able to operate logically. It is, therefore, bound to be ever-greater shortages and delays of supply, a situation that is likely to be quite severe for countries like India for, some years to come if not for decades. This is particularly so when the industrial base is in the process of establishing its credibility. Therefore, it is imperative to include the connected economic dynamics involved, including the policy measures essential for building a wider domestic defence industrial base.

**Lack of Performance of Defence Public Sector Undertakings (DPSUs).** Our nation has a vast defence industrial base. It consists of 39 Ordnance Factories, eight Defence Public Sector Undertakings, and a small, yet emerging private sector. In addition, there are about 50 research laboratories under the Defence Research and Development Organisation at the heart of India's defence technological advancements. The basic strategic requirements of the defence forces are met by the eight Defence Public Sector Undertakings. These requirements include—fighter aircrafts, helicopters, warships, submarines, heavy vehicles and earthmovers, missiles, electronic devices and components, alloys and special purpose steel. The defence industry was also entrusted to ensure indigenisation and self-reliance in critical defence technologies. This, however, appears to be a distant dream.

Among the eight DPSUs, Hindustan Aeronautics Limited is the largest, accounting for nearly half of the production by DPSUs. Since the establishment in 1964, HAL has over the years evolved into a large aeronautics complex. The company's primary mandate is to design, manufacture, maintain and overhaul fighters, trainers, helicopters, transport aircraft, engines, avionics and system equipments. However, HAL has generally not been able to rise to the expectations of the IAF on aspects of product support, schedules and build quality.

**Lack of Performance of DRDO Organisations.** The Defence Research and Development Organisation (DRDO) is an agency responsible for the development of technology for use by the military. It was formed in 1958 by a

merger of the Technical Development Establishment and the Directorate of Technical Development and Production with the Defence Science Organisation. DRDO has a network of 52 laboratories which are engaged in developing defence technologies covering various fields, like aeronautics, armaments, electronic and computer sciences, human resource development, life sciences, materials, missiles, combat vehicles development and naval research and development. The organisation includes more than 5,000 scientists and about 25,000 other scientific, technical and supporting personnel. The director general of DRDO is also the secretary defence R&D and scientific advisor to the defence minister.

The IAF's most ambitious LCA programme was launched in 1983 for two primary purposes. The principal and most obvious goal was the development of a replacement aircraft for India's ageing MiG-21 fighters. The LCA programme's other main objective was to serve as the vehicle for an across-the-board advancement of India's domestic aerospace industry. In 1984 the GOI established the Aeronautical Development Agency (ADA) to manage the LCA programme. Although the Indian combat aircraft the 'Tejas' is most often described as a product of HAL, responsibility for the development of the Tejas actually belongs to ADA, a national consortium of over 100 defence laboratories, industrial organisations, and academic institutions with HAL being the principal contractor and ADA being steered by DRDO.

It is worth mentioning that no major DRDO project has been an unqualified success. None has ever been completed on time or without huge cost overruns. The LCA project, launched in 1983, is still in the doldrums as the DRDO has failed to develop the right engine. After nearly three decades, even with an imported engine, LCA has only barely achieved IOC status. The primary reason for underperformance and ineptitude is lack of public accountability, focus, failure to develop scientific disposition and DRDO's oversight. Therefore, a review of all projects under its aegis is needed for a reality check and course correction.

### **Remedial Measures**

The stated aim of the DPP is to: "Ensure expeditious procurement of the approved requirements of the Armed Forces in terms of capabilities sought and time frame prescribed, by optimally utilising the allocated budgetary resources". Additionally, the goal of achieving self-reliance in defence equipment is to be kept in mind. Unfortunately, the DPP has not been able to achieve its stated objectives.

The measures to simplify and streamline the procedure for expeditious processing of procurement proposals are discussed in the subsequent paragraphs.

**Grant of AON.** As has been discussed earlier in the paper, it is suggested that for grant of AON, a proposal should be taken up directly with DPB/DAC if concurred by DRDO, DDP, MoD and MoD (finance) during the SCAPCC. This would result in saving of time by at least 4-6 weeks.

**Creation of Integrated Acquisition Organisation.** To overcome the present deficiencies surrounding the Indian acquisition system, it is proposed to create a separate integrated and professional acquisition organisation by incorporating all the acquisition functions under one head. The benefit of creating such a separate integrated acquisition organisation, lies in the fact that it will not only provide timely and cost-effective acquisition but will also ensure a single point of accountability.

**Synergy Within MoD.** In order to effectively induct equipment into Services, synergy between various wings of the MoD is required. Coordination between acquisition wing, the general wing and the finance wing is essential to progress the different aspects of the induction namely equipment, manpower and infrastructure. These wings must adhere to a common timeline enshrined in the DPP and projected at the time of accord of AON. Such a coordinated effort from all the wings of the MoD will result in an effective and a comprehensive induction of the equipment into the Services.

**Delegation of Powers.** Currently, the MoD controls every stage of the procurement procedure. Repeated reference to the MoD even for innocuous matters is proving most frustrating and time consuming. As no decision making powers have been delegated, Headquarters Integrated Defence Staff (HQ IDS) and Service Headquarters (SHQ) have been confined to doing secretarial work for MoD. For example, even the report of the Technical Evaluation Committee (TEC), prepared entirely on the basis of unsubstantiated assertions made by vendors in their technical proposals, is required to be approved by MoD instead of the preferred SHQ. The responsibility for determining vendors whose equipment is fully SQR compliant and considered fit for induction into service should be assigned to the user Service HQ. It is, therefore, proposed that the TEC report should be approved by the SHQ. Further, once the technically acceptable vendors are identified, the most critical and sensitive process of commercial evaluation should be undertaken by MoD, as is being done at present.

**Flexibility in Contract Drafting.** Management of contracts usually requires some flexibility on both sides and a willingness to adapt to the terms and conditions of the contract to reflect a rapidly changing world. Problems are bound to arise that could not be foreseen when the contract was awarded. Therefore, the contracts should be capable of change (to terms, requirements and perhaps scope) and the contract should be flexible enough to facilitate it.

**From Regulator to Facilitator.** The present procedure assigns MoD the role of the regulator with accountability to meet the annual cash flow targets. It is on this background many contracts are executed annually. The contracts executed may not really result in quality and timely inductions and the implementation of the contracts is not facilitated by the MoD. Furthermore, the Air HQ is left to

resolve all the matters arising out of the contract while implementing it. In this scenario, MoD must change its role from regulator to that of the facilitator. It must provide necessary guidance in terms of interpretation of the clauses of the contract, costing, pricing and other commercial and policy issues.

**Adequate Staffing.** Adequate man-power should be posted to look after the acquisition process and the post contract management. The man-power selected to perform the duties of acquisitions at the MoD and the SHQ should be of high integrity and preferably have a defined tenure. It is to be understood that thorough preparation and well-drafted contracts are essential foundations for good contract management, which in turn would benefit the MoD and the IAF tremendously.

**Formal Education about Procurement Procedures.** Most of the officers posted to IAF/MoD have very little or nil formal training on the complicated acquisition procedures and negotiating tactics. Therefore, concentrated efforts need to be directed towards developing a talent pool with experience at various levels of project management. Hence, participation in various courses for contract management needs to be institutionalised.

**Tenure Management.** Continuity indeed is an important aspect of project management. However, as of now the posting of officers stands de-linked with the project schedules. More often than not, the dealing officer gets posted out when the scheme is about to achieve a critical milestone. The experience and thought process are lost entirely with this kind of brain drain. The vendors and external agencies are aware of this weak area and probably exploit it to their advantage.

**Educating the Bureaucracy about Service Needs.** There is a need for a short familiarisation about the Services for all bureaucrats, prior to a posting to the acquisition wing of the MoD. They need to know the working ethos, aspirations and expectations of the Services and relative significance of the major acquisitions that are being planned so that necessary attention can be paid to these projects. It is re-iterated that these bureaucrats are to facilitate acquisitions by the Services and need to guide the Services instead of only raising objections and absolving themselves of all the responsibilities. It is observed that representatives of MoD (finance) are only concerned about best price and in their opinion a multi vendor situation is a remedy for all situations. However, it is to be understood that going global has diversified our inventory immensely and there are other important issues e.g. inventory holdings, training, infrastructure that need to guide our procurements.

**Organisation to investigate Allegations.** We have one of the most exhaustive trial procedure, with so many agencies testing the same equipment that it is well nigh impossible to influence or predict the outcome. Therefore, we need a



single independent organisation to quietly investigate an allegation and decide once and for all if an allegation or complaint needs to be ignored or acted upon. Error in judgement and dishonesty must be clearly demarcated. This would allow people to work with a free mind and without fear of the three Cs—CVC, CBI, CA&G. However, individual accountability must be established and systemic failures corrected to allow the system to function efficiently.

**Enhance the Efficiency of HAL.** HAL is assured of captive business and faces insignificant competition from any source—more so when the thrust of the Government is on indigenisation. HAL's size belies its performance. With vast resources in terms of high tech infrastructure, manpower, land holdings etc. under its control, HAL needs to carry out a sincere audit of its performance based on its HR vision, mission, objectives, strategies and policies to make it a dynamic, vibrant, and value-based organisation sensitive to the need of its customers. However, the performance of HAL has not lived up to IAF's expectations. In fact, the Cabinet Committee on Security too, while considering a note from the Ministry of Defence, had observed that keeping in view the fact that there are time and cost overruns in most projects being executed by HAL, a comprehensive review of the working of HAL should be carried out and proposals generated for strengthening and expanding production capacity in this area. Hence, various measures and methodologies to be adopted for strengthening and enhancing the production capacity of HAL need to be identified and implemented by the DDP (MoD).

**Enhance the Efficiency of DRDO Organisations.** The director general of DRDO is also secretary defence R&D and scientific advisor to the defence minister. It is proposed to segregate the functions and have an independent secretary defence R&D who will be more accountable and amenable to the aspirations of the Defence Forces. The primary reason for underperformance and ineptitude of the DRDO is the lack of public accountability as well as focus and failure to develop a scientific disposition. Therefore, a review of all projects under its aegis is needed for a reality evaluation and course correction.

**Exit Clause for DRDO/DPSU Projects.** Unless a re-organisation of the DRDO/DPSU is carried out to enhance their efficiency, it would continue to be cost over runs and time delays in the 'Make' category of acquisitions, which are high-technology complex systems to be designed, developed and produced indigenously. Therefore, to avoid cost over runs, time delays and to instil a sense of accountability it is proposed to have an 'exit clause' in all contracts with DRDO organisations.

## **Conclusion**

Acquisition of defence equipment is costly, complex and has direct impact on national security. The procurement process is presently archaic with concerns at procedure level and organisational level. The process needs to evolve with

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change in the technology of equipment, market dynamics and the national strategy. An integrated and enabling approach of defence procurement and a change of role for the MoD from regulator to facilitator is the need of the hour. Furthermore, remedial measures in terms of adequate staffing of the acquisition wing, ensuring the staff is equipped with specialised contracting and negotiating skills that translate into implementable contract, needs to be put in place urgently. These changes in the procurement process will ensure the induction of the right war-fighting technology in the IAF in the shortest time frame possible and at the most optimum cost, which will retain the primacy of air power.

## A Critique of the US Defense Acquisition Process

*Terrence Elemendorf*

### **Overview**

The United States defense acquisition system is composed of three primary overarching and interrelated elements: the requirements generation process, currently known as the Joint Capabilities Integration and Development System (JCIDS)<sup>1</sup>; the Planning, Programming, Budgeting, and Execution (PPBE)<sup>2</sup> process; and the Defense Acquisition System,<sup>3</sup> perhaps better known as the Department of Defense (DOD) 5000 series of Directives, Instructions and Guidebook. As the introduction to the JCIDS instruction states: “There are three key processes in the DOD that must work in concert to deliver the capabilities required by the war fighter: the requirements process; the acquisition process; and the Planning, Programming, Budget, and Execution (PPBE) process”. These three elements are sometimes collectively referred to as the “Big A” acquisition system,<sup>4</sup> to distinguish it from the narrower DOD 5000 Defense Acquisition System (“little a”),<sup>5</sup> and are often depicted in the form of three interlocking and overlapping rings to reflect their tight interrelationship.

Requirements generation was formerly accomplished in a somewhat stove-piped fashion, with bottom-up inputs from the individual armed services. JCIDS was developed and implemented in 2003 to produce fully integrated joint war fighting capabilities, in which programs and budgets are developed in response to programming guidance issued by the Secretary of Defense. The primary “objective of the JCIDS process is to ensure the capabilities required by the joint warfighter are identified with their associated operational performance criteria in order to successfully execute the missions assigned”.

The PPBE process is a closed-loop system to allocate resources within the Department of Defense. Per the defense acquisition guidebook, planning “begins with a resource-informed articulation of national defense policies and military strategy” and is done in collaboration among the office of the Secretary of

Defense, the joint staff, and military components. Programming begins with the components' each developing program objective memoranda containing a "detailed and comprehensive description of the proposed programs, including a time-phased allocation of resources (forces, funding and manpower) by program, projected six years into the future". Budgeting occurs concurrent with programming, and "converts the programmatic view into the format of the congressional appropriation structure, along with associated budget justification documents. The budget projects resources only two years into the future, but with considerably more financial details". Finally, the most recent addition to the process, the execution review evaluates actual output against planned performance and adjusts resources as appropriate, and "provides feedback to the senior leadership concerning the effectiveness of current and prior resource allocations". That feedback mechanism closes the loop, improving future planning, programming and budgeting activities.

The DOD 5000 Defense Acquisition System is the management process by which the Department of Defense provides effective, affordable, and timely systems to the users. It "exists to manage the nation's investments in technologies, programs, and product support necessary to .. support the United States Armed Forces. The investment strategy of the Department of Defense shall be postured to support not only today's force, but also the next force, and future forces beyond that". Since the interface between the DOD and contractors is primarily driven by the DOD 5000 in conjunction with the Federal Acquisition Regulation (FAR), the primary focus of this paper will be this "little a" acquisition system and the statutory and regulatory structure that implements it in the form of contracts and other agreements with industry for the supplies and services needed to support the defense forces.

A key aspect of the DOD 5000 system is the program life cycle structure that defines the decision points for approvals required to move from one phase to another. As a general rule, that life cycle comprises logical steps in reducing the risk of bringing new capabilities to defense forces from early concepts through fully matured production, to operation and support.

The most recent significant change to the DOD 5000 involved the introduction of an evolutionary acquisition (EA)<sup>6</sup> approach. EA provides an avenue for phased and overlapping development of new technology in order to bring incremental capability to defense forces sooner than would otherwise be possible if all the technologies needed for the end-state system were to be matured and integrated prior to initial production. EA is now the preferred DOD strategy for rapid acquisition of mature technology<sup>7</sup> for the user.

### **Flexibilities of the Acquisition System**

The defence acquisition system provides several levels of flexibility in acquiring supplies and services in order to maximize the effectiveness of the system in supporting defense forces. One key element is flexibility in the way potential sources are sought once a determination has been made that a certain capability will require new hardware or services from industry. While the preferred method

of acquisition is to leverage the power of the marketplace through competition (in various forms), regulations allow for procurement through methods other than full and open competition, such as directed or sole-source procurements.

As provided in Part 6 of the FAR,<sup>8</sup> sole source procurements may be utilized, when justified, under the following conditions:

- When the supplies or services required by the agency are available from only one responsible source and no other type of supplies or services will satisfy agency requirements.
- When the agency's need for the supplies or services is of such an unusual and compelling urgency that the Government would be seriously injured unless the agency is permitted to limit the number of sources from which it solicits bids or proposals.
- When it is necessary to award the contract to a particular source or sources in order:
  - To maintain a facility, producer, manufacturer or other supplier available for furnishing supplies or services in case of a national emergency or to achieve industrial mobilisation,
  - To establish or maintain an essential engineering, research or development capability to be provided by an educational or other non-profit institution or a federally funded research and development center, or
  - To acquire the services of an expert or neutral person for any current or anticipated litigation or dispute.
- When precluded by the terms of an international agreement or a treaty between the United States and a foreign government or international organization, or the written directions of a foreign government reimbursing the agency for the cost of the acquisition of the supplies or services for such government.
- When a statute expressly authorizes or requires that the acquisition be made through another agency or from a specified source, or the agency's need is for a brand name commercial item for authorized resale.
- When the disclosure of the agency's needs would compromise the national security unless the agency is permitted to limit the number of sources from which it solicits bids or proposals.
- When the agency head determines that it is not in the public interest in the particular acquisition concerned.

Although a contracting officer must document the conditions justifying sole source procurement, these alternatives to full and open competition do provide important opportunities for faster and streamlined procurement of supplies and services. When such methods are used in lieu of competition, the taxpayers' interests are protected through specific regulations governing the negotiation process. These regulations are intended to ensure price reasonableness in the absence of competitive marketplace pressures. FAR 15.404-1(b)(2)<sup>9</sup> provides several methods for determining price reasonableness.

Another important level of flexibility provided by the defence acquisition system lies in the various types of contracts that may be authorized depending on the inherent risks involved in the work to be performed. These can range from cost-reimbursable type contracts, whose final value is a reflection of recorded costs consistent with FAR regulations plus some type of fee; fixed price incentive type contracts, whose final price is adjusted using formulas that calculate earnings based on the relationship of cost incurred to a negotiated target; to firm fixed price contracts that reflect an economic price adjustment based on indexed price escalation factors and a formula negotiated up front.

The range of contract types<sup>10</sup> can be matched to the levels of programmatic and technical risks involved across the life cycle of a program, from early concept definition when little is known about the specific solution to a capability need to enable accurate determination of a fair price, through production of a mature and well-defined system. The DOD has defined various technology readiness levels (TRL)<sup>11</sup> that can be a guide as to the appropriate contract type. Other factors, such as the length of the period of performance and the degree to which that interval exposes the contractor to fluctuations in economic conditions beyond its control, will indicate what specific type of contract that may be appropriate.

Finally, while the FAR and its various supplements provide standard terms that streamline the creation and negotiation of a contract document, another level of flexibility is available in the form of special contract provisions that can be proposed by either party to address specific situations not readily anticipated by the standard clauses. Examples of this might include an advance agreement between the contracting officer and the contractor regarding treatment of certain costs (e.g., warranty, obsolescence, incentive fees), a clause that overrides standard terms in certain situations, or a provision clarifying how the requirements of a standard clause will be met. Such special provisions are accorded the highest order of precedence in the event of a conflicting requirement elsewhere in the contract, by incorporation of such clause in a special section of the FAR uniform contract format set aside for just that purpose. This area of flexibility can provide for an equitable arrangement that standard clauses might not reflect.

Another important aspect of the effectiveness and flexibility of the U.S. acquisition process is the role played by the dedicated professional contracting staff. Contracting officers have authority to enter into, administer, or terminate contracts and make related determinations and findings. They are responsible for ensuring performance of all necessary actions for effective contracting, ensuring compliance with the terms of the contract, and safeguarding the interests of the United States in its contractual relationships. As further described in FAR subpart 1.6<sup>12</sup>, the contracting officer is a single professional responsible for coordinating input from functional specialists in audit, law, engineering, information security, transportation and other fields to lead negotiations and enter into contractual commitments on behalf of the Government.

## **Current Trends in US Acquisition**

The regulations governing the U.S. acquisition process are continually evolving. While the basic tenets of the system, often anchored in legislation, are generally stable over time, individual regulations may be added, revised, or even deleted as specific situations arise or needs evolve. Moreover, as circumstances change, the flexibilities within the system may favor a different area of emphasis within the existing range of possibilities.

In that regard, certain clear periodic trends have emerged over time in defense acquisition. Most notable, following the tragic events of 11 September 2001 were an emphasis on contingency contracting techniques to provide rapid support of defense forces<sup>13</sup> engaged in irregular conflict, and a burgeoning defense budget to simultaneously support conflicts and humanitarian missions in multiple regions. More recently, however, the global financial crisis has compelled governments around the world to focus on controlling debt and deficit spending. The United States is subject to these same pressures, and while there are differences of opinion regarding the extent to which the DOD should be subject to funding reductions, there is no doubt that affordability of defence programs has become a key area of focus.

Additionally, the Congress has become increasingly concerned over the problem of cost growth of defence programs beyond original projections<sup>14</sup>. Prominent evidence of this concern is found in the form of the Weapon System Acquisition Reform Act of 2009<sup>15</sup>, which, among other reforms, imposed reorganizations and assessments on the DOD itself; mandated acquisition policy changes to improve analysis of alternatives, to ensure competition, and to address various perceived systemic shortcomings; and strengthened the provisions related to reporting and addressing programs incurring critical cost growth.

These twin pressures have led the current DOD leadership to establish various efficiency initiatives<sup>16</sup>, designed to maximize the effective use of financial resources, and to change the balance of money spent on war fighting (“tooth”) versus overhead (“tail”). As such, the Secretary identified four tracks on which efficiency improvements would proceed, including setting goals for the Services and Agencies to find overhead savings, seeking affordability ideas from industry and think tanks, improving efficiency in the acquisition process, and streamlining the office of the Secretary of Defense itself.

Among these, the initiative to improve efficiency within the acquisition process has resulted in a series of “better buying power”<sup>17</sup> guidance memoranda and implementation directives, comprising 23 activities organized under five categories, targeting affordability and cost growth, incentivizing productivity and innovation, promoting competition, improving service acquisition, and reducing non-productive processes.

As an example of a change of emphasis within the range of acquisition policy flexibilities, the Federal Government has issued policy memos urging greater use of fixed-price type contracts<sup>18</sup>, with the expectation of reduced exposure to cost growth. Additionally, as part of his “better buying power” guidance, the

Under Secretary for Acquisition, Technology, and Logistics (AT&L) promulgated a preference for the greater use of Fixed Price Incentive Fee (FPIF)<sup>19</sup> type contracting where appropriate. This, in turn, is proposed to be reflected in an update of the DOD's FAR Supplement (DFARS). However, given that cost growth arises from many factors, such as the degree to which program requirements involve advancing the state of the art, it is highly questionable whether simply shifting the risk between the parties can succeed in controlling cost growth. Use of fixed-price type contracting in development programs has proved uniformly unsuccessful in the past.

Another key trend in defence acquisition involves concerns about the health of the defence industrial base. After the fall of the Berlin Wall, defense spending draw-downs prompted significant consolidations among the prime contractors of the defense industry. Terminations of existing programs and reduced numbers of new starts simply meant that there was insufficient work to support the numbers of prime contractors that existed during the Cold War.

Somewhat similarly today, albeit for different reasons, pressure to reduce defense spending is prompting some concerns about the viability of the current number of subcontractors, and whether consolidations at lower tiers below the major prime contractors might act to limit competition or even present potential risks to national security. Accordingly, supply chain visibility has become a key interest area of the DOD. Congress elevated the industrial policy office in OSD from a director-level position to create a new Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy [DASD (M&IBP)]. The duties of this new position include managing a new industrial base fund used to: support the monitoring and assessment of the industrial base; address critical issues in the industrial base related to urgent operational needs; support efforts to expand the industrial base, and address supply chain vulnerabilities. In addition to that office's traditional responsibilities of conducting ongoing review of the industrial base, DASD (M&IBP) is also tasked to establish a program to expand the industrial base by identifying new commercial sources of domestic supply that are not traditional military suppliers.

Ancillary concerns about industry consolidation include potential conflicts of interest that might arise as mergers and acquisitions may bring together companies specializing in setting requirements or evaluating solutions with companies specializing in pursuing contracts to develop and manufacture systems responsive to those requirements. The aforementioned Weapon System Acquisition Reform Act of 2009 specifically directed DOD to address potential organizational conflicts of interest for major defense acquisition programs in the DFARS, and proposed changes in the FAR are also underway.

These concerns regarding affordability of defense and the health and viability of the defense industrial base, both related to the global financial situation, are likely to remain in the forefront of U.S. defense acquisition trends for the foreseeable future.



## Contracting Policies

### *Limitation of Liability*

A fundamental consideration in a contract is the concept of risk management and allocation. Generally, a particular risk should be allocated or assigned to the party best able to manage, control and mitigate the risk. For example, during pre-delivery performance of the contract, the risk of scheduled performance should be primarily attributed to the contractor and remedies for non-compliance provided for in the contract could be in the form of liquidated damages. Likewise, the risk of loss to the product while in the care, custody and control of the seller should also be primarily allocated to the seller.

As we transition to post delivery allocation, the U.S. Government assumes post delivery risk associated with the products the U.S. Government procures from its contractors. The principal reason is that the owner/operator of the delivered product has primary care, custody and control of the product and can most directly influence and manage such asset and its associated risk. In particular, with regard to aircraft, the vast majority of aircraft-related incidents are the result of pilot error, maintenance error or weather. Therefore, the aircraft owner/operators are in the best position to prevent accidents through proper maintenance, inspection and operation (including mission profile) of their aircraft. If contractors to the U.S. Government were required to cover post-delivery product loss liability, they would be forced to procure separate insurance policies to cover the extended exposure in the event of product loss. The additional premium cost would be passed on to the U.S. Government thereby increasing the price of the product.

Contractors typically manage risk of product loss or damage while the aircraft is in the contractor's care, custody and control, but after the aircraft is delivered to and accepted by the customer, risk shifts to the customer as the owner/operator.

Once the ownership of the aircraft has transferred from the contractor to the customer, the contractor retains responsibility for three critical areas. First, the contractor is responsible for the express warranty provisions of the contract. Second, the contractor carries the liability associated with post-delivery loss or damage arising out of the contractor's willful misconduct or lack of good faith. Third, the contractor is responsible for post-delivery third party claims for property damage, personal injury or death arising out of the contractor's negligence or willful misconduct.

The U.S. Government through its acquisition policy accepts liability for post-delivery risk of loss. The U.S. Government has implemented protections under its Federal Acquisition Regulations. Specifically, FAR 52.246-24<sup>20</sup> Limitation of Liability—High Value Items states that the contractor is not liable for loss of or damage to property of the Government, including supplies delivered hereunder, that occurs after Government acceptance and results from any defects or deficiencies in the supplies. The contractor is liable if a defect or deficiency results from willful misconduct or lack of good faith on part of the contractor's

managerial personnel. FAR 52.246-25<sup>21</sup>—Limitation of Liability Services states that the contractor is not liable for loss of or damage to Government property, including materials delivered hereunder, that occurs after Government acceptance of services, or results from defects or deficiencies in the services performed or materials furnished. The contractor is liable if the defect or deficiency in services results from willful misconduct or lack of good faith on part of the contractor 's managerial personnel.

This policy is found in FAR Subpart 46.8<sup>22</sup>—Contractor Liability for Loss of or Damage to Property of the Government, which provides as follows:

“46.803 Policy.

(a) General. The Government will generally act as a self-insurer by relieving contractors, as specified in this subpart, of liability for loss of or damage to property of the Government that (1) occurs after acceptance of supplies delivered or services performed under a contract and (2) results from defects or deficiencies in the supplies or services.”

Furthermore, under DFAR 252.228-7001<sup>23</sup> Ground and Flight Risk, the U.S. Government also assumes the risk of damage to, or loss or destruction of government-owned aircraft in the possession of the contractor while “in the open”, during “operation”, and in “flight”. This assumption of risk by the U.S. Government is applicable to the acquisition, development, production, modification, maintenance, repair, flight, or overhaul of aircrafts. The contractor is responsible for the contractor 's share of loss under the Government's self-insurance. The contractor 's share is the lesser of:

1. The first \$100,000 of loss or damage to the aircraft in the open, during operation, or in flight resulting from each separate event, except for reasonable wear and tear and to the extent the loss or damage is caused by negligence of Government personnel or,
2. 20 percent of the price or estimated cost of the contract.

The U.S. Government's assumption of risk continues unless the contracting officer finds that the contractor has failed to comply with the proper operating procedures or if the aircraft is in the open under unreasonable conditions, and the contractor fails to take prompt corrective action.

The United States Government has chosen to self insure its products as the owner/operator and recognizes that it is most capable of managing the risk. The benefit to the United States Government is significantly lower cost. Without appropriate allocation of risk, contractors would be required to protect their long-term financial viability through insurance for entire global fleets and potential litigation costs associated with mishaps. The additional premium cost would then be passed on to the customer thereby significantly increasing the price of the product.

## **Contract Options**

The U.S. Government frequently employs options in contracts when there is a

need to maintain flexibility in a single contract for an expected long-term requirement, without having to undergo a termination. Circumstances such as uncertainties in funding, or maintaining the option to re-compete a long-term contract if the contractor is not performing satisfactorily, may drive the government to consider options in lieu of a single, long-term contract.

The U.S. Government is also aware that fluctuating requirements in a long-term program can undermine a contractor's efforts to remain efficient in contract performance, can heavily impact labor rates, can affect supplier agreements and performance, and makes retention of a skilled labor force difficult. So, in an effort to reach an equitable means of meeting the Government's acquisition need to use options, while accommodating the resulting impacts to contractors, the Government structures options with the following terms, as a minimum:

- The option periods of performance have carefully constructed start and completion dates that reflect the agreed-to lead times for completion of the effort. These lead times include the schedule for long-lead material purchases.
- The contract contains a series of "option exercise dates" that take into account the option period of performance and material lead time by establishing a "not later than" date for exercise of the options. For example, if the option period of performance needs to start in September 2014 and long lead material needs to be ordered three months in advance of the period of performance, the option exercise date may be no later than June 2014. Another consideration may be establishing option exercise dates 30 to 60 days in advance of the period of performance to maintain a highly skilled workforce so that workers are not placed on other projects because continuation of the program is uncertain.
- The U.S. Government frequently inserts an additional provision to provide a "Notice of Intent to Exercise Option" notification so that the contractor can plan resource allocations and project anticipated business base accordingly.

This is an example of how risks and uncertainties in the U.S. Government procurement system strike a balance between the Government's need to remain flexible in the acquisition approach, and the contractor's need to have predictability in the contract/program requirements.

### **Economic Price Adjustments**

The U.S. Government includes Economic Price Adjustment (EPA) clauses in contracts as a means of addressing risk that is associated with abnormal inflation, only when unusual circumstances occur to drive abnormal inflation. Normal inflation can be projected with a reasonable degree of accuracy and is inherent in forward pricing rates and the negotiated contract price. Abnormal inflation, by definition, cannot be anticipated. For example, the oil embargo of 1974, which increased annual Consumer Price Index escalation from 6.2 percent in 1973 to 11.0 percent in 1974, could not have been forecasted. The intent of an EPA clause

is to protect both the contractor and the customer against such unforeseen circumstances.

An EPA clause is a special contractual provision that defines procedures for contract price adjustment in the event of abnormal economic fluctuations that may occur during contract performance.

The EPA clause is based on the following premise: If escalation occurs at a rate higher or lower than projected (and priced), then the contract cost and price are adjusted upward or downward accordingly. Adjustments are based on comparisons between the contract prices and published indexes that are identified in the clause. Actual published indexes and forecasts of those same indexes are used to measure the escalation variances. These variances, calculated in terms of percentages, are applied against costs subject to EPA to determine adjustments to contract price. FAR Section 16.203<sup>24</sup> describes the contract clauses and identifies three general types:

- Adjustments based on established prices.
- Adjustments based on actual costs of labor or material.
- Adjustments based on cost indexes of labor or material.

International contract EPA clauses are generally based on published index movements outside of forecasted trigger bands applied to elements of price over time to avoid the need for any audit of contractor costs. Early in the acquisition process, it is important to evaluate the need for an EPA clause. Serious doubt concerning the stability of market or labor conditions beyond the contractor's control becomes a significant factor during an extended period of contract performance, which may be defined as two years beyond the current calendar year. Without an economic price adjustment contingency clause, contractors are forced to increase prices to cover these risks, which are outside their control. Since these contingencies should be targeted to abnormal economic fluctuations, the buyer will generally receive best value by mitigating the risk by including an economic price adjustment clause to avoid application of price premiums for unmitigated, long-term economic risk.

### **Contract Changes**

The U.S. Government's policy and processes for issuing changes to a contract is well-defined in part 43<sup>25</sup> of the FAR and is implemented through the various change clauses (depending upon contract type) listed in part 52.243<sup>26</sup> of the FAR. Contract changes fall into two major categories: unilateral and bilateral changes, each having their own definitions, limitations, and uses. Most changes are executed bilaterally as unilateral changes are primarily used to make administrative updates that have no impact on scope, schedule, terms or price. Bilateral changes (supplemental agreements) are signed by both the Government and the contractor and are used to:

- Make negotiated equitable adjustments resulting from issuance of a change order;
- Definitize letter contracts (contracts issued without finalization of price, delivery and scope);

- Reflect other agreements of the parties modifying the terms of the contract (still within the general scope of the contract and may involve changes to price, delivery, scope, terms and other material aspects of the contract).

The Changes clause included in every Government contract allows for changes to specific areas within the general scope of the contract in any one or more of the following:

- Drawings, designs, or specifications;
- Method of shipment or packing;
- Place of delivery.

Further, the Changes clause stipulates that if any change made to the contract pursuant to the above clause causes an increase or decrease in the cost or schedule to perform the contract, whether or not changed by the order, the Government must make an equitable adjustment in the contract price, delivery schedule or both, as applicable.

This process makes it clear that, with limited exceptions, only changes that do not involve a cost or schedule impact are subject to unilateral contract modifications. The few cases that involve cost or schedule impact that can be issued under a unilateral modification each have equitable adjustment features within the clauses themselves—e.g. stop work clause, terminations, settlement expenses. When price or schedule impacts are involved, the U.S. Government approach is to require a bilateral modification to the contract that reflects an agreement of the parties as to price and schedule adjustments.

### **Foreign Corrupt Practices Act (FCPA)**

The FCPA,<sup>27</sup> U.S. federal law since 1977, prohibits payments and gifts to individuals associated with foreign governments, including political parties, for the purpose of obtaining or retaining business. The FCPA makes it unlawful for corporations, any officer, director, employee, or agent to corruptly offer, pay, give, promise to pay or give, or authorize the payment or gift of money or anything of value, to any foreign government official for the purpose of influencing an act or decision or securing an improper advantage in order to help corporations get or keep business. A similar prohibition applies to a payment or gift to a foreign political party or party official or to a candidate for foreign political office.

It is unlawful to make payment to any person knowing that payment will be given to a foreign official to obtain or retain business. U.S. Contractors could be held liable for an unlawful payment made by a consultant, agent or dealer.

The Act includes exemptions for: Payments to facilitate or expedite routine governmental action such as obtaining permits, licenses or other official documents, and payment of a reasonable and bona fide expenditure such as travel and lodging expenses incurred by foreign officials directly related to promotion, demonstration or explanation of products or services, or execution or performance of a contract with a foreign government.

The key elements of an FCPA violation are the following:

1. **Payment, Gift or Promise:** The payment of money or giving of a gift is prohibited by the FCPA if it is to a foreign official for a corrupt purpose. Even an offer or promise of such a payment or gift can be the basis of an FCPA violation. For example, a promise, before selection of a contractor's product, to grant a foreign official a contract to perform after-sale support services could be construed as a violation of the FCPA (if all other elements of an FCPA violation are present). Even an unfulfilled promise to pay a bribe will satisfy this element of an FCPA violation.
2. **Contractor Employee, Affiliate, or Representative:** The Contractor, its directors, officers, employees, and agents can be held liable for violations of the FCPA. The contractor can also be held liable for acts of a foreign subsidiary or of a foreign representative if the contractor fails to take appropriate action to prevent improper activities by its subsidiaries and representatives.
3. **Foreign Official Recipient:** The FCPA prohibits corrupt payments or gifts to a foreign official. A "foreign official" is defined as "any officer or employee of a foreign government or any department, agency or instrumentality thereof, or of a public international organisation, or any person acting in an official capacity for or on behalf of any such government or department, agency, or instrumentality, or ... public international organisation". This broad definition can apply to individuals whose official status may not be readily apparent. Someone who is not a government employee may nevertheless have a special appointment to perform a specific task that makes the person a foreign official under the "acting in an official capacity" portion of the FCPA definition. Consultants and special advisers to a government or to a government official have been found to meet this element of an FCPA violation.
4. **To Obtain or Keep Business:** To be a violation of the FCPA, the questionable payment or gift or promise must have been made for the purpose of obtaining or keeping business. Such a purpose is not limited to a sales situation. The broad FCPA prohibition applies equally to procurement and industrial participation (offset) transactions. It applies to performing and carrying out existing business, such as obtaining favorable tax treatment for such business. Therefore, FCPA issues may arise not only with sales representatives, but also in relationships with distributors, subcontractors, suppliers and joint ventures.
5. **The Knowledge Standard:** The FCPA also prohibits making a payment to a person while knowing that all or a portion of the payment will be offered, given, or promised (directly or indirectly) to a foreign government official (or to a foreign political party or party official or foreign candidate) for the purpose of influencing an act or a decision or gaining an unfair advantage in order to help the Contractor obtain or keep business.

The U.S. Government FCPA applies to all U.S. contractors doing business anywhere in the world. The overarching nature of the FCPA provisions may fulfill the intent of similar requirements established within acquisition policies of foreign governments.

## **Conclusion**

In summary, this paper has highlighted some aspects of the U.S. Government's Defense Acquisition System and policies that drive flexibility, efficiency and affordability into the procurement of major defense systems and associated services. The U.S. Government has implemented many key contracting terms and conditions that result in the balancing of risk between the buyer and the seller. The rights of sellers are recognized in many areas such as limitation of liability, equitable price adjustment for contract changes, economic price adjustment and priced contract options. Additional important areas of U.S. Government acquisition policy serve to achieve a balanced approach but have not been discussed herein, such as equitable termination provisions and the protection of the seller's intellectual property. These policies have been adapted over time in a continual effort to provide best-value-for-money acquisition solutions to support U.S. defense forces. It may be equally beneficial for the Government of India to consider similar terms for incorporation in its acquisition policy.

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## Complex Programme Management in Defence

*Michael Christie*

This paper addresses a range of aspects of the approach taken in the management of complex defence programmes and therefore presents discussions regarding the approach taken by both the defence procurement organisation and the contractor. The paper addresses aspects of project management in the different points of a project lifecycle as well as some cross-cutting issues.

### 1. Complexity in Defence Programmes

In discussing complexity, it is firstly important to define what it means with that term.

Unclear	<p style="text-align: center;"><b>“Making Movies”</b></p> <p><b>e.g. Culture change projects</b></p> <ul style="list-style-type: none"> <li>• Well-understood approach</li> <li>• Not clear how good the outcome will be</li> </ul> <p><i>Techniques:</i></p> <ul style="list-style-type: none"> <li>• Mixture of traditional and strong feedback mechanisms</li> <li>• Spend enough to get an acceptable outcome</li> <li>• Key measurement is “have we done enough?”</li> </ul>	<p style="text-align: center;"><b>“Fog”</b></p> <p><b>e.g. Concept projects</b></p> <ul style="list-style-type: none"> <li>• High ambiguity, unclear approach</li> </ul> <p><i>Techniques:</i></p> <ul style="list-style-type: none"> <li>• Traditional methods are not as useful</li> <li>• Ongoing customer/supplier agreement</li> <li>• Clear understanding of “value”</li> <li>• Proceed in small steps and check on direction</li> </ul>	
What To Do	<p style="text-align: center;"><b>“Painting By Numbers”</b></p> <p><b>e.g. Repeat production projects</b></p> <ul style="list-style-type: none"> <li>• Low ambiguity, clear process</li> </ul> <p><i>Techniques:</i></p> <ul style="list-style-type: none"> <li>• Traditional “on time/on budget?” measures</li> <li>• Detailed plan/estimate in advance</li> </ul>	<p style="text-align: center;"><b>“Quest”</b></p> <p><b>e.g. Systems/Software Development projects</b></p> <ul style="list-style-type: none"> <li>• Know what is needed but unclear how to achieve it</li> </ul> <p><i>Techniques:</i></p> <ul style="list-style-type: none"> <li>• Prototyping</li> <li>• Phase gate approach with go/no-go decisions</li> <li>• Firm up definition in phases</li> </ul>	
Clear	Clear	How To Do It	Unclear

This paper uses a model (shown above) of programme types drawn from Reference 1, which describes both the differences in types of programmes and the different approaches to managing these programmes.

The paper uses this to frame specific experiences and examples from programmes, which the author has managed over the last few years. These programmes have had a mixture of complexity:

**New Concepts:** e.g., FOAS (Future Offensive Air Systems) where the solution is not defined but the military requirement is known. In this case both the definition of the equipment required and the potential mix of platforms had to be defined.

**Mixture of Novel and Mature:**

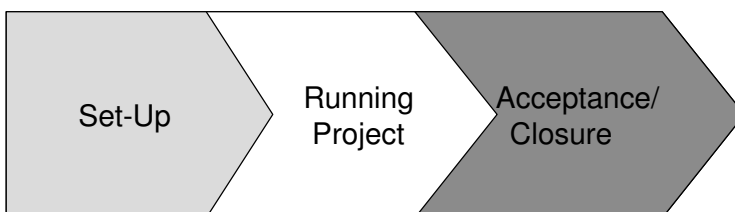
- Novel Airframe and systems but from mature technology base, i.e. the F-35 programme, where technology developed on the Eurofighter Typhoon programme was used for a very different product.
- Same airframe, different systems, i.e. a number of Advanced Hawk Variants, where the mature Hawk platform was used with different systems and engine upgrades to produce significant upgradation to capability.
- Mature design elements but combined in a new way, i.e. the Astute Nuclear Attack Submarine, where design aspects from previous classes of submarine were integrated and updated in a new way.

**“Same” Product:** Some Hawk Variants represent minimal change from the last variant and are the closest example to repeat production of a stable, mature product. However, even the slightest obsolescence upgrade can lead to a degree of complexity.

An observation regarding long, complex defence programmes is that they do not tend to fit in any one box for the full lifecycle and that they tend to progress from “Fog” to “Quest” to a “Painting by Numbers”. This change of project characteristics also leads to a need for a change in project management techniques and project managers.

**Lessons Learnt Across the Programme Lifecycle**

The lessons learnt from these programmes (and other experience) have been grouped for simplicity into the phases of a programme’s lifecycle. The crude lifecycle model used for this is shown below.



### *Lessons in the Set-Up Stage*

The set-up stage of the programme is vital to establish clarity, when in complex programmes, clarity is the hardest thing to achieve. The elements of this are summarised as follows:

**A Clear Contract Baseline**—When defining the baseline, it should be noted that it is not only a baseline schedule but that it also must include baseline costs and baseline technical specifications. The key challenge is to ensure that these three elements are consistent and coherent. At the earliest stage possible, the approach to acceptance of the system should be defined. Experience has shown that the approach to specification does not always automatically lead to clarity in the acceptance stage, which can lead to both programme delays and contractual difficulties. The key aspect of this is the decision on whether overall performance has precedence over specific design, i.e. a system can be defined by what it is (in terms of physical elements); design specification or what it does (in terms of output performance measures) or performance specification. Clarity on precedence at an early stage will assist significantly in reducing risk at a late stage in the programme (i.e. during the acceptance phase). Having to clarify the approach to acceptance during acceptance itself will almost certainly affect the critical path of the programme.

**The “Real Goal”**—part of defining what is in the contract baseline is developing a clear understanding of what is needed overall. Usually this goes beyond the basic deliverable of the contract and will include things such as customer dependencies. All of these will be required to meet the “real goal” as this is ultimately the achievement of what the end-user needs. This is discussed later in the acceptance stage. The process of clarifying the goal is a classic project management challenge but in some of the types of complex defence programmes which we see around the world, especially in the “Fog” type of concept programme, there needs to be extra attention to this. Even in development programmes where the product is clearer, the focus on this clarity of goal must be increased.

**Risk, Maturity and Change Management**—Given that there is a major chance that the definition is immature at the early stage of the contract, there needs to be a means of both managing change and managing risk around all of these assumptions. In addition, in the programmes listed in this paper, some techniques for measuring maturity have been used and can add substantially to the understanding of real progress in the programme.

- Risk Management techniques will have to cover conventional risk assessment and management approaches but some method of evaluating integrated risk or complex interactions of risk is highly recommended. Comparisons with other programmes, use of experienced, independent people as well as simulation techniques are all valuable. Also, schedule risk management as well as evaluation of

the cost of risk is essential to give an integrated view of the impact of risks.

- Maturity management techniques are also effective in ensuring a realistic view of progress. Establishing the link between risk and maturity should assist in calibrating performance as, simplistically, risk can be considered as the inverse of maturity. Performing the check on whether maturity metrics are consistent with risk metrics is a valuable performance evaluation technique.
- Change management techniques and philosophy also have to be established to ensure that the ambiguity at the beginning and the increased stability at the end of a programme are accommodated. This requires a gradual shift in the approach to change management from a controlled tolerance of change to an increased intolerance of change to ensure stability is maintained as maturity is reached. Intolerance to change when change is essential can cause poor specification performance and allowing change when stability is essential can cause schedule and cost performance problems. Therefore, strong change management with a controlled shift in philosophy through the programme lifecycle is recommended.

These processes are a key part of developing and maintaining clarity of the goals of the programme and ensuring the project team remains focused on the right things.

Finally, in the set-up, the choice of the contracting mechanism(s) is very important. Experience on some of the programmes listed has shown that although ostensibly the most controlled approach, 'fixed price contracting', is not always the best way to get the cheapest answer. In fixing the price, there is either the assumption that the product is fully known or the contractor is likely to assume a risk of change and include that in planning the programme. In addition, the fixed price contract does not necessarily engender the correct behaviours. An example of this is the problem of accommodating change as the product matures. A fixed-price contract tends to lead to a more bureaucratic and rigid approach which restricts change and can lead to design compromises and potentially more significant design problems and bigger changes.

There are a number of approaches, which seek to enable the flexibility required when the outcome is not clear whilst putting mechanisms in place to avoid the contractor simply aiming for cost reimbursement plus a fee. For example, in the F-35 programme a mixture of cost reimbursement with an incentivised fee (profit) was the mechanism aimed at dealing with the ambiguity but incentivising the contractor to mature at the fastest possible rate. In addition to this, the increasing use of 'earned value management' techniques as an advisory or mandatory element of the contract can provide additional control to the more open contracting methods.

### *Lessons in the Run Stage*

Developing the themes from the set-up stage, during the run stage some form of synthesis of performance is required. Essentially, this entails some form of calibration of progress against the baseline schedule against incurred cost as well as some measure of the “value” achieved for that cost (measured against the overall goals of the programme). This entails the collection of a range of data and assessing each element critically against the other. Whilst this synthesis can be performed in an analytical way, there also needs to be space for judgement to be applied. Performance will not always be obvious. For example, during the detailed design stage of a complex product, being realistic about how well the programme is progressing is not simply a case of counting how many drawings have been produced as the overall maturity of the product is complex and legitimate change may occur which may seem to cause negative progress.

The other specific aspect of complex systems is that they do not always behave in a predictable manner. This is also true of complex projects. Systems engineering refers to “emergent properties” and there are many ways of attempting to predict these in engineering. In programme management, some similar techniques such as simulation and modelling can be used and there have been some examples of using computational modelling to simulate the approach taken by programme managers. These are not mature and have not been used in many areas but can provide some degree of decision-support.

There is always a danger during this phase of being blinded by data and not actually being able to accurately assess progress. It is important to have enough data but not too much. This will have to be continually assessed as a programme progresses as there can be a tendency to add more and more data and have massively complex reporting packs, which do not clarify the position.

This aspect of judgement leads to another critical aspect of the running of a complex programme, i.e. that of the people involved. For the application of judgements to be valuable, there will be a need for the right mix of experience and skills. There will be a need for more conventional, rigid and direct approaches to project management and there will, at the same time, be a need for the more flexible, abstract assessments. This will inevitably lead to a range of types of people and places a significant pressure on the programme manager to balance the types of people and how they interact. This ‘people leadership’ and the ability to organise diverse people is a key skill in its own right for a programme manager

One of the key leadership challenges is balancing the desire to be positive and motivate the team by showing progress with the requirement to be realistic, which can in turn be perceived as pessimism and negativity. Being over-positive can lead to something, which has been referred to as “the conspiracy of optimism”. In the experience of some of the programmes studied, this can be positive at first but tends to lead to an even greater dejection if the programme falters or fails. The de-motivation is much greater if this happens than if there is a healthy challenge throughout the programme, but with real, continued

success. This is fundamentally a leadership issue where achieving the balance and maintaining motivation is the overall aim.

Again, reflecting on the things established in the set-up phase, the processes of risk, maturity and change management have to be maintained throughout the run phase. Processes such as these can become “stale” during a long project and people can begin to simply follow processes without thinking. Some way of refreshing the application (re-training, re-assessing the philosophy such as in change) rather than following blindly the processes, which were set at an early stage, is recommended. This refreshing of processes is also part of avoiding the conspiracy of optimism as it can be the blind adherence to a process, which leads to a blind faith in the data that is produced by these processes.

The final aspect of the run phase is another human aspect, i.e. the continual close management with the customer. The tenet of “the more complex the programme, the more communications are essential” is one worth considering in this area. The more ambiguity, the more clarification is needed; The more dependencies, the more integrated management is needed; the more complex the overall goal, the more stakeholders will be involved. All of these lead to a conclusion that communications professionals and joint management is essential. Again the programme manager needs to have these skills in abundance to manage complex programmes.

### *Lessons in the Acceptance/Closure Stage*

The acceptance/closure stage is the test of how effective the other phases were. The clarity of acceptance criteria will be demonstrated here but is determined earlier as said before. However, the management of dependencies in the areas such as ‘entry into service’ becomes more central during this phase.

An example is the best way to describe this. In order to enter a submarine into service there is a requirement for the submarine to be delivered (and to meet specification); there is a requirement that the crew is available and trained; there is a requirement that the weapons are procured, developed and available; there is a requirement that the base infrastructure is ready to receive in-service boats and there is a requirement that the through life logistics support mechanisms are in place.

The likelihood is that only one, maybe two of these will be in scope to an acquisition contract—the others are the day-to-day business of the Navy. However, an approach by the contractor which only focuses on the contracted requirements is likely to lead to dissatisfaction of the end customer who cannot operate the system effectively.

Therefore, some form of formal management of the dependencies is vital to ensure success. This links to the definition of the “real goal” mentioned above.

In addition, a means of avoiding all of the risks of acceptance being at the end of the programme, as is when the system is fully tested, some form of “progressive acceptance” is beneficial. This can be developed as part of a maturity management process, whereby the achievement of a maturity management milestone can also be deemed as an acceptance milestone.

## **Summary and Conclusions**

The main areas for discussion in this paper were:

**Clarity of the Total Goal at the Outset**—Both the process and philosophical aspects of clarifying the programme's goal and purpose. This is a classic project management principle but one which is even harder to achieve when considering complex defence programmes, where the contract usually only deals with the procurement of the equipment but where the aim is military effectiveness. The challenge of the programme manager both in the procurement organisation and in the contractor is to be clear how the various aspects of the goal are apportioned and managed. For example if the military goal is to achieve an effective operational submarine force, but the contract is the procurement of a submarine, there needs to be clarity as to how the organisations work together to manage the other dependencies.

Another aspect of the same topic is that clarity of how the system will be accepted is required as early in the programme as possible. Experience has shown that the approach to specification does not always automatically lead to clarity in the acceptance stage, which can lead to both programme delays and contractual difficulties. The key aspect of this is the decision on whether overall performance has precedence over specific design.

**Organisational/Cultural Issues**—In managing complexity and ambiguity, there is a need for the managers to be equipped to deal with that complexity. It is contended that this is a specialist skill set and may need specialist decision-support tools. Although this is felt to be the case, a broader mix of skills is likely to be required including more conventional programme control skills and fundamental leadership skills.

In addition, the issue of relationship management and communications, both formal and informal, is likely to be a key aspect. As a simple rule of thumb, the more complex the programme, the more this is an essential part

**Contracting Mechanisms**—The main area of discussion here is that the type of contract which is used to manage the programme will have a significant effect on the behaviours of both procurer and contractor and, therefore, should be thought through carefully and perhaps be subject of specific policy focus. There was some discussion of the merits and otherwise of fixed-price, "gainshare" and cost-plus-incentive types of contract. A proposed approach could be for a mix through the lifecycle whereby the gradual "fixing" of elements of the programme would enable flexibility in the early stages and that the early stages could use some form of incentivisation to avoid the issues of pure cost-plus contracting.

**Lifecycle**—The key observation here is that as a complex programme progresses through its lifecycle, there is a tendency for the project type (using the Obeng model described earlier in the paper) to change. This, in turn, leads to a need

to adjust the project management techniques and style as the programme progresses.

In conclusion, the challenge of a programme manager in leading a complex programme is itself a very challenging role as it requires balancing of a range of specific skills and techniques of management as well as the leadership style which can deal with the level of ambiguity, the level of change, the customer relationship, and stakeholder management requirements.

A crude review of most of the incumbents in these roles within the industry will show that they have probably had a varied career, with experience in many areas and probably an earlier specialism before they move into programme management itself. This has led to a re-assessment of the selection techniques for programme managers and they have tended to be developed from existing senior roles in engineering or manufacturing or from the Military. Similar consideration of the background requirements for defence procurement organisations has taken place in some countries and has led to significant development programmes. This would be worth of serious consideration for those who do not have a formal professional development programme for acquisition programme managers.

#### NOTE

1. Eddie Obeng, *All Change!: The Project Leader's Secret Handbook* (Financial Times Series 1994).



# Indian Experience in Contracting/Post Contract Implementation and Project Management Challenges

*R.K. Arora*

## **Introduction**

Considering the magnitude, nature, peculiarities and complexities involved, expeditious procurement of requirements of the Armed Forces within the prescribed time-frame and sanctioned cost, accompanied with a high degree of transparency, competition, probity, public accountability, and optimal utilisation of scarce budgetary resources with focus on 'value for money' is a major challenge.

Besides the Defence Procurement Procedure (DPP) and the Defence Procurement Manual (DPM), which are periodically reviewed and revised, elaborate guidelines have been laid down by the Ministry of Defence (MoD) to address these aspects. Revised versions of the Defence Procurement Procedure (DPP-2011) and Defence Procurement Manual (DPM-2009) as well as Supplement-2010 to DPM-2009 have recently been brought out, incorporating the latest policy decisions of the Ministry of Defence relating to defence acquisitions.

## **Major Challenge Areas**

While the manuals and guidelines issued by the MoD provide the requisite policy framework, the peculiar nature and complexities of the defence acquisitions proposals make every case unique, particularly with regard to the aspect of project management. Among the various types of projects being processed out of the defence budget, major challenge areas from the angle of project management are as following:

- Ship-building Projects.
- Design & Development Projects.

- Transfer of Technology Projects.
- Civil Works/Hybrid Projects.
- Automation/Information Technology Projects.

The following paragraphs illustrate the relevant issues, which are commonly noticed and have vital bearing on the management of the above projects. Some of these issues may be equally applicable to other projects also, and may not be limited to one particular type of projects.

### **Ship-building Projects**

Ship-building is an extremely complex and arduous task that warrants effective management of all associated activities in order to minimize the cost and time over-runs. Timely delivery of the platform with associated weapons, equipment, and sensors of desired quality specifications is of paramount importance so as to ensure timely availability of the capabilities and to avoid any substantial gap in the achievement of the growth or development plan of the service concerned.

The Comptroller and Auditor General of India (C&AG) has recently published a report on performance audit of "Indigenous Construction of Indian Naval Warships" based on their review of P15A, P17 and P28 projects, sanctioned during 1986 and 2003. This report provides significant inputs regarding the weaknesses in appraisal, execution and monitoring of ship-building projects being undertaken in India. The C&AG's salient comments brought out in the aforesaid report are as under:

- (i) There is normally an inordinate delay of 4-5 years from the original completion date approved by the Government.
- (ii) The delay in commencement and execution of ship-building projects has been attributed, inter alia, to delay in finalisation of drawings/design, availability of steel and inadequate infrastructure at shipyards.
- (iii) The time and cost over-runs in warship construction projects has adverse impact on the fleet strength of the Navy and has also resulted in price inefficiency and lack of transparency.

Some of the other relevant issues brought out in the C&AG's report together with the issues observed by the Ministry of Finance in appraisal of certain other cases of time and cost over-runs that warrant a re-look of project monitoring mechanism in respect of such capital intensive projects involving long gestation period are as under:

#### **(a) Poor/Unrealistic Initial Cost Estimation**

- (i) The initial approval of the Government for ship-building projects is often sought on the basis of inputs like 'Budgetary Quote' received from the DPSU shipyards concerned.
- (ii) There appears to be lack of scientific bench-marking of the various cost components involved, commensurate with the futuristic Qualitative Requirements (QRs). In the absence of such bench-marking, the financial implications projected for initial approval of the Government often turn

out to be unrealistic and underestimated. Even the escalation percentage, factored in such estimates to arrive at the completion cost, eventually turned out to be unrealistic as the final cost exceeded the original cost by approximately 226–580 per cent, far beyond the escalated cost.

- (iii) The cost and time over-runs observed in the ship-building projects have been attributed to various extraneous reasons, which are stated to be beyond the control of the shipyard concerned.
- (iv) Such cost over-runs have eventually resulted in increase in profit charged by the shipyard concerned, being a fixed percentage of the cost, specially in respect of 'cost plus contracts'. In certain cases, profit has been paid to the shipyards on items like Exchange Rate Variations (ERVs), where there is no 'real value addition' or 'yard effort' by the shipyard concerned.

**(b) Contract Management Issues**

- (i) In a few cases, it has been seen that the Letter of Intent (LoI) for the ship-building project has been issued to the shipyard concerned even before obtaining sanction of the appropriate competent authority in the Government.
- (ii) There was undue delay of 5-8 years in conclusion of contract agreement, after receipt of Government sanction/issue of LoI. For instance, as per C&AG's report, the contract for Project P28 is yet to be concluded even after more than seven years of commencement of the project - the LoI was signed in March 2003. Meanwhile, the projects concerned had made significant physical progress and substantial payments have been released, despite there being no formal contract agreement in place.
- (iii) In a few cases, the contract agreement signed between the Government and the shipyard concerned was found to have contained delivery dates, which were at variance with the corresponding delivery dates approved by the sanctioning authority.
- (iv) The projects have suffered time over-runs of even more than 10 years, adversely affecting the fleet strength and 'operational preparedness' of the Navy.
- (v) Even for seeking ex-post-facto approval of the Government for time and cost over-runs in such projects, an inordinate delay of more than 10 years has been noticed in submission of the proposal by the department concerned.

**(c) Financial Management Issues**

- (i) In some cases, it has been noticed that payments had been released to the shipyard concerned even in excess of the original cost sanctioned by the Government, on the pretext of avoiding further cost and time over-runs and in anticipation of the approval of the Government for regularisation of such payments. This approach has effectively rendered the case 'fait accompli'.
- (ii) It has also been seen that the DPSUs were sanctioned huge advance

payments, which remained unutilized with the shipyards concerned for years together. Even the categorisation of advances viz. interest bearing or non-interest bearing was done in an ad hoc manner. Furthermore, release of funds to the shipyards concerned was done in an arbitrary manner without linking it to specific milestones of the project and spending capacity of the DPSU shipyard concerned. Such release of funds was apparently aimed at booking of expenditure towards the end of the financial year with a view to avoiding surrender of budget and was actually tantamount to “parking” of funds. Such instances reflect rather poor financial management of public money involving huge cost of borrowing by the Government. Moreover, such practices tend to dilute budgetary discipline through arbitrary cash flow out of Government treasury.

#### ***(d) Infrastructure Issues***

One of the main reasons cited for inordinate delays in ship-building projects is inadequate availability of infrastructure at DPSU shipyards. As per the C&AG’s report, despite inadequate infrastructure at the DPSU shipyards for undertaking warship construction, the Government did not take effective steps for augmenting such infrastructure projects through timely interventions and planning. The Government has often sanctioned piece-meal augmentation of infrastructure facilities as part of the ship construction projects. Accordingly, modernisation of certain shipyards viz. MDL and GRSE has been sanctioned through different projects with the aim to arrest time and cost over-runs. However, C&AG have noticed undue delay even in implementation of such infrastructure augmentation plans, depriving the concerned ship-building projects of the intended benefits in full measure from such modernisation activities.

#### **Design and Development Projects**

Some of the glaring issues that have been noticed in processing of Design and Development Projects are as under:

- (i) It has been noticed that the Qualitative Requirements (QRs) formulated at the time of initial sanction of the project were rather unrealistic and high-end, which required relaxation during the course of development on account of being practically unachievable.
- (ii) Qualitative Requirements (QRs) and delivery schedule in case of design and development projects was left open-ended in the RFP on the pretext of flexibility. Such an approach leaves a lot of uncertainty, ambiguity and discretion with the development agencies and makes the appraisal and monitoring of the project rather difficult.
- (iii) The development agency took inordinately long time in offering the system/sub-systems for ‘User Confirmatory Trials’, thus affecting the project completion schedule in an adverse manner.
- (iv) The development agency sometimes initiates new sub-project(s) during

the course of development of the main project for approval of Government, without consulting the main user service/organisation. Such an approach leads to huge gap between the requirements and development plan of the user organisation and the offer made by the developing agency concerned.

- (v) Further, inordinate delays have been noticed in submitting the proposal for seeking approval of the appropriate authority/Government for anticipated cost and/or time over-runs.
- (vi) Sometimes, approval for revision in cost/delivery schedule is sought from a lower CFA and not the appropriate CFA. Such cases may invite avoidable audit implications and effectively render the case 'fait accompli' for the appropriate CFA, depriving him of the opportunity for timely intervention towards mid-course corrections.
- (vii) In a few cases, even revised date of completion proposed for approval involves uncertainty and is not worked out and projected in a firm manner.
- (viii) It has further been noticed that procurement of a sub-system has actually been made from a DPSU, though the RFP was issued to private sector vendors. The compelling reasons for such a major deviation have not been convincingly recorded.
- (ix) The Letters of Intent (LoI) for projects of sub-systems have been issued to the DPSU concerned, even before/in anticipation of approval of the Government. Thus, the financial powers of the appropriate CFA appear to have been exercised at lower levels, which is procedurally irregular and may, inter alia, involve audit implications at a later stage.
- (x) It has also been seen that substantial interest-free advance payments have been released to the DPSU concerned, without obtaining approval of the appropriate CFA and even without issue of RFP for the project. Such advance payments are stated to have been released based on the actual expenditure, which was claimed to have been incurred by the DPSU concerned in anticipation of approval of the project.
- (xi) Although while seeking approval of the Government, an indicative time-frame was envisaged regarding the progressive extent of indigenization in the course of execution of the project, the actual extent of indigenization achieved over the years was found to be rather low.

### **Transfer of Technology Projects**

- (i) It was noticed in a case that long after obtaining approval of the Government for the project after transfer of technology from a foreign vendor, the department had sought approval of the Government for significant additional financial liability stated to have arisen on account of certain new items (e.g. tooling etc), which were not envisaged or included earlier in the proposal.
- (ii) Dependence on foreign vendor in ToT cases and after completion of ToT has its own inherent impact on project management and completion.

- (iii) The complexities involved in integration of the sub-systems with main platform also affect the project schedule, due to dependence on the OEM/main vendor concerned.

### **Civil Works/Hybrid Projects**

- (i) While civil works involve construction (civil and electrical) works, the hybrid projects involve civil works together with installation of equipment and machinery. Such projects are found to have suffered from significant cost and time over-runs on account of inordinate delays in demolition of old structures, cutting of trees etc., besides changes in quantities and QRs during the course of project implementation. Certain significant variations in the cost of construction material e.g. abnormal increase in steel prices have also affected final cost of the project in an adverse manner.
- (ii) The cost over-runs in such civil works projects have also led to corresponding increase in the associated consultancy cost, if the same is not frozen initially and is to be worked out on the basis of a fixed percentage of the final project cost.

### **Automation/Information Technology Projects**

- (i) It has been seen that the information technology related projects submitted for approval involve rather long implementation period, which is fraught with the possibility of technological obsolescence and crash in prices with technological advancements.
- (ii) Furthermore, in case of subsequent phases of such projects, the due appraisal of the previous phases interlinked with the proposal, which have since been completed is often not undertaken to evaluate the achievement of the intended objectives, besides the critical issues relating to integration of the various phases of such projects.

### *Suggestions*

Based on the discussions in the preceding paras and experience gathered in processing the various proposals pertaining to defence acquisitions, the following suggestions are made to improve the quality of project appraisal, monitoring and completion, and to minimize the time and cost over-runs:

### **Qualitative Requirements (QRs) and Level of Technology**

- (i) It should be ensured that the technology involved in the proposed procurement is state-of-the-art/futuristic and acceptable, and does not require any re-assessment due to obsolescence on account of time over-runs/delays in processing.
- (ii) If the QRs projected had been finalised or approved long ago, their validity with regard to the present requirement should be specifically confirmed.

- (iii) In case a particular platform or system is intended to be used by different services and agencies, it may be ensured that the level of technology meets the requirements of all such agencies concerned.

### **Transfer of Technology (ToT)**

- (i) If the proposal involves Transfer of Technology (ToT), the extent and scope of ToT and value addition and indigenisation envisaged in various phases of ToT should be indicated in financial terms confirming the economic viability of the purchase through the ToT route, and indicating the extent of continued dependence on foreign vendor during and after completion of the ToT envisaged in various phases of the project.
- (ii) In case of acquisition or development of a sub-system or weapon system, the compatibility and complexities envisaged in integration with the main platform, which may, inter alia, require comprehensive assistance from the Original Equipment Manufacturers (OEMs) with associated financial- or contractual implications, need to be adequately addressed ab initio.
- (iii) It should be seen as to whether the extent of indigenisation envisaged in various phases is linked with commensurate reduction in foreign exchange (FE) component of the cost of the equipment or system in conformity with the project objectives.

### **Multi-System/Multi-Component Projects**

If the project envisages integration of various other systems/equipment with the main platform at a later date, it should be clearly brought out as to whether such systems and sources thereof have since been identified, and whether the delivery schedule thereof matches with the corresponding milestones of the main platform.

### **Design and Development Projects**

- (i) In case of design and development projects, the system realizabilty, its viability as well as confidence level of the developing agency, with regard to project outcomes and outputs, need to be deliberated in consultation with all stakeholders including the ultimate user. It need also to be indicated in quantified terms, particularly in case the technology for the system has not matured even in other developed countries, or the system is to be designed and developed indigenously for the first time. While doing so, the uncertainties envisaged, if any, should also be brought to the notice of the competent authority.
- (ii) For developmental projects, it should be clearly brought out as to whether the project is a composite one with defined project outcomes/deliverables or is only a part/sub-project of an umbrella project, or will ultimately lead to several further independent projects, which would subsequently involve considerably higher financial implications.

- (iii) The possibility of 'sunk costs', if any, anticipated in the project, and the agency to be responsible to bear such costs should be clearly brought out.
- (iv) If the project envisages association of a foreign vendor, there should be an appropriate provision in the contract agreement or in the Memorandum of Understanding (MoU) for sharing of the possible 'sunk costs', so that they also have adequate financial stake in the success of the project.
- (v) A desirable course of action for better monitoring of the extent of indigenization in Design and Development Projects would be to quantify and spell out the targeted and anticipated extent of indigenisation over successive phases of production, which could be monitored at appropriate levels.

### **Cost Aspects**

- (i) In case of manufacturing projects, the reasonableness should, inter-alia, be confirmed vis-à-vis the cost of prototypes under the design and development phase. Moreover, in case the design and development of the system has been funded by the Government, it should be confirmed that the investment made thereon has been appropriately factored-in while working out the cost of the system being manufactured, and commensurate financial benefits for the Government have been ensured. Such financial benefits should be adequately ensured in case of commonality of the design with a similar design/system, if any, earlier funded by Government.
- (ii) In support of the estimated cost, the price level/base year of the cost estimates should be indicated. In case the cost estimates have not been worked out at current price level, the specific reasons therefore should be spelt out.
- (iii) In respect of development-cum-production projects and projects involving transfer of technology being funded by the Government, there should be a pre-determined arrangement with the implementing agency to share with the Government financial benefits, if any, in the future, as a result of commercial exploitation of the facilities/assets/technology to be acquired by the implementing agency during execution of the project.

### **Profit to the DPSU/Shipyard**

- (i) The profit admissible to the Defence Public Sector Undertaking (DPSU)/ Shipyard concerned should be worked out as a separate component, and in consonance with the Government policy in this regard.
- (ii) The profit admissible should adequately take care of the original efforts and value addition and efficiency of the DPSU/Shipyard, and should not be levied on components like taxes, duties, freight, exchange rate variations (ERV) etc., where there is no value addition by the DPSU/ Shipyard concerned.



**Cost Plus Contracts**

- (i) Cost plus contracts should normally be avoided in view of indefinite liability involved. Such contracts have an inbuilt incentive for delays in project completion instead of commensurate penalty, inasmuch as any delay in the project would lead to commensurate increase in the profit margin of the vendor.
- (ii) Cost plus contracts normally become benchmark for follow-on contracts and acquisitions. Therefore, these should be entered into developmental cases only as an exception, and that too only for the initial system/equipment. The follow-on systems/equipment should be manufactured on a 'fixed price basis'.

**Payment Terms/Advance Payment to Vendor**

- (i) The Payment Terms/phasing of expenditure should be worked out, inter-alia, duly linked with defined milestones and tangible deliverables, in consonance with the anticipated physical progress of the project, and factoring in the spending capacity of the vendor, so that the proposal does not appear to be expenditure driven and the release of payments is not tantamount to parking of funds with the vendor concerned, or merely to meet the expenditure targets.
- (ii) In case advance payments have been released to the vendor, it should be ensured that before releasing subsequent stage payments, the question of adjustment of interests on advances (which could not be utilised by the supplier within the agreed timeframe), if any, accrued to the supplier is also taken into account.

**Project Milestones/Delivery Schedule**

- (i) The delivery schedule/project milestones should be worked out in a realistic manner so as to avoid frequent revisions at a subsequent stage.
- (ii) The delivery schedule/milestones envisaged for the project should factor in the production capacity and limitations, if any, of the DPSU, Shipyard and vendor concerned in meeting the commitments of technology absorption, related qualitative and quantitative parameters etc., and their workload in respect of various other developmental and production projects already in hand with them.

**Phasing of Projects**

- (i) The projects should be divided into convenient monitorable phases, which would have the associated benefit of concurrent review of technology, if necessary, before undertaking the subsequent phases.
- (ii) Inordinately long implementation period for the project/phase may not turn out to be technologically prudent and financially wise in certain types of projects, e.g. for communication or information technology related projects, where the technology becomes obsolete and prices crash considerably at very short intervals.

- (iii) While undertaking a new phase of an on-going project, it should be ensured that the milestones envisaged therein have been appropriately dovetailed with the corresponding milestones of the inter-linked previous/parallel phase under execution.
- (iv) It may be desirable to undertake simultaneous preparation of budgeted cost/outlays and performance schedule and outcomes in respect of the implementing agency for six monthly intervals for the project, to be subsequently compared with the actual cost incurred and performance achieved during that period in order to facilitate timely forecasting of likely time and cost over-runs, and to take further corrective action(s).

### **Issue of Letter of Intent (LoI) and Conclusion of Contract Agreement**

- (i) The issue of letter of intent or conclusion of contract agreement for any purchase should be only after obtaining prior approval of the competent authority in order to avoid adverse comments or possible audit, contractual or legal implications at a later stage.
- (ii) The contract agreement for the projects should be concluded within a reasonable time period, after the project has been sanctioned by the competent authority. Delay in signing the contract document should be avoided even if the Letter of Intent (LoI) has been issued. The agreement should contain, inter alia, well-defined project milestones and clearly lay down the responsibility of each party for scientific monitoring at different levels.
- (iii) The stage payments incorporated in the contract agreement should be linked to defined milestones and in conformity with the spending capacity of the vendor/shipyard concerned.
- (iv) The timelines and procurement activities for platform construction and associated system/equipment should be dovetailed suitably so as to avoid any time over-runs on account of gap in their availability.
- (v) The C&AG have recommended that the equipment, weapons and sensors under development should be replaced with proven systems, in case the development process does not synchronize with the timelines planned for ship construction.

### **Project Monitoring**

- (i) The Ministry/Department should have appropriate and effective mechanisms at sufficiently high levels for monitoring of physical and financial progress of the project at regular intervals, with a view to anticipating slippages, forecasting and minimizing likely time and cost over-runs.
- (ii) Such mechanisms should be buyer/user driven, and should have adequate representation from all stakeholders.
- (iii) The frequency of monitoring should be adequately high.
- (iv) The mechanism should generate necessary and timely reports for information and decision of competent authority regarding corrective actions.

## **Delays in Processing**

Sometimes it is seen that although the 'Acceptance of Necessity' (AoN) or 'in principle' approval for the project was obtained long ago, further processing of the proposal suffered from inordinate procedural delays, inviting adverse comments from the user. Such delays, particularly those impinging on operational preparedness, need to be brought to the notice of the competent authority, duly explaining reasons and circumstances therefore.

## **Cases involving cost and time over-runs**

- (i) The cases where revision of cost estimates/Probable Date of Completion (PDC) is anticipated, should be taken up for decision/approval of competent authority as soon as such possibility comes to notice, without waiting for completion of the project.
- (ii) The cases, where cost/time over-runs have already taken place or the system has been delivered long ago with cost/time over-runs, rendering the case 'fait accompli', should be taken up with the competent authority for ex-post-facto approval, duly explaining the compelling reasons and circumstances for delay in seeking approval.
- (iii) In case the interim approval of an authority lower than the competent authority has been obtained by the Ministry/Department, the facts and circumstances relating thereto should be brought to the notice of the competent authority at the time of seeking his approval.
- (iv) The specific reasons warranting the proposed revision in cost/PDC should be brought out indicating, inter-alia, whether the revision is due to any change in scope of work etc., and the agencies responsible for the cost/time over-runs.
- (v) The mechanism for monitoring the progress of the project should also be indicated.
- (vi) If the initial estimates approved by the competent authority could not be worked out realistically in the absence of requisite information/cost data, this fact should be brought to the notice of the competent authority at the time of seeking approval for the revised cost.
- (vii) In case, there are any other reasons also for cost/time over-runs, which may reflect poor project management, poor administrative and financial controls etc., which led to failure in ensuring requisite mid-course corrections, these should be candidly disclosed to the competent authority.
- (viii) The impact of components like escalation/inflation and exchange rate variations (ERV) should be separately brought out, duly indicating as to whether admissibility of such escalation/exchange rate variation in the event of slippages in project completion was provided for at the time of seeking initial approval of the competent authority.
- (ix) A comprehensive analysis of physical and financial progress of the project (phase-wise/component-wise) should be carried out and commented upon in the proposal. If necessary, a detailed report, based

on physical verification of the progress of work as well as the corresponding expenditure booked should be obtained at appropriately high level, in order to facilitate an informed decision particularly with regard to the extent and scope of continued Government support to the project.

- (x) The impact, if any, of the changes in delivery schedule/cost estimates of the project on quality of deliverables and performance of the equipment/system should be spelt out.
- (xi) The impact of cost over-runs on the profit originally approved in respect of the DPSU/Shipyard/vendor concerned should be analysed in order to see that the cost over-run does not eventually result into benefit to the vendor on account of increase in profit, instead of commensurate penalty and accountability for delays.
- (xii) It should also be ensured that liquidated damages/penalties, if any, charged by the DPSU/Shipyard/Implementing Agency from their sub-vendors are appropriately passed on to the buyer Ministry/Department.
- (xiii) In the cases involving cost over-runs, often the 'Work Services' component involves very high escalation, both in absolute and percentage terms, over the original approved cost. In such cases, deeper scrutiny of project planning and implementation is called for in order to ascertain the reasons therefore.

### **Closure of Developmental Projects**

- (i) The approval for formal closure of developmental projects, if required, should be sought without any delay after physical completion of the project and achievement of requisite programme objectives. The delays, if any, in seeking approval should be explained adequately.
- (ii) While seeking approval, the gaps, if any, in achieving the programme objectives should be candidly brought to the notice of the competent authority.
- (iii) In case any of the objectives envisaged in the original proposal have not been completed, or have been de-linked, or are being taken up separately as independent projects or supplementary projects or as sub-project of another project, the position should be explained to the competent authority, duly indicating corresponding additional financial implications, if any.

### **Capacity Augmentation/Modernisation Projects for Shipyards**

- (i) There is a strong case for increasing the capacity for ship-building, refit, repair and maintenance in public sector and private sector. Such capacity should state-of-the-art and commensurate with the futuristic requirements of quality as well as quantity, in conformity with the demand forecast.
- (ii) The proposals for investment on modernisation and up-gradation of infrastructure and capacity augmentation of various Defence Public

Sector Undertakings (DPSUs), Shipyards and Defence Research and Development Organisation (DRDO) laboratories should also factor in the installed capacity and its utilisation in the recent past, besides the additional futuristic annual requirement.

- (iii) Such proposals should normally not be linked with the ongoing projects, and corresponding investments should not be loaded to the project cost.
- (iv) Such investment proposals should normally be taken up separately in a comprehensive manner, instead of piecemeal manner, after preparing a road-map for modernisation activities of the DPSU/Shipyard concerned, duly carrying out the cost benefit analysis, and evaluating the various options available (inter-alia for funding e.g. through internal resource generation, market borrowing etc.) as well as the quantum of workload on the DPSU/Shipyard, in order to arrive at the most cost effective option.
- (v) The proposals should be appraised in a comprehensive manner in consultation with all stakeholders in the Ministry/Department vis-à-vis the extant policy of Government.

### **Defence Procurement Procedure (DPP) 2011—Important Issues**

The latest edition of Defence Procurement Procedure (DPP), 2011 has recently been issued by Ministry of Defence, which has come into force w.e.f. 01.01.2011, and has, inter alia, addressed the various important issues related to capital acquisitions. Some important provisions are as under:

- (a) The procedure for cost estimation for ship-building projects has been outlined now, which specifically prescribes that “for new design ships, the estimated cost shall be as close to the final cost as possible explicitly indicating variable cost elements and projected cost of weapons, related sensors and other items under development, if any”. Similarly, for ‘Follow-on’ ships, the estimated cost should be broken down into fixed and variable cost elements, giving their specific details. For unforeseen changes during construction of ships due to minor operational requirements, a provision will be made for the same, while obtaining approval of the competent authority.
- (b) There will be ‘fixed price’ contract for ‘Follow-on’ ships. For contracts in respect of new design ships or ships with substantial change in design, there will be a ‘Variable Price’ element on ‘not exceeding’ basis.
- (c) The contract agreement will have to be signed within two months from the date of approval of the competent authority. In case of delay in signing of contract, approval of the Raksha Mantri will be required.
- (d) Regarding monitoring of ship-building projects, the following mechanism has been laid down:
  - (i) Six monthly review will be undertaken by an ‘Apex Steering Committee’ under the chairmanship of Secretary (DP).
  - (ii) Quarterly review will be undertaken by the Committee chaired by CWP&A with members from MoD (Acq Wing/DP/Fin/

- DGQA), Design and Production Directorate, PCDA (N) and the shipyard concerned.
- (iii) These Committees shall be suitably empowered to ensure efficient execution of the project and will monitor their physical and financial progress vis-à-vis the prescribed milestones. These will also be required to identify technical and administrative hold ups and to issue suitable directions for timely completion of the project.
- (e) In respect of 'Buy' and 'Make' projects, the Defence Procurement Procedure-2011 prescribes the following mechanism for monitoring:
- (i) For simple projects involving one time off-the-shelf buys, without any design and development, the review and monitoring will be done by the Acquisition Manager in MoD or equivalent service officer in the SHQ.
  - (ii) For complex projects, which require design, development and testing in consultation with the users with likely ToT, and have enlarged scope in terms of basic complexities, the review will be carried out by a Steering Committee headed by DG (Acq) in MoD or Principal Staff Officer (PSO) at SHQ with members from MoD, MoD (Fin), DRDO, DDP and SHQ. In such cases, the Acquisition Wing will submit quarterly Contract Implementation Reports (CIRs) to DPB.
- (f) Regarding the cases pertaining to revision in project cost and time of ship-building projects, the Defence Procurement Procedure – 2011 specifically prescribes the following:
- (i) No expenditure can be incurred beyond the sanctioned amount approved by the competent authority.
  - (ii) The competent authorities and the procedure for approving the cases of cost and time over-runs have been clearly laid down.
  - (iii) All cases involving cost over-run exceeding 20 per cent and time over-run exceeding 10 per cent require approval of the Cabinet Committee on Security (CCS).

## **Conclusions**

The issue of project management, particularly in the area of defence acquisitions, is a rather complex issue and possibly there could not be any universal solution to the problem. Over the last few years, the Government has issued revised editions of the Defence Procurement Procedure as well as various Government orders to address the problem of time and cost over-runs and to improve the quality of project management. The latest edition of Defence Procurement Procedure issued this year is a major step in this direction. However, the real impact of provisions will have to be seen in the times to come.

The efforts by the Government towards improving the quality of acquisition process, project management and associated decision making have often been made on 'need' basis and 'as and when required' basis. The experience tells that the different categories of projects may warrant different types of project

management. Therefore, a systemic and focused approach towards project management in defence acquisition is the need of the hour for this challenging area.

Another important and desirable approach would be to go in for 'capacity building' in the area of project management, especially for the key officials responsible for this task, so as to keep them abreast with the latest ideas, tools and techniques as well as with international best practices in this area.

It is strongly felt that a systemic approach, keeping in view the issues discussed in this paper, would enable the project monitoring agencies to deliver the projects in a more transparent, time bound and efficient manner with better financial discipline and 'value for money' out of scarce resources.

# Logistics Management: The French Experience

*Alain Costes*

## **Introduction**

In service support (ISS) is a very present and significant topic, for political leaders and military chiefs, in France and abroad. This situation results from many reasons that range from the increase of the cost of military equipment, the duration of development of new systems and the necessary evolutions of these systems during their operational life.

It is a mystery for nobody: in our countries, defence spending have a continuous tendency to slow down, while, in the meantime, the cost of equipment is increasing. The reason for this evolution is well known: more electronics, more integrated systems on board, more capabilities on the same aircraft, rapid evolution of technologies, quick changes in threat nature..

The main consequence of this situation, as observed almost everywhere, has been a reduction in the total number of systems purchased, a reduction of the size of the stock of spare parts, while the need for operational activity is not declining actually, to say the least. The resulting effect is that all the logistic system, which mission can be summarised as “to produce flight hours” or “to produce aircraft on the apron ready to fly”, has been set into great tension.

In the good old times, we had enough aircrafts so that a pilot could always find an aircraft ready to fly, with no pressure on the maintenance guy, enough spare parts so that the depot manager was not in a hurry to deliver, and in the end the purchaser could take his time and wait for the one being late to buy repairs or new spare parts.

Nowadays, it is different. Time delays, failures at any step of this logistic chain leads almost automatically to an impact on the whole process. It is no longer possible to work without worrying about what is going on before or after ones own action, and without having a broader and more transverse view on the process.

Fortunately, in France, we had already started to move, implementing new



types of contracts placed with the industry, sharing more information and welcoming more company representatives on our air bases, taking advantage of industrial best practices for our own logistic processes.

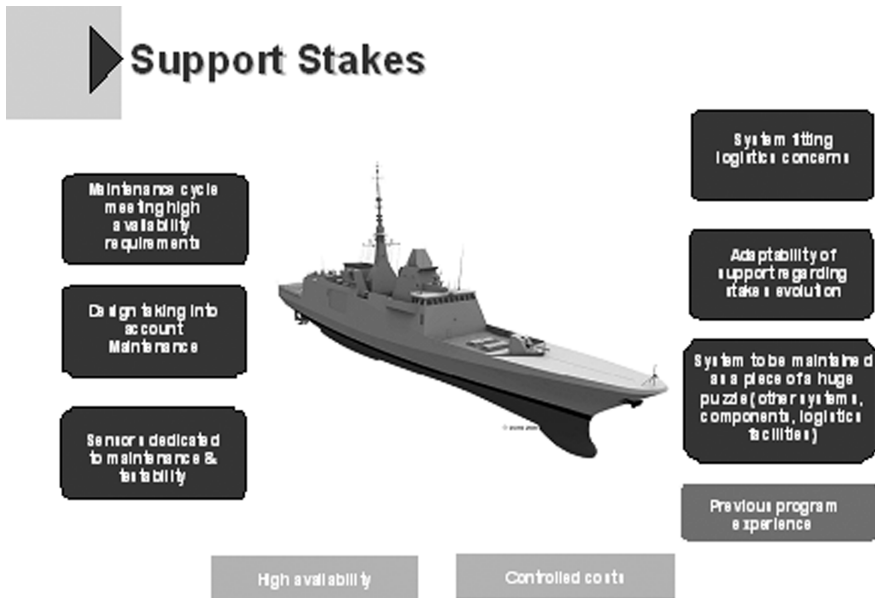
The convergence of this increased pressure and the wider openness to industrial best practices came just in time to settle a new pace for our logistics.

### Logistic Support in French MOD

The French Minister of Defence has three main collaborators:

- the chief of defence staff, in charge of the general organisation of the armed forces, the preparation and use of them, the capability related choices, he is assisted by the three forces chief of staff (Army, Navy, Air force),
- the chief executive of the DGA (General directorate for armaments, the French MoD armament procurement service), responsible for research, military equipment development, technical and industrial policies,
- the general secretary for administration, for all general administrative matters, budgetary, legal, human resources, social, ...

In the forces, if the chief of defence staff has authority over the forces chiefs of staff (air force, navy, army) for the choices of future equipment and for engagement of forces in military operations, they still remain responsible for the preparation (education, training, etc.) of their troops and for the maintenance of their equipment. Their task is to solve the difficult equation of adjusting the number of equipment in the inventory, the need for training, the everyday



availability of systems, the manpower, to the objectives of readiness specified by the "White book on defence and national security", issued in 2008.

In service support has become a very present topic these years, and its importance is growing for military and political leaders, not only in France but in many other countries as well.

It has to cover servicing, maintenance, management or replacement of outdated equipment, hardware and software modifications, whose cost are generally increasing when a new generation arrives. This can be observed for the majority of new equipment in every domain; air, naval, land. As a consequence, the burden of ISS is becoming a real concern. In France, it represents roughly 6B € of spending (contracts and manpower) each year, from which over 50 per cent is dedicated to aeronautical equipment.

A certain number of actions have since many years been taken by the French MoD. The first one in this respect has been the creation of the SIMMAD, which stands for Integrated Structure for Maintaining in Operational Condition the Aeronautical Materials of Defence in 2000. It was a true innovation at that time to merge into the same entity former teams from the 3 French services (Air, Land, Navy) and from the procurement agency DGA, to deal with in service support of all MoD aircraft. This brought an increased efficiency of the actions taken to support equipment through:

- sharing technical expertise for common fleet (helicopters, RAFALE fighter, ...), and so avoiding redundant capacities, double work and risk of separate evolution of between forces aircraft standards,

## Cross cutting contract for standard & consumable components



- Logistic support permanence :
  - Long term contract (10 year s)
  - Signed in 2004
- Globalization and flexibility
  - 264 000 items,
  - Replenishment plan (consumption, forces activity, ..)
- A single supplier : in charge of
  - replenishment from various sub contractors
  - storage inventories
  - maintenance sites delivering
  - obsolescence and technical event management regarding systems qualification
- Incentive payments
  - KPI
  - Fixed rate ^ flight hours

- gaining advantage of best practices developed for contract specifications, legal framework, management of spare parts, etc.,
- having an entity totally dedicated to the support and the availability of the aircraft of the MoD,
- developing common purchase of spare parts with a single contract for all services, for instance low cost and consumable items. A good example of the advantage of this pooling is in the aeronautical field the negotiation and execution of a single contract, signed in 2004 and worth 100 M € per year, which replaced about 170 previously scattered contracts. With this contract, for instance, the number of none or delayed delivery for lack of an item has dramatically felt.

The performance of this organisation based on a single service for all aeronautical maintenance can be seen daily with an availability rate over 90 per cent for all our deployments overseas (operations, exercises, etc.) and has been demonstrated by the immediate and sustained response of our Air Force and of the Army helicopters for the operations over Libya.

The next optimisation of SIMMAD will occur next year, in summer 2012 as it will be distributed between Paris headquarters and an operational base in Bordeaux.

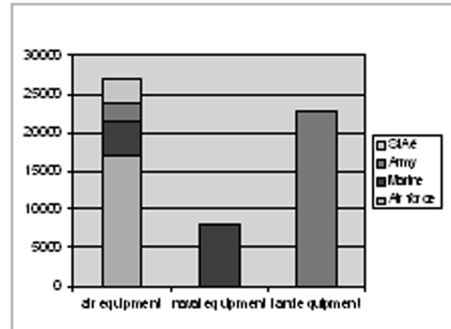
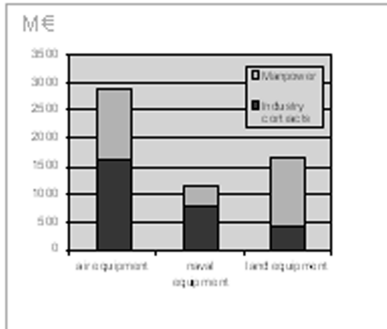
A second aspect, which now appears as a driver for new projects, is the overall cost of a programme, from the very beginning until the end of its life, and eventually dismantlement as well. It has already been a concern for many years, but the key point nowadays is to obtain a better coordination between procurement of systems, definition of maintenance principles, purchase of tools, spare parts, and repairs. We are also looking for ways of getting a more realistic and sincere prevision for ISS, in parallel with a deeper involvement of the manufacturer for the achievement of these objectives. To address this point, France has had its general instruction on programme management - the so-called Instruction 1514—modified in order to take into account, better and deeper, the future cost of support from the very beginning of a new programme. From now on, in each integrated programme team, along with the programme manager (technical, contractual, calendar matters) and the programme officer (operational matters) there is a third person in charge of the in service support, of its definition from the beginning, and its implementation at the foreseen cost.

For a plane such as the Rafale we anticipated this need. As a specification for the design of the aircraft, some precise criteria and objectives for ISS were determined by the French MoD—which were controlled throughout the development. In doing so, not only have we gained an omnirole aircraft, capable of performing every type of mission in the same flight, but also we got an “operational capability over support effort” ratio that outclasses all our other aircraft. With a military effect of the Rafale approximately the triple of the Mirage 2000, it was important that the cost of support remained comparable to that of the Mirage 2000 to guarantee true economies of scale. And it is the case, being proven on a daily routine within the framework of Unified Protector above Libya!

## Main figures - In Service Support

Costs : 3 G€ (contracts) +  
3 G€ (employees)

Manpower : 60 000  
employees



June / 2011

Main figures for in service support in France are shown in the figure below:  
As a comparison, acquisitions represent an annual investment of about 9B € for France.

### The Area of Aeronautical in Service Support in France

The main figures for aeronautical support in the French MoD are as below (2009):

- 1500 aircraft: 970 (fixed) + 530 (rotary) wings,
  - Air force: ± 800
  - Army: ± 450
  - Navy: ± 250
- 350 000 + flight hours logged per year
- 25 000 people in French MoD (80 per cent military)
- 2.0 billion €: yearly spending on contracts
- 20.0 billion €: value of the inventory.

### And today?

Beginning from the 2005's, it appeared that it was harder and harder to maintain a satisfying level of availability and that the efforts deployed in order to maintain or to recover a good availability of a given fleet seemed effectless or with an insignificant result. An external audit of our organisation was consequently conducted showing possibilities of progress, mainly transverse, impacting much of the structures involved in the maintenance field. The MMAé was then created to address this problem and come up with propositions of evolutions in

organisations and processes—some of its achievements are detailed at the end of the paper. I will focus on two main present topics: the supply chain approach and the increased implication of the industry.

### **The Supply Chain Approach**

The question to answer is why the traditional approach for maintenance, which on the one side is based on purchasing of spare parts, stockpiling in central depots, delivering to bases, and on the other side the maintenance of aircraft done on bases and asking for repairs of new parts when necessary, seems to not be working any longer.

As always, the first answer is budgetary: budgets are decreasing or at the best stabilised while the cost of maintenance is continuously increasing. This is one point, but the impact looks greater than the constraint on the budgets and most of all we cannot rule out that there might be another way than just pouring more money - and sometimes, we experienced that more money did not bring any outstanding effect.

My conviction, and we have some hints it is right, is that there is an economical way of dealing with this problem.

First, the reason of this situation is rather simple. As budgets have been reduced, we have bought fewer systems, and then less spare parts. In the meantime, the operational burden has only been slightly diminished, eventually changing from a posture of readiness only to real operations. The result is in fact that all the maintenance system has been set into tension. There are no longer too many aircraft on the apron so that if one is not ready to fly you can take another, there are no longer enough spare parts on the base so that you do not have to wait for a delivery from the main depot, and the stockpiles have melt so that you cannot manage the purchase of new spares independently of the depot situation. We used to have each part of the process working independently in “silos”, and this is no longer acceptable. We had a vertical way of doing maintenance, and now we need to have a transverse approach.

Secondly, we can find solutions to this problem just by looking around. The industry knows well the situation since it has developed “no depots” logics with “just in time” concepts. This cannot apply directly on such unpredictable an activity as the maintenance. The supply chain approach is a good answer. Its principle is that each productive operation is linked to the previous one (which is feeding it) and to the next one (which is waiting from it). The point is that each actor of the different processes of maintenance, from the purchaser of spare parts to the one who is delivering a flyable aircraft on the air base, are part of a continuous process and must be aware of what is going on around them.

The consequences are mainly evolutions in organisation and ways of thinking the individuals activity. We are presently looking for the development of the know-how inside SIMMAD itself, as it is the major actor of the aeronautical maintenance process. We are promoting the awareness of the direct impact of time delays in dealing with procurement and transfers of spare parts, in shipment of broken down equipment towards the repair shop, in the urgency of dealing

with missing items, and in the anticipation of possible breaches in the inventory of spare parts... The organisation itself of our maintenance is modified in order to strengthen the links between all services that contribute to the process of producing "ready to fly" aircraft. For instance, a dedicated project of MMAé called ELOGE is addressing the problem of better exploitation of the fleet of aircraft of an air base through an improvement of the dialogue between flight squadrons and maintenance teams about preparation and configuration of needed aircraft, along with the physical presence of a depot representative in the workshop for the supply of spare parts, and the display of the situation of the delivery plan of aircraft in the maintenance process. The result was a 20 per cent increase of the number of available aircraft for the first flight of the day in a six-month period of time.

### The Increased Implication of the Industry

The basic principle of support in the French forces is the autonomy. Since we want our forces to be autonomous when deployed in operations, no civilians being allowed in dangerous zones, we have to be prepared to face all maintenance situations and to be confident in the extensive know-how of our technical personnel. For this reason, we would not let the industry perform aircraft servicing or maintenance on our operational bases. This is the only way to ensure the right preparation of our maintenance teams and to demonstrate it on a daily basis.

For this reason also, we have always specified an as simple and as quick as

## ▶ Forward maintenance execution (NSO)

Outsourcing is not implemented for maintenance



Government:

- SLM
- Crews



Government:

S MITER, Forces

Industry:

Some equipments  
(Fleet management)



Government:

CSFA, ALAVIA

possible return to “flight ready” for our combat aircraft. For instance, I have been able to observe personally, during my visits on air bases, that a RAFALE can afford more flights per week than a M2000.

For in depth maintenance, the options are more opened, since the operational impact is lower. As you can see in the figure below, we tend to have a mix between governmental services and industry. In the aeronautical field, we have a tradition of sharing the depot level maintenance between the MoD service called SIAé (Aeronautical industrial service) and the industry. The reasons to do so lay mainly into keeping internally the capability to assess the industrial offers, having the possibility to even challenge these offers, and sometimes to perform maintenance tasks that no company would accept at a reasonable price, in order to keep in service some of our aging aircraft.

## In depth maintenance execution (NSI)

An appropriate level of gvt involvement (autonomy, price, expertise)



Industry:  
Main supplier  
DCNS  
  
Part of manpower  
are MINDEF  
employees assigned  
to DCNS



Mixed:  
Government:  
SMITER  
  
Industry:  
NEXTER  
RENAULT



Mixed:  
Government: SIAé  
  
Industry:  
SAFRAN  
DASSAULT  
EUROCOPTER  
THALES



The transformation from former maintenance principles (technical levels 1 to 3, even 4 or 5) to only two (front and in-depth) have led to a reassessment of the separation between what is pure operational and what is pure industrial. In the meantime, the idea of service-oriented contracts has gained more and more interest with more mature industries able to tackle with such a demand. New opportunities have therefore emerged for a better service.

### Service Orientated Contracts

Why is an increased industry implication of interest for the purpose of in service support? Actually, industry brings quicker reaction times, shorter decision lines, autonomy of its agents, capability to set a contract in a very short time etc. All this is the current way of doing for forces in operations.

But, for routine activities as maintenance, bureaucracy and paperwork, governmental procedures, the distribution of responsibilities prevent defence services to match the performance of the industry on these points. And these have become critical, as the system has been put under tension. This situation is not bad in itself, as it has indeed been designed to work as it does, at least partly, for the sake of the taxpayer!

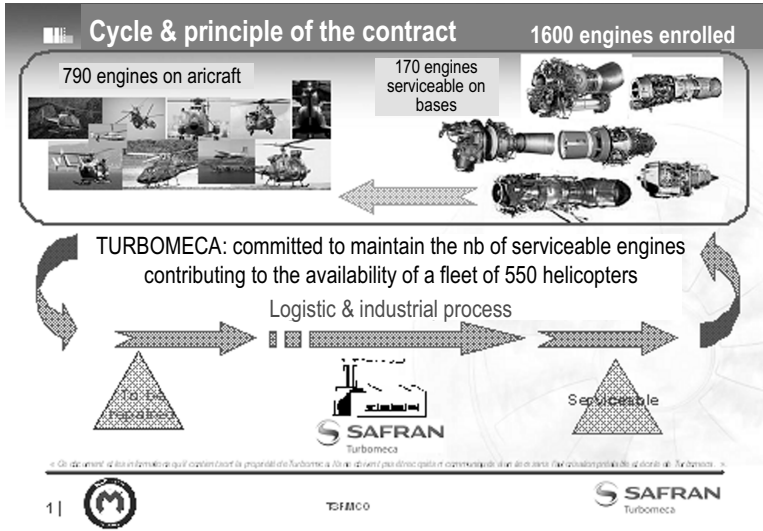
Looking for more reactivity, we went along the scale of industry commitment. For the first step of involvement – stock availability – I have already presented the choice and the interest of a single contract for standard and consumable spares.

The next step for which we have observed clear benefits is operational availability. For instance, since 2001, the Turbomeca Company has been entrusted the maintenance of all the engines it has manufactured for the helicopters of our three forces. The contracted service is global: to maintain a determined number of serviceable engines on each base, adapted to the number and type of helicopters deployed.



The company and the MoD have progressively learned how to manage such a contract. The result is impressive: during the execution of the contract, more than 2,000,000 flying hours have been logged, more than 2,000 engines delivered and no AOG<sup>1</sup> have been declared related to a lack of serviceable engine since 30 months. The minimum saving generated by this contract have been evaluated

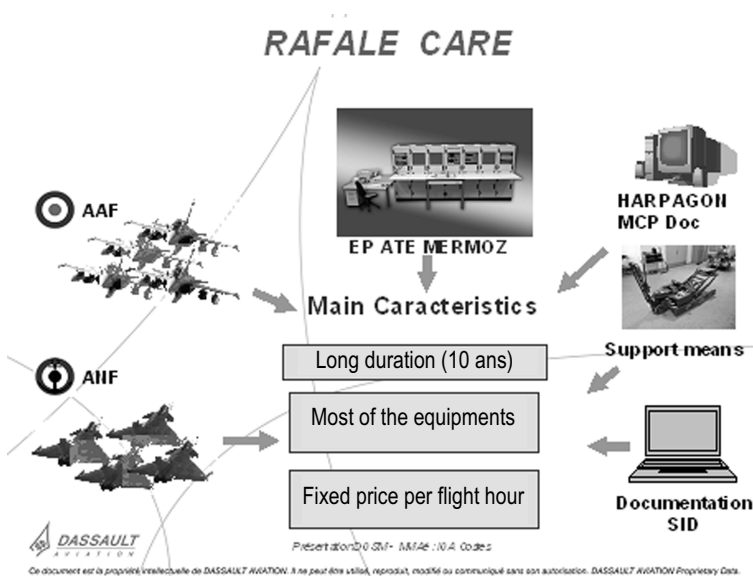




to 10 per cent of its total amount, not taking into account the savings generated by a better global availability and the elimination of missing spare engines.

Building on this experience, SIMMAD has elaborated in 2008 the RAFALE Care contract, with the Dassault Company. The objective of this contract is to minimise the quantity of equipment in the repair process, and, under the responsibility of the manufacturer, to get an optimised management of the repair chain and the associated documentation.

Next step has been jumped over with really capability contracts. We have at least two emblematic ones for the initial training of our pilots.



Since 2007, the Air force has an availability contract, signed for 10 years, for the aircraft and flight simulators of its training school of cadets in Cognac. Each year, about 20 000 flight hours and 5 000 flight simulator hours are delivered with a very high level of satisfaction and almost 100 per cent of availability.

## **CASSIDIAN Aviation Training Services Cognac Air base**

*“Servicing and in service support of EPSILON aircraft for equivalent for basic training of cadets”*

18 Grab 120, CATS ownership



37 EPSILON (TB30), MOD ownership

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**CASSIDIAN**  
AVIATION TRAINING SERVICES

The Dax school, providing the initial training of all MoD helicopter pilots (Army, Navy, Air force) is also working with an availability contract based on a certain number of helicopters ready to fly every morning according to the flight planning; the particularity of this contract is that all the helicopters (36) are provided by the bearer of the contract and that it is the first public-private-partnership signed in France in 2008 for 20 years. It has reached its cruise regime this spring.



**Dax school apron filled with new helicopters**

What are the main teachings of these contracts? I would highlight 3 aspects:

- these contracts assume that a true partnership between MoD and the company in charge is established; it is of most importance to grant direct access to the industry to our files and to all relevant information for it to optimise its work,
- we must give to the bearer of these contracts the greatest visibility for its activity and the largest access to our forecast and planning; actually, the best is to prepare the planning together,
- we must anticipate that we just can't anticipate everything and that the contract will need adjustments during its lifespan. Amendments are a normal way of doing, to come along with the life of the contract. For instance, by doing so, the Turbomeca contract has successfully faced major evolutions of its perimeter.

### **Plateau Working**

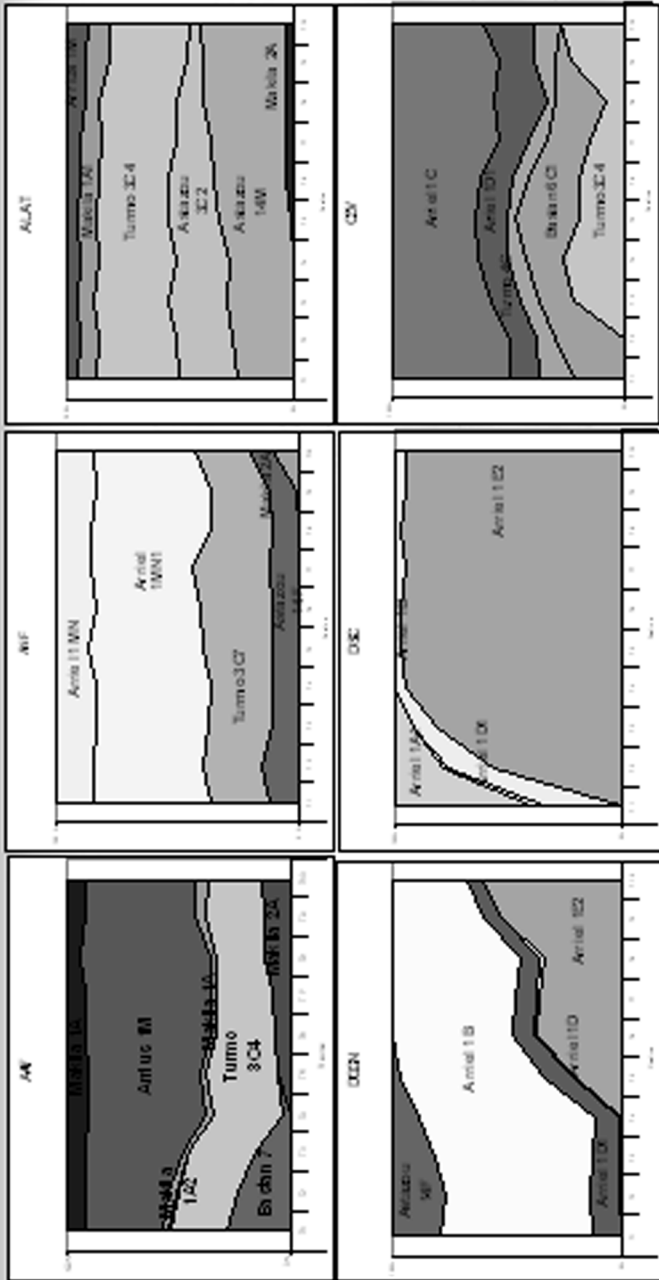
Share of information is capital to reach a good level of service (supply chain principle!). We have already seen its importance for capability contracts.

Unfortunately, in all ministries of defence, there is always the fear of releasing sensitive information, and in every organisation there is the idea that keeping information is gaining power. But in service support is really a team work and teams work well when every member cooperates with all the others. From this conviction, we have launched the plateau working.

The first plateau, CICOMORE, was created in 2006 as an initiative of MMAé, in order to solve an availability problem on the M53 engine of Mirage 2000. On the same place, Bordeaux, were assembled representatives from SIMMAD, the contract manager, Air force, the owner and user, SIAé, the repairer, and SNECMA the manufacturer and spares provider. Through essentially the sharing of information on priorities, work organisation, respective expectations, the crisis has been solved rapidly. In order to prevent further ones, the plateau CICOMORE has been extended to all fighter aircraft engines, and of course to the Navy. This concept is being presently extended to other fleet or equipment.

At the other end of the spectrum, which is on the very spot of the aircraft, plateau work is also being considered. This is really a revolution to contemplate having some industry representatives on our homeland bases. But we are doing it. The question is no longer to anticipate or plan, but to dramatically improve incidents treatment by bringing together pilots, daily users and designers at the foot of the aircraft, observing and discussing flight events and needs to control or repair. Doing such increases the global know-how on the aircraft, and then accelerates and optimises treatments through the different contacts into the maintenance repair process. From this action, we can gain one or two more aircraft ready to fly. This very new action has started this year on one base and we are already considering extending it to other ones in France.

**The TURBOMECA contract:  
Evolution of the activity per engine & per user**



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Cellule Intégrée de Coordination de la Maîtrise d'Oeuvre des Réacteurs



### Conclusion: the Way Forward

The budgetary constraints have led to a dramatic reduction of the different margins we still had in all our maintenance processes.

The better way to deal with this situation is to take advantage of the ideas and solutions already implemented in the industry where this question has been intrinsic for years. We have to be more industrial to succeed in keeping the availability to the level requested by the missions attributed to the armed forces.

Being more industrial give two way of action we are exploring simultaneously in France:

- by implementing more industrial processes in our military organisations, using for example the supply chain principles,
- by involving the industry more widely into our processes and on our premises, through collocated workers and contracts requesting larger services.

The perimeter to be considered has already been widely explored. But, each time an activity is limited to homeland, extensions can already be at least envisioned.

The result is a very positive one: we have a better service with less people and at a very competitive price. By this evolution, we reach in fact a largely better efficiency of the capital our country has entrusted its armies.



**In Service Support: Delivering ready to fly aircraft, every day  
[RAFALE at Solenzara (Corsica) Air force base - Spring 2011]**

### **What is MMAé?**

MMAé, which stands for “Mission for the modernisation of aeronautical maintenance” is a very small team of 5 high level officers, coming from the different services of the French MOD, and acting as an internal counsel to the Minister’s office in order to explore, promote, and support the implementation of any evolution or change in organisations or in processes in order to improve the ISS of aeronautical systems of the ministry (aircraft of any type and helicopters as well, operated by Army, Navy or Air force). This mission was initiated by the Minister, in mid-2005, when it appeared that ISS for aeronautical systems represented roughly 50 per cent of the overall in service support of the French armed forces, and that the capabilities of the three services (Air Force, Army, Navy) should be improved through a better management of this spending and better practices.

Main actions of MMAé since its creation have been:

- renewal of maintenance levels from the classical 3 levels to only 2: front/operational and in depth/industrial, giving better guidelines for what has to be performed by the forces, and what can be subcontracted to industrial entities,
- creation of a unified depot level maintenance service, in 2008, merging facilities from Air force, Army, Navy and DGA, in order to concentrate technical know how and develop industrial best practices,

- elaboration and exploitation of a comprehensive cost model for aeronautical support, designed at recording actual spending on each type of aircraft and providing an evaluation of future spending
- experiment of industrial practices in an Air force maintenance squadron, and of supply chain applications for the anticipation and the quantity assessment of spare parts procurement (project ELOGE).

NOTE

1. AOG : aircraft on ground; when called upon, an AOG means that an aircraft is waiting this specific item to resume flight availability.

## Harnessing the 'PPP' Model in Defence Acquisition and Construction Works to be a Catalyst for Participation of the Private Sector

*Vinay Kaushal*

I recall that in March 2005 a customary presentation was being made to the parliament standing committee on defence on the budget demands of the Ministry of Defence. Additional FA, Mr Chopra was making the presentation, a slide with the title "MAP" was flashed with the budgetary figures. Dr Farookh Abdulla, a member of the committee enquired: "What is this MAP?" He was informed that it is an acronym for "Married Accommodation Project" which has been undertaken to overcome the acute shortage of married accommodation. He loudly remarked, "Bhaiya isme to aap jitne paise do wo kam hai. Meri sirf ek darkhast hai ki beshak thora banao magar dhang ka banao or uske maintenance par be twajo do", he then turned around and addressed his colleagues on the committee, "Aap jab kabhi airport ya kahi aur ja rahen ho or apko gharo ke overhead tanks me se pani overflow hota hua dikhe to meri guzarish hai ki aap un gharon ko ja ke dekhen to aap payaenge ki who ek fauji colony hai or unke bathroom me pani nahi aa raha hoga or flush bhee kaam nahi kar raha hoga". ("Friends whatever money you give for this will be less. My request is that please, make lesser number of houses but please make them properly and please pay attention to their maintenance. Whenever you are going to the airport or anywhere else and you see overflowing overhead tanks, my request to you is please go and see these houses. I bet you will find that it is a defence personnel colony and when you go in to those houses you may find that there is no water in the toilet and the cistern may not be working). MAP was conceived and formed to reduce the married accommodation deficit to construct about two lakh houses. Phase I was to construct about 60,000 houses. Phase I of MAP has just been completed last financial year with cost and time over-runs of about Rs 700 crs and two years<sup>1</sup>.

Another incident comes to my mind. Mirage 2000 aircrafts were inducted



in to the IAF in 1985 and the roof of the mirage squadron hangar collapsed at Gwalior in May 1989 causing damage to the aircraft inside.

The above two incidents recalled are a reflection of the works of the infrastructure support for the defence. Resources may be a constraint but as the budget figures tabulated below would indicate that budget allocation for construction works has received a favourable attention. If that be the case, it is the method of infrastructure creation and the delivery of services that need to be focused on.

Now when a major modernisation thrust is underway, we need to ensure that in parallel and in good time the infrastructure also is ready at the selected locations prior to the induction, so that the state of the art equipment is housed in matching class infrastructure and environment. In addition to the technical accommodation the living accommodation (both married and single) should get upgraded.

As may be seen in Table 1 below (Figures in tables 1 & 2 are the actual expenditure up to Financial year 2009-10 and BE figures for 2010-11 & 2011-12 (all as per Defence Services estimates)), in the case of revenue budget, the share of works budget over the 12 year period has been 8.25 per cent and had increased to above 9 per cent but got moderated to less than 9 per cent—presumably because of pay commission arrears in the revenue budget of 2008-09 and 2009-10. It may also be seen that the increase in budget over the previous year has been higher in the works budget compared to the total revenue budget except the two pay commission arrears years.

Data of 12 years has been tabulated below in Table 2 and brings out that while the share of expenditure on construction works was 6.83 per cent in 2000-01, the share of allocation in the current financial year has increased to 10.29 per cent. The share of construction works over the 12-year period is 9.25 per cent; however, the same has been above 10 per cent since 2006-07 except for one year.

The primary cause for not realising value for money is inherent in the existing methodology of execution of both creation of infrastructure and maintenance of buildings. The primary aim of the contractor is to execute the project in as small a cost as possible, just about meet the input specifications, manage the environment to overlook the deviations and ensure that no major shortcomings are noted in the defect liability period, which is one year. Time and cost overruns are a recurring occurrence in these projects. Poor quality in execution generates more maintenance business. The maintenance activity earlier was primarily departmentally managed by the MES and this was seen to be creating a large work force, which itself was a drain on the budget and non-performing. This has been substituted by subcontracting the maintenance on item rate contract, which was thought to provide incentive to attendance of complaints, but the recurrence of complaints becomes the revenue model in such a system. Lest it be thought that this is unique to defence works procedure, we need to just look at by the now notoriously famous construction and major up-gradation of the infrastructure during the CWG. There was abundance of

**Table 1: Revenue Budget—Construction Works Budget Over the Years Vs Increase in Revenue Budget Over the Same Period**

Revenue Works	2011-12	2010-11	2009-10	2008-09	2007-08	2006-07	2005-06	2004-05	2003-04	2002-03	2001-02	2000-01	Total
Army	5117	4288	4610	4283	3649	3254	3044	2816	2546	2240	2052	1855	39755
Navy	774	670	645	632	558	489	444	394	373	356	339	309	5982
Air Force	1802	1590	1560	1318	1167	909	841	805	714	647	599	532	12484
Total	7693	6548	6815	6233	5374	4653	4329	4015	3633	3243	2990	2697	58221
% increase over previous year	17	-4	9	16	15	7	8	11	12	8	11		
% of Revenue Budget	8.08	7.50	7.52	8.50	9.91	9.00	8.98	9.15	8.41	7.97	7.86	7.24	8.27
Revenue Budget	95217	87344	90669	73305	54219	51669	48211	43862	43203	40709	38059	37238	703704
	9	-4	24	35	5	7	10	2	6	7	2	2.85	2.56
													Revenue budget 2011-12 increase no of times over 2000-01 budget
													Works budget 2011-12 no of times over 2000-01 budget

**Table 2: Capital Budget—Construction Works Budget Over the Years Vs Increase in Capital Budget Over the Same Period**

	Army	Navy	Air Force		Total	Capital budget  Budget	C Wks as a % of Capital
			Const Works	Special projects IAF			
2000-01	537	87	196	26	845	12384	6.83
2001-02	547	87	186	36	856	16207	5.28
2002-03	780	121	229	16	1146	14953	7.66
2003-04	936	109	331	3	1381	16863	8.19
2004-05	1223	144	431	9	1807	31994	5.65
2005-06	1944	149	451	2	2545	32338	7.87
2006-07	2585	187	628	80	3480	33826	10.29
2007-08	2761	285	775	73	3894	37462	10.39
2008-09	2857	406	817	114	4193	40918	10.25
2009-10	3091	308	905	135	4440	51112	8.69
2010-11	4722	452	1428	297	6899	60000	11.50
2011-12	4722	554	1343	501	7121	69198	10.29
Total	26706	2889	7720	1292	38607	417254	9.25
2011-12 Budget increase no of times over 2000-01 Budget	8.80	6.36	8.32	8.42	5.59		

funds for the CWG projects yet even that did not ensure a satisfactory result. It is the exploitation of the conventional contract system that is the primary cause. Compare it to the Delhi Airport (project cost Rs 8975 Crs) and the Badarpur elevated structure on NH-2 at Delhi Haryana border (Cost Rs 340 Crs)<sup>2</sup>. Both the projects had a handicap of being undertaken while ensuring the availability of the airport for regular use and through traffic on NH-2(24X7). These projects were completed well in time and have caused no adverse cost implications. What distinguishes these two projects from the others is that they have been executed on 'PPP' basis. We therefore, at this crucial juncture need to harness the 'PPP' mode for our infrastructure related activities.

### Defence Industrial Base

A nation's military strength is determined by its economic might. Industry provides the military with the wherewithal to fight the nation's wars. Since independence the policy relating to Strategic Defence Production has been evolving. India has emerged as a major arms purchaser in the past few years, despite the slow pace of acquisition and defence modernisation. A heightened threat perception and a determined effort to overcome technological obsolescence in defence equipment are driving this process. However, such a high level of imports tacitly admits to the failure of the domestic defence production establishment, barring a few exceptions, to meet the requirement of the armed

forces, both in terms of requisite volume and cutting-edge sophistication. Lack of policy clarity and the risks perceived by the private sector has restricted private sector participation in defence procurement to supplying components and subsystems. Of the 30 per cent of defence supplies procured domestically<sup>3</sup>, the private sector barely supplies 9 per cent. Research and Development and mass production are still largely the preserve of the state sector. We, therefore, need to identify a vehicle, which would enable sharing of risks between the Government and the private sector and enable India to move closer to its cherished objective of sourcing more than 70 per cent of military hardware domestically. Ironically, a vibrant domestic manufacturing sector would make joint ventures between foreign vendors and domestic players more successful, by way of enhancing the technology-absorption capacity of the latter. Collaboration between the public and private sectors needs to be taken several notches higher. The defence sector needs to replicate the achievements in the non-defence sector.

### **Infrastructure Augmentation**

India is the world's fourth largest economy, the growth has been robust and it is poised to grow at 8 per cent per annum in the years to come, thanks to the policies of economic liberalisation pursued by the government. This robust growth has placed an increasing stress on the physical infrastructure such as power, roads, ports, airports and railways, which were already carrying a significant deficit from the past. There is consensus that the growth achieved in the manufacturing and service sectors would have been constrained if infrastructure services did not keep pace. The government has, therefore, been committed to building world-class infrastructure for improving the quality of life and enhancing competitiveness of the economy<sup>4</sup>. The financing requirements of infrastructure are so large that no amount of resource mobilisation by the government can meet this challenge. Hence, there has been greater emphasis on roping the private sector. Recourse to private capital has, therefore, been inevitable for sustaining the growth momentum and, as may be seen in the table below, that from a relatively modest contribution, share of the private capital has increased from 24.85 per cent in the 10th plan to 36 per cent in the 11th plan and the enthusiasm of the response has made the planning commission confident to factor a share of 50 per cent in the 12th plan.

The government has been able to harness the concept of PPP in the infrastructure across all sectors. Typically, the mode of investment has been through Public Private Partnerships (PPP) involving investment by private entities through concession agreements, which lay down the performance obligations to be discharged by the concessionaire. PPPs are increasingly becoming the preferred mode for construction and operation of commercially viable infrastructure projects in sectors such as highways, airports, ports, railways and urban transit systems.

Table 3<sup>5</sup>

(All Rs in crs at 2006-07 prices)

<i>XIIIth Plan Projections of Investment in Infrastructure</i>				<i>XIth Plan</i>	<i>Xth Plan</i>	
<i>FY</i>	<i>Projected Government Investment</i>	<i>Projected Private Sector Investment</i>	<i>Total</i>			
2012-13	350000	250000	600000	690296	370381	Centre
2013-14	375000	300000	675000	620367	310473	States
2014-15	400000	390000	790000	740292	225220	Private
2015-16	450000	500000	950000			
2016-17	475000	609240	1084240			
TOTAL	2050000	2049240	4099240	2054205	906074	

### Public-Private-Partnership—The Concept

Public-Private-Partnership or PPP is a mode of implementing government projects/programmes/schemes in partnership with the private sector. The term private in PPP encompasses all non-government agencies while PPP subsumes all the objectives of the infrastructure to be created, project to be executed by the government, or service being provided earlier by the government, and is not intended to compromise on them. Essentially, the shift in emphasis is from creating the infrastructure by the government and delivering services directly, to service management and coordination. The roles and responsibilities of the partners may vary from sector to sector. The private provider may have significant involvement in regard to all aspects of implementation, while some risks and responsibilities may be on the government.

### Definitions of PPP

The understanding of PPP is also different across different countries. There is no specific definition of 'PPP' given in India except one by the planning commission in the context of Viability Gap Funding (VGF). Based on the projects undertaken so far, PPP refers to projects based on a contract or a concession agreement between a government or a statutory entity on the one hand and a private sector company on the other, for delivering infrastructure services on payment of user charges. The main characteristics of PPP projects include longer term service provisions (running up to thirty years or even more), balanced sharing of risks (relating to financing, designs, construction and operation etc.) between the public and the private sector and the public sectors' continuing responsibility to provide targeted services of prescribed quality at reasonable costs to the needy public. Further, PPP projects involve the transfer of public assets to the private sector partner usually for the duration of the contracts and the delegation of the government's authority to recover user charges to the

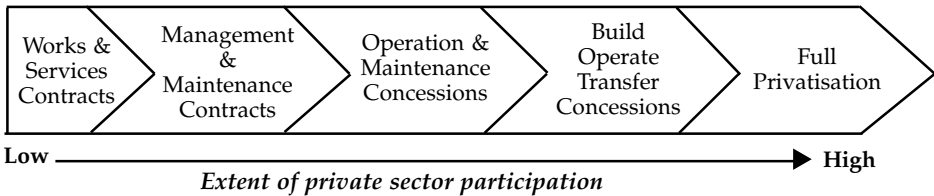
private sector partners. In certain cases, it also results in the private control of monopolistic services previously owned by the government.

**Difference between PPP and Private Sector run projects**

Unlike outsourcing, which involves contracting with outside organisations to provide support services and which has been standard practice in the Government for years, privatisation shifts some or all of the responsibility and risk for planning, organizing, financing, and managing a program or activity from the Government to private contractors or partners.

The private sector would naturally step in into areas where it senses business opportunities. However, there may be areas, which are responsibility of the state or where, because of perceived risks, the private sector may reluctant unless the risks are mitigated through state support. The continuum of extent of private sector participation as illustrated below shows the main categories on an horizontal axis, where the extend of participation of the private sector grows from left to right.

**Figure 1<sup>6</sup>**  
**Public Private Partnership**



The key differences between public-private-partnership and 'private sector projects' may be summarised as follows:

**Responsibility:** Under private sector projects the responsibility for delivery and funding a particular project or service rests with the private sector. PPP, on the other hand, involves full retention of responsibility by the government for the project and providing of the service.

**Ownership:** While ownership rights under private sector projects are sold to the private sector along with associated benefits and costs, PPP would continue to retain the legal ownership of assets by the government but the specific rights for specified period may be assigned to the concessionaire.

**Nature of Service:** While the private provider determines the nature and scope of service under private sector projects, under PPP the nature and scope of service is contractually determined between the two parties.

**Risk & Reward:** Under private sector projects all the risks inherent in the

business rest with the private sector. Under PPP, risks and rewards are shared between the government and the private sector.

### **Principles of PPP**

PPP involves a long-term relationship between the public sector and the private sector. While the collaboration between the two may take various forms like buyer seller relationship or donor-recipient relationship, the most stable partnership is in the form of 'contract' binding on both parties.

### **Contractual Framework**

The 'contract' mirrors the basic objective of the programme/project, the tenure of the agreement, the funding pattern, and of sharing of risks and responsibilities. The need to define the contract very precisely, therefore, becomes paramount under PPP. Projects/programmes under PPP may, however, broadly be classified under three heads, namely:

- (a) Service contract;
- (b) Operations & maintenance (management) contract; and
- (c) Capital projects, with operations & maintenance contract.

### **Payment Mechanism**

Payment to the concessionaire could take the form of:

- (a) Contractual payments: Contractual payments may be in the form of advance payment, progress payment, final payment, annuities and guarantees for receivables etc. Annuities, in turn, could be with respect to recovering the fixed costs or for recovering both variable costs and the fixed costs of the project. In the former case, both the government and the private partner share the risk of running the project.
- (b) Grants-in-aid: Grants-in-aid, in turn, can take different forms, such as a block grant, capital grant, matching grant, institutional support, etc.
- (c) Right to levy user charges for the asset created/leased-in: Lease agreement license, similarly, may allow the concessionaire to recover the cost of construction, operation and maintenance through levying user charges. Moreover, in the case of lease agreement, the asset reverts to the government after the expiry of the contract. The agreement ought to also provide for the condition of asset that would be returned at the end of the contract.

### **Monitoring and Evaluation**

Payments, however, have to be linked to performance, which in turn requires monitoring. Performance measurement can be done with respect to measuring 'efficiency' or measuring 'effectiveness'. While measurement of efficiency entails comparing the unit cost of providing the service from amongst the various alternatives, measurement of effectiveness involves comparing the desired

outcomes from amongst the various alternatives. Monitoring may be done in either of the following ways:

- (a) By government departments authorized to do so, based on a standardized scale,
- (b) By independent agencies/regulators based on a standardized scale, (c) By the department or independent agencies, based on the simple criteria of 'pass' and 'fail', or
- (d) By the department or independent agencies, based on the feedback received from the beneficiaries.

Involvement of third party/independent agencies for monitoring appears to be preferable as they leave the government hassle free over the project and minimize government control. A certain percentage of the cost of the project, therefore, needs to be earmarked for contract management. The government and the developer/service provider could mutually decide the third party. The third party involvement could be further supplemented with provision for adjudication by the (higher) judiciary.

### **Risk and Revenue Sharing**

PPP involves sharing of risk and reward between the partners. The risk involved in project implementation may be of the following types:

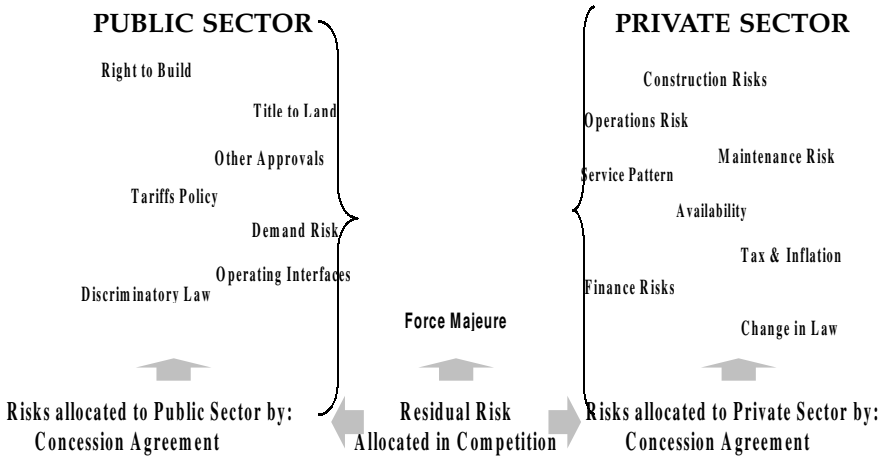
- (a) Construction/implementation risk, arising from:
  - (i) Delay in project clearance;
  - (ii) Contractor default;
  - (iii) Environmental damage.
- (b) Market risk, arising from:
  - (i) Insufficient demand;
  - (ii) Impractical user levies.
- (c) Finance risk, arising from:
  - (i) Inflation;
  - (ii) Change in interest rates;
  - (iii) Increase in taxes;
  - (iv) Change in exchange rates.
- (d) Operation and maintenance risk, arising from:
  - (i) Termination of contract;
  - (ii) Technology risk;
  - (iii) Labour risk.
- (e) Legal risk, arising from:
  - (i) Changes in law;
  - (ii) Changes in title/lease rights;
  - (iii) Insolvency of developer/service provider;
  - (iv) Change in security structure.

It is essential that all the generic risks be identified before finalizing the contract. The assurance of the government to share the risks with the private partner is



a significant confidence building measure. Quite similarly, if the actual output or returns exceed those contemplated at the start of the project, the windfall is to be shared (equally) between the public and the private sectors. The pattern of risk sharing seen in the PPP contracts is depicted in the figure below:

**Figure 2**



## Potential Benefits

The potential benefits expected from PPP are mentioned as below:

- Cost-effectiveness—since selection of the developer/service provider depends on competition, the project is generally more cost-effective than before.
- Higher Productivity—by linking payments to performance, productivity gains may be expected within the programme/project.
- Accelerated Delivery—since the contracts generally have incentive and penalty clauses vis-à-vis implementation of capital projects/programmes this leads to accelerated delivery of projects.
- Clear Customer Focus—Output terms (performance based) not detailed specifications (prescriptive based). Balance between detailed specifications and output specifications to enable innovation and efficiency in delivery. The shifts in focus from service an input to outputs create the scope for innovation in service delivery and enhance customer satisfaction.
- Recovery of User Charges—Innovative decisions can be taken with greater flexibility on account of decentralisation. Wherever possibilities of recovering user charges exist; these can be imposed in harmony with local conditions.
- Duration of Contract—The Contracts or concession periods are long and include operation & maintenance responsibility. There is thus an

inbuilt incentive to use technology and innovative methods that improve output quality and reduce upkeep and maintenance costs low.

### **Selection of Service Provider**

Transparency in 'selection' is an essential feature of PPP. Selection of the developer or the service provider is done through competitive bidding. This involves a well publicised and a well-designed bid process to ascertain financial, technical and managerial capabilities of the service provider or the developer. The Feasibility-cum-Preliminary project report broadly containing<sup>7</sup> the information on preliminary design, proposed design standards and specifications, traffic surveys and analysis, road and bridge inventory data inventory and condition surveys for road inventory, condition surveys for bridges and other cross drainage structures, land acquisition plan, details of various regulatory requirements such as environment and forest clearances, economic and financial analysis, preliminary estimation and costing, operation and maintenance system, technical schedule to the concession agreement and the concession agreement are part of the bid document. A conventional two bid system is adopted, the threshold levels in the technical bid are normally the experience of having executed contracts of the type (technical) or and value. Net worth is another benchmark. Since the bidders are normally joint ventures, the thresholds have to clearly define in addition to the combined value and experience of the SPV and also a minimum for the lead partner and each of the other partners. The bid documents are voluminous and elaborate as the constitution of the SPV and each of the partners needs to be provided along with the verification certificates prescribed. The response to the bidding process depends on how the project is packaged and the nature of the valuation that the bidders place on the concession, that is, on the right to do the job. The bidders are required to tie up with their prospective lenders for the financial terms, expectations regarding state support as well as their comments on the concession agreement etc. The final selection of the developer/service provider depends upon one or a combination of the following (the types of projects where it has been used are given in brackets):

- (a) Lowest capital cost of the project, (BOT Annuity: Used on annuity based projects)
- (b) Lowest operation and maintenance cost (OMT: Infrastructure pre-existing or operation and Toll collection on BOT-Annuity projects)
- (c) Lowest bid in terms of the present value of user fees, (BOT Toll: not being practiced, since toll rates have been uniformly prescribed for national highways as per national highway rules)
- (d) Lowest present value of payment from government, (BOT negative Grant)
- (e) Highest equity premium (BOT projects where based on the existing infrastructure, the Government is offered an equity share e.g. Delhi airport)

- (f) Highest upfront fee (BOT—positive grant e.g. Panipat elevated high pass on NH-1)
- (g) Highest revenue share to the government and (BOT e.g. Six lanning of NH-1, NH-8)
- (h) Shortest concession period (BOT Toll: used on a few projects like bridges & ROB's)

Under situations of only a sole bid being received, the authorities have the choice of either accepting or rejecting the sole bid. In the case of rejecting the sole bid, or when no bid is received, the project/programme proposal itself may be modified and the bid process restarted. Alternatively, the selection of the developer/service provider is done through competitive negotiation with the private sector participants.

### Types of Contracts (Concession Agreements)

The concession agreements can be broadly classified in to two categories of BOT and OMT, depending on the work content. The revenue models in both the cases are either annuity based or authorisation to collect revenue (rates & escalation factor specified in the bid document) on the basis of a gazette notification.

- (a) BOT Build-operate-transfer
  - DBFO Design-build-finance-operate
  - BOOT (Build, Own, Operate and Transfer),
  - BOLT (Build, Own, Lease and Transfer)
    - (i) Annuity
    - (ii) Toll (revenue)
- (b) OMT Operate maintain-transfer
  - (i) Annuity
  - (ii) Toll (revenue)

### Methodology and Operations

Typically, private sector companies form an entity called a “Special Purpose Vehicle” (SPV) to develop, build, maintain and operate the asset for the contracted period. In cases where the government has invested in the project, it is typically (but not always) allotted an *equity* share in the SPV. The consortium is usually made up of entities whose prior experience and financial status individually and in combination with the partners helps them to qualify. The SPV partners have to bring in equity and manage the balance fund requirement through a consortium of banks/financial institutions and external commercial borrowings. The consortium of financial institutions study the financial viability of the project and the formal commitments are made only after a bid is successful. The successful bidder is given a time of six months to achieve financial closure with the consortium and its only after the financial closure (where the conditions for providing funds, the oversight and securing the revenue stream through

escrow account) is achieved and submitted to the government agency inviting the bids that the contract (concession agreement) becomes operational. It is the SPV that signs the contract with the government and with subcontractors to build the facility and then maintain it. It is these complex arrangements and contracts that guarantee and secure the cash flows and make PPP projects prime candidates for project financing. The above is illustrated in Figure 3 below.

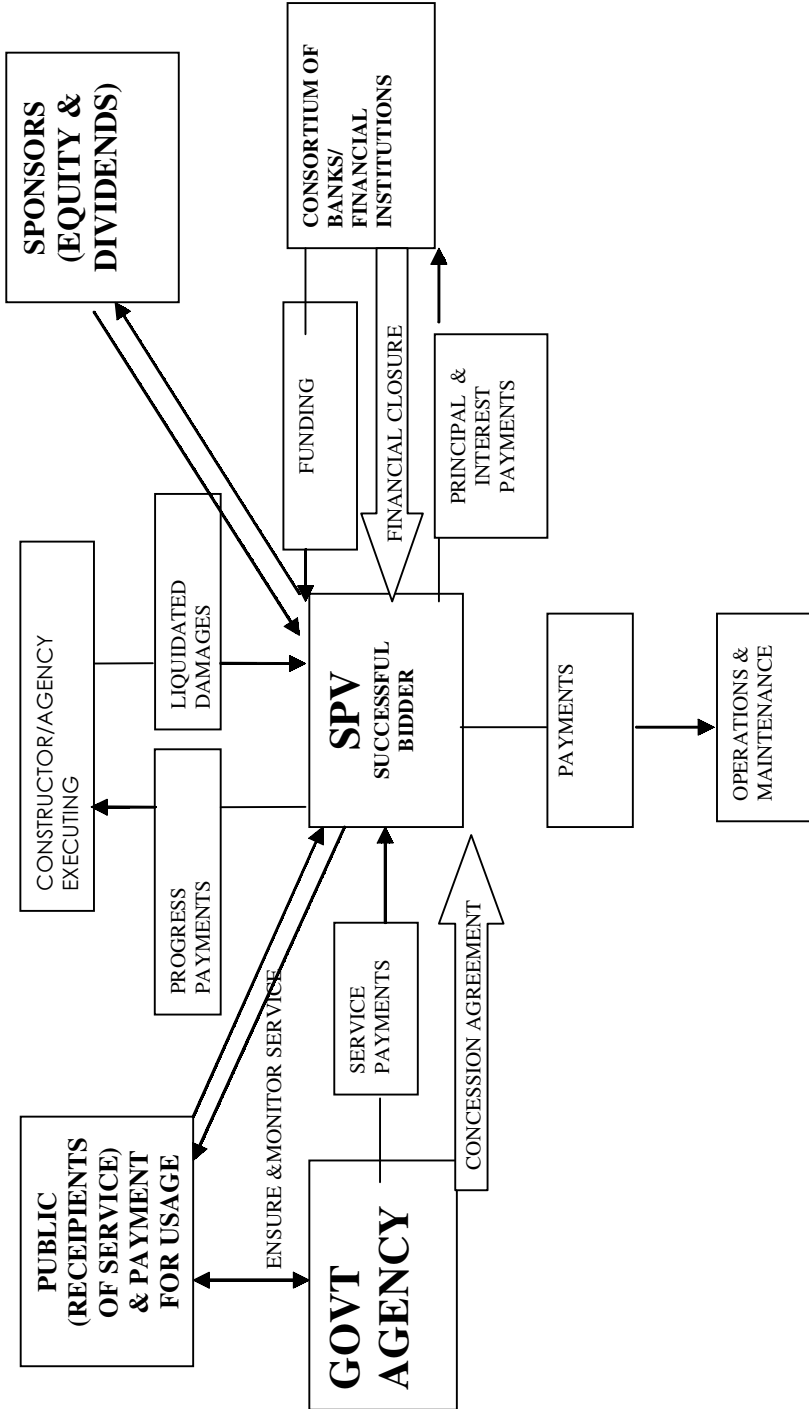
### **Funding of PPP in India<sup>8</sup>**

Though PPP infrastructure development in India is in the process of maturing, recent trends have been very encouraging. Infrastructure financing, not only in terms of amount but also in terms of the cost and terms at which the finance is available to private players, is very critical. The study shows that PPP infrastructure projects have so far been largely financed by debt (68 per cent of project costs, on an average). The contribution of equity has been 25 per cent with remaining coming from subordinate debt-3 per cent and grant-4 per cent. Commercial banks are the major source of debt and constitute 72 per cent of all debts with other financial institutions such as IDFC, IIFCL, IDBI, IL&FS, etc. constituting the balance 28 per cent. Interestingly, the tenor of term loan by banks is around 50 per cent of concession period length. Commercial banks are comfortable lending to PPP projects despite having limited long term resources, but always with resets. The resets have shown a clear trend of becoming shorter and shorter in duration. In the absence of appropriate interest rate swaps in the market, project developers have limited choice. The report also reveals that when interest rates came down substantially, developers have tried successfully to refinance their loans, particularly when the construction periods were over. This activity also mirrors what happens in the developed markets.

The reports analysis of financing of PPP projects, on the debt side of funding are:

- (a) Relationship banking or promoters' strength is the most important factor that influences lending to PPP projects. Driven by the fact that there is little history of operational PPP projects, banks ask for corporate and sometimes personal guarantees from the developers.
- (b) Long term sources such as insurance and pension funds are currently not going into PPP infrastructure, as they can invest in only in 'AA' rated instruments and there are no 'AA' rated instruments available from the SPVs of the PPP projects in the market as of now. Internationally, investments grade "BBB" is the minimum rating requirement for insurance and pension funds' investment.
- (c) Bonds are not a popular source of funding at all in the PPP market. Apart from the absence of an active market, the developers surveyed also indicated that the cost of issuing and credit enhancement makes these costlier than the term loan from banks. Though not explicitly stated, higher level of disclosure is also a reason. Absence of monoline institutions in India, unlike in the international scenario, is also an important reason.

Figure 3



- (d) External Commercial Borrowings (ECBs) in the current scenario have become relatively less expensive and developers are looking at them favourably even with such loans having no option of long term forward cover or convertibility into rupee loan before their maturity. The ECB policies followed in the next few years will determine their contribution to financing of infrastructure projects.

Given that PPPs are substantially funded by debt, the consortium of financial institutions will have significant and often complex security arrangements in place. They generally take security over the SPV, giving them access to the revenue streams from the project. The charge will generally be fixed through the project documents themselves (including the project agreement and subcontracts made pursuant to it). This will include, for example, security over any SPV rights to claim under guarantees given to the SPV from the SPV's subcontractors. Financiers generally will establish reserve accounts (for debt service, insurances, life-cycle maintenance etc.) supported by a cash waterfall and also usually sculpt the repayments so that a debt-free 18-month to 2-year tail at the back end of the project is achieved. Increasingly, they do not insist on the SPV obtaining leasehold rights over the facility, although they will take a mortgage of lease if such leasehold is available. These agreements are in place prior to the financial closure i.e. prior to the commencement of the project to regulate their respective rights upon termination, upon default by the private sector party or step-in by the public sector. This agreement will usually permit the financiers to attempt to cure the default where possible.

### **PPP in Defence, the Experience of other Countries**

PPP projects in the defence sector typically are designed to overcome fiscal constraints, manage life-cycle costs, and reduce pressure on military personnel. They include equipment maintenance and installation, supply chain integration and operational support, depot maintenance, specialised military training, infrastructure and real estate management (land development, privatised housing and base closures and development). What distinguishes PPP projects in defence from the other sectors is the unique combination of single customer, multiple products and unique requirements of each project as illustrated in Figure 4.

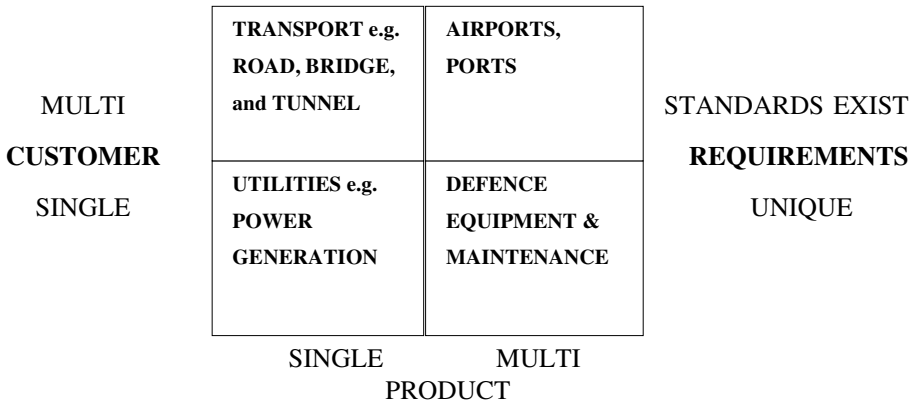
### **International Experience**

#### *United Kingdom*

**They have been the leaders in using the PPP.** The UK Ministry of Defence has employed various PPP models since 1997. Brief details of two major projects currently under implementation following the PPP model called PFI (Public Finance Initiative) are given below:

**Future Strategic Tanker Aircraft (FSTA) programme:** MoD selected the concessionaire, following an open competition, to provide the replacement air-

Figure 4



to-air refuelling and air transport capability through a Private Finance Initiative (PFI) solution in which the private sector will provide not only replacement aircraft, but also a complete and secure long-term service. Fourteen Voyager aircraft (Airbus 330) and a complete support package are being provided to the RAF under a 27 year £10.5bn Private Finance Initiative contract signed with the AirTanker consortium in 2008. AirTanker will own and support the aircraft while the RAF will fly the aircraft and have total operational control. In addition to the aircraft, the package will provide training and maintenance, and new purpose-built buildings at RAF Brize Norton, the RAF’s air transport hub. AirTanker will provide a comprehensive service for the RAF to ensure the full operational availability of the fleet over a 27-year period. The contract includes options to extend the service for a further period. On military operations Royal Air Force aircrew will fly the aircraft. When not in military service, the aircraft can be leased for commercial use and operated by civilian aircrew. It is envisaged that the fleet will be managed in three groups. A majority will be in full time military service with the RAF. Another group will be in military service during the weekdays, switching to commercial use at the weekend, and the other aircraft will be in full-time commercial use but available to the RAF in times of crisis. The first of the RAF’s future strategic tanker aircraft (FSTA) arrived in the UK on 18 April 2011.

**Allenby/Connaught Project:** The project has one simple mission—to make life better for some 18,700 soldiers (nearly 20 per cent of the British Army) by providing modern, high quality, fully serviced, purpose-built living and working accommodation. The new living accommodation, which provides every soldier with his or her own en-suite room, good quality dining centres, cafés, on-site shops and sports facilities. The contract was awarded in April 2006. In addition to a major £1.4Bn, 8-year construction programme involving the new build or refurbishment of 550 buildings and the demolition of 487, the 35 year project encompasses a wide range of support services including catering, cleaning, transport, estate management, document production and handling, stores and

waste disposal. The project has a total through life value of some £8Bn and covers Army Garrisons across Salisbury Plain and at Aldershot. In average, one new building is being delivered to the Army each week. Buildings include offices, stores, training facilities, dining centres, sports and leisure facilities, but the core is 261 accommodation units and in all the project will deliver or maintain 11,500 single en-suite bed spaces for single soldiers. In the 4 years since the project began over 4,700 bed spaces have been delivered. 269 new buildings have been constructed and 292 demolitions completed with 97 per cent re-use of material.

A report by the Comptroller and Auditor General<sup>9</sup> (National Audit office) examines whether there has been effective allocation and management of risk in the Department's PFI projects. Their findings are based on a detailed examination of eight PFI case study projects. This analysis is supported by a census of all the Department's PFI contracts let in 2007 and consultation with the Department's staff, contractors and advisers. Their primary finding is, "The Department has achieved a good service delivery on a broad and diverse portfolio of PFI projects". Across its whole PFI portfolio of more than 50 projects most have reached full service delivery on time, for the cost set out in the contract and are delivering services satisfactorily. These new projects have enabled the Department to achieve considerable benefits from a range of services. Some of the projects are delivering new equipment and training, which are contributing to improving the effectiveness of military personnel. Others are providing support services, which are helping the Department to carry out its work more efficiently.

### *France*

Based on the provision in regulations introduced in 2004, the first PPP based contract was concluded by French defence in 2008. The project was aimed at streamlining its training syllabus and to avoid paying for a new fleet of training helicopters from its own budget. The contractor is to provide a variable volume of flight hours each year to the École d'Application de l'ALAT at Dax, south-west of France. Set between 16,000 and 22,000 flight hours per year (during 22 years), this figure was considered adequate to train each year about 150 rotorcraft pilots; originating from the French armed forces (land, air, naval and military police, and Gendarmerie) and, more recently, from the Belgian armed forces. The firm was to supply 36 new Eurocopter EC120 helicopters to replace the (EAALAT, French Army aviation schools) 55 SA342 Gazelle helicopters based in Dax, France. The first EC120s were planned to being delivered in 2010. The contractors will be in charge of buying, operating, servicing and repairing the EC120 helicopters, which will be the contractor's property over the course of the contract. The military instructors at EALAAT will still provide the pilot training itself, which is in charge of the initial training of helicopter pilots. Using a brand-new fleet of 36 Eurocopter EC120, the present day EA-ALAT school is nowadays training young pilots for 50 per cent of the cost previously involved. That is when it was flying its own fleet of some 55 SA341 and SA342 Gazelle helicopters!



The latest French defence PPP project is for the building complex, popularly dubbed the French Pentagon and expected to house 9,300 command and civilian staff in 2014 under a 3.5 billion Euro (\$5.1 billion) public-private partnership (PPP) contract. The concessionaire selected through competitive process is to build and manage the site under a 27-year lease, receiving an annual rent of 130 million euros. The design of the main building is an environmentally friendly system inspired by the lines of stealthy military aircraft. The building will bring together at the Balard site, located in east Paris, the headquarter staff of the services, which are dispersed around the capital. The Direction Générale de l'Armement procurement office will also join the defence staff.

### *Australia*

Australia has also incorporated changes in its procurement procedure and set up PPP directorates both at Service HQs and the MoD and have in the recent past completed the following projects; General John Baker Complex, Headquarters Joint Operations Command (HQJOC), based just outside of Canberra, is a 234-hectare high-security facility responsible for the planning and conduct of operations such as disaster relief within Australia and the region, and participation in large-scale allied military operations. The contract for the project was signed in 2006 and the completion of the Headquarters Joint Operations Command facility occurred on 9 July 2008 (on time and within budget). HQJOC moved into the Baker Complex on 14 November 2009. The project cost is approx. \$340m or \$1.4b over 30 years has been executed on PPP basis. The project timelines were:

**EOI:** Mid '04

**Submission 1:** Feb '05, initial scope

**Submission 2:** Jun '05, reduced scope

**Submission 3:** Jan '06, further refined/reduced scope

**Contractual Close:** Jun '06

**Financial Close:** Aug '06

**Handover:** Jul '08

### *Germany*

The German defence ministry has initiated a number of innovative defence PPPs. An army maintenance joint venture with HIL GmbH involves the entire value chain for 10,000 combat systems (not including system purchase). Under the terms of the eight year contract, HIL GmbH must ensure that 70 percent of all combat systems are available for use at all times.

### *USA*

In the United States, the bulk of defence PPPs have involved either military base closures or military housing redevelopment and privatisation. The army's Hawaii Family Housing project, a joint venture between the army and Actus Lend Lease, involves building 7,894 military housing units at seven Army

installations on Oahu. The 50-year lease provides for \$1.6 billion in housing delivered by the private sector partner over a ten year period.

### **Harnessing PPP for Infrastructure and Acquisition Process in Indian Defence Services**

It has been seen that PPP models have been chosen over a wide variety of acquisition projects in some of the countries. PPP mode has in all the countries been initially used in the transport sector (Highways) and after it has stabilised it is used across other infrastructure sectors and then used in defence acquisition. India's experience in PPP has followed similar route. It was used first in the national highways programme and after gaining foothold spread to the other infrastructure sectors. As has been tabulated in table 3 of this paper, share of the private capital in the infrastructure investment has increased from 24.85 per cent in the 10th plan to 36 per cent in the 11th plan and the a share of 50 per cent is expected in the 12th plan (Rs. twenty lakh forty nine thousand and two hundred forty Crores or 469 Billion US Dollars). In the national highways sector of the total length of 9675 Km where toll is being collected, 3750 km are under the management of PPP concessionaire (39 per cent). The road length and project cost of the PPP contracts awarded in the last four years<sup>10</sup> (which included two year period affected by the world economic slow down) are tabulated below (these figures are only of contracts awarded by NHAI and does not include the figures of state government projects.) There have been delays in the completion of some projects in the national highways programme executed through PPP; the major causes have been "land acquisition" and environment (forest) clearances etc., which is the responsibility of NHAI. The existing policy permits award of contract with 80 per cent land required for the project only acquired.

**Table 4**

<i>Financial year</i>	<i>No. of projects</i>	<i>Length in km</i>	<i>Project cost (Rs in Crs)</i>
2007-08	13	1219.1	9510.61
2008-09	8	643.1	8591.1
2009-10	38	3360.15	33311.2
2010-11	50	5082.84	43327.16
Total	109	10305.19	94740.07

While in the early days, it was the traditional civil works contractors who became the first movers, it did not take very long for who's who of the Indian business houses to start a vertical infrastructure and all of them are bidding for the PPP projects.

We in the Indian defence are in the process of a major modernisation drive. The need is much greater than what the ever-increasing availability courtesy the economic growth will provide. We therefore need a multiplier, which would augment this effort through greater efficiency. We will also need a matching infrastructure to harness the hardware that we acquire for modernisation to be able to exploit their full potential. The catalytic effect of harnessing the 'PPP'

mode in the infrastructure tells us that it brings in enough confidence in the private sector to cross their perceived hump in venturing into hitherto unexplored sectors. The valuable experience of other countries in using the 'PPP' in defence infrastructure and acquisition process helps us to identify the following areas where we could make a beginning and expand to other areas based on our experience and the private sectors' appetite.

- (a) Infrastructure: Up-gradation and augmentation of airfield infrastructure to meet the needs of the new weapon platforms and systems induction. Similarly expansion and augmentation of infrastructure at naval ports is needed and also for Army formations.
- (b) MAP: Phase I has taken almost 10 years. The housing deficit is acute and there will be a paradigm change in the quality of life of the personnel and their families when the maintenance and the facilities management improve. This can be achieved by using 'PPP' mode in Phase II (projects of Phase II where work has not been awarded) and in the remaining phases. Post construction maintenance responsibility and estate management during the concession period will bring in improvement in quality of construction and upkeep of the complexes. The days of the unserviceable electricity and water meter, and flat rate billing will give way to metered consumption and pay for what you use. If the revenue model is based on shadow tolling, the individual occupant will not pay rent to the concessionaire (his/her liability will continue to be recovered as per the rules) but the concessionaire will get paid for each day of occupation at prescribed rate for each type of accommodation. This will bring down the float of vacant accommodation (awaiting allotment and on maintenance).
- (c) Accommodation (other than married accommodation): We continue to use some of the second world war built accommodation which needs to be refurbished or demolished and replaced with what is suitable for today's need. The design, build quality and facilities of single living in accommodation across all categories i.e. Officers, JCO's and OR's needs to meet the aspirations and requirement of today's generation.
- (d) Training infrastructure (other than ab-initio training) including simulator based training facilities. The sweetener for such projects could be usage of capacity beyond the requirement for civil use. The revenue stream could be per hour of usage with a minimum guaranteed usage and rates for usage beyond guaranteed hours.
- (e) Maintenance of Equipment & facilities: Base Repair Depots (BRD's), army workshops and naval dockyards can also be assigned on PPP basis with permission to use the spare capacity (after meeting the defence commitment) for civil use.

### **Requisites for the Success of PPP Projects**

It will be appropriate at this juncture to consider the requisites for using the 'PPP' concept and the success of a PPP project. Briefly, these include the following:

- (a) We would need to create PPP directorates in Service HQs, both in the branches that handle the acquisition and the works services. An AM (PPP) & FM (PPP) will need to be appointed in the acquisition wing of MoD and also in E-in C's branch.
- (b) PPP will be a new concept and the staff entrusted with initiating the PPP projects, examining them and implementing them would not have past experience in guiding and developing such projects. It is necessary to provide comprehensive training to all officials who deal with PPP projects in different capacities and promote professionalism in the management of PPP.
- (c) The projects may involve handing over of existing defence assets and would certainly require spelling out in great detail the expectation both in terms of hardware & delivery. This is something, which has not been done in the past. We would therefore need to standardize formats for preparation of detail project reports for each type of project and ensure that personnel down to the lowest formation level are involved in listing out the assets and identifying deliverables.
- (d) Incentives and Sharing of Risks: Private entrepreneurs show interest in PPP projects primarily because of the profit motive and this should be appreciated while designing a 'PPP' project. In the absence of adequate concessions and incentives for the risks being assigned, private sector will have no motivation to participate in PPP projects. The format of PPP involves a mutual sharing of risks by both sides, the scheme of PPP must provide for fair incentives to all parties who join the enterprise. In commercial terms, this calls for fair financial and economic returns on investments for the private sector partners in proportion to the risks assumed by them; and the approach of the concerned sponsoring partner must be appropriately accommodative. The aim should be to identify deliverables and link payments to deliverable, which should be quantifiable and recurring. This helps potential bidders in identifying and quantifying the revenue stream which they in turn can show to the financial consortium. The concept of shadow tolling should be used to capture the usage of a facility and relate the payments to usage. In case this would not be possible for any operational reasons, the design of the project package should provide for alternate incentives to the private partners by way of gap funding, annuities etc. of justifiable magnitude.
- (e) Legal and Institutional Framework: In order to implement PPP projects successfully, it is essential for MoD to put in place on priority basis, a well-conceived and strong legal and institutional framework. It must be remembered that by awarding a PPP contract, the responsibilities of the service HQs do not become extinct; on the other hand, it will continue to have responsibility to oversee the efficient and effective implementation of the project and its successful operation, and achievement of value for money at all times. This calls for detailed planning and the establishment of appropriate legal and institutional framework capable

of discharging the responsibility satisfactorily. The framework to be put in place to implement PPP projects should have built-in capability to develop and manage healthy contractual relationships and to react justly and adequately to meet unforeseen developments during the implementation. One of the most basic requirements of the framework should be to create level playing fields for all participants to the arrangement and the ability to respond to situations promptly and equitably.

- (f) Scrutiny by Appraisal Unit of the Planning Commission: Planning commission has spearheaded the usage of 'PPP' mode in the infrastructure sector. A PPPAU is functioning in the Planning Commission and till we gather our own in-house expertise, the projects should be submitted by the sponsoring HQs for scrutiny before submitting for approval as per DPP.
- (g) Scrutiny by Finance Ministry: A Public Private Partnership Appraisal Committee (PPPAC) carries out due diligence of all proposals received for the approval of the central government, and has Secretaries of the Departments of Economic Affairs (Chairperson), Expenditure, Legal Affairs and Planning Commission apart from the Secretary of the sponsoring ministry/department as members. A Committee on Infrastructure (COI) under the Prime Minister is responsible to establish the policy and procedures for PPP. It also approves individual proposals received for PPP mode for amounts above those delegated to PPPAC—currently, only national highway projects costing above Rs.500 cores and other projects of more than Rs.250 cores are required to be brought up before COI for approval. The COI has the Finance Minister, the Minister in charge of the infrastructure portfolio concerned, the Deputy Chairman and two members of the Planning Commission as members. To marry the twin requirements of PPP approval path and the DPP laid down procedure, it is suggested that the proposals whether under RM's power or for CCS approval must go to the Department of Economic Affairs (DEA) in the Ministry of Finance, since they have a special cell for PPP transactions instead of department of expenditure.
- (h) Formulation of Model Concession Agreement and DPR as part of DPP: We need to take the help of planning commission in formulating the Model Concession Agreement (MCA) for each type of contract and incorporate them and a standardized Detailed Project Report (DPR) format and include the same in DPP.
- (i) Appointment of consultants: The MCAs in the highway sector envisage the appointment of independent engineers and independent auditors for PPP projects who are responsible to verify and report periodically to the public sector partner on the construction, development, operation and maintenance of the projects. They are to be appointed from panels maintained by the Ministry (NHAI) and have access to the records and data generated by the private sector partners. They are responsible to

monitor the work and operations as also commercial aspects of the projects (such as total project cost, revenue generation etc.) and keep the public sector partners informed of all developments periodically. In the case of defence PPP projects, we will also need various types of consultants given the vast canvass; they would be domain experts and independent auditors.

### **CAG Audit of PPP Projects**

The report of the National Audit Office of UK referred to in the UK experience shows that that the approach of audit in the case of PPP has to be different, Since PPP could take different forms such as concessionaires, joint venture projects, joint developers etc., the approach of public audit may not be uniform; but the basic principles and procedures will remain. Performance audit of PPP projects will be carried out as per the recently issued guidelines. The "Public Auditing Guidelines on Public Private Partnership in Infrastructure Projects" (2009) issued by the C&AG contains the broad principles and procedures to be adopted for the audit of PPP projects. The Guidelines emphasize that the basic objective of the audit of PPP projects is to "to provide unbiased, objective assessment of whether public resources are responsibly and effectively managed to achieve the intended results", namely, to verify the value for money aspects. The Guidelines point out that PPP arrangements attempt to marry the conflicting approaches of the two partners to the arrangement, namely, the responsibility of the public sector to provide services at reasonable costs to the public and the private sector's motive of maximizing profits. In terms of inputs, the public sector holds the authority and regulatory skills as against the management and technical skills of the private sector partners. The Guidelines advise that public auditors should appreciate the need to align the different strengths and capabilities of the partners to the arrangement for achieving the best results in public interest. The focus of audit would thus be to verify the PPP arrangements to see that the government department and agency pioneering the PPP project has efficiently put in place a sound system to oversee the efficiency and competence of the project implementation, including construction, quality management, compliance with contractual conditions, and integrity of the targeted public service, strictly in terms of the established norms and contract conditions. Thus, the main thrust of the public audit will be on the end results achieved rather than on how the private sector partner has gone about to achieve the contracted outputs. The audit, while promoting accountability, should not discourage private sector involvement, investment and innovative management techniques<sup>11</sup>.

### **Conclusion**

'PPP' has been put to good use in the defence sector in a variety of projects in some countries. We in India have experience and institutional expertise in use of 'PPP' in other sectors. We are spending a lot of our resources on acquisitions from abroad while an efficient industrial base is waiting on the sidelines because

of perceived risks it associates to the defence sector. We need to hold their hands, to encourage them to break in. The works infrastructure in defence needs to be improved. All big Indian industrial houses have made a foray into infrastructure courtesy 'PPP'. We also need to create a suitable infrastructure in time for supporting and efficiently exploiting our state of the art acquisitions. The married accommodation and other accommodation need to be augmented and upgraded. We need to realise the 'value for money' for the resources allocated for works infrastructure and its maintenance. At an award distribution ceremony on National Technology Day on 26 May 2010, Prime Minister Manmohan Singh said the government would encourage the participation of India Inc. in the defence sector through public-private partnerships: "Greater participation of Indian industry in the defence sector is a must. Our government will encourage public-private partnerships as a catalyst towards achieving this objective". The Defence Production Policy identifies PPP as one of the approaches to synergize and enhance the national competence in producing state of the art defence equipment, weapon systems and platforms within the price lines and timelines that are globally competitive<sup>12</sup>. The acquisition wing of MoD needs to harness 'PPP' to meet the twin objectives of defence acquisition and construction works to be a catalyst for participation of private sector and provide timely and quality infrastructure for the 'state of the art' weapon systems being inducted.

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## Perspectives on Performance Based Logistics

*Shobhana Joshi*

### **Introduction**

The focus on “availability” has had an effect on the life-cycle management of major defence equipment particularly of complex platforms. The success of a sustainment strategy for a military capability, whether it is strategic strike, reconnaissance or transportation, can be measured from the state of preparedness. Preparedness is the combined outcomes of readiness and sustainability. Readiness denotes the availability, serviceability and deployability of a system and sustainability refers to the ability of a force to maintain the necessary level of combat powers for the duration required to achieve its objectives. One of the factors that can improve availability is maintainability, which is both a factor of the design of the product and the effectiveness of the support system. The defence and aerospace sector has witnessed a major shift in support and maintenance logistics for complex systems over the past few years from the traditional service procurement practices. This approach is often referred to as Power by the Hour or Performance-Based Logistics (PBL)(Kim et al, 2006). By leveraging long-term performance based agreements and incentivizing desired outcomes using a well-crafted set of metrics, PBL can deliver substantial performance improvements for both new and legacy weapon systems over traditional “spares and repairs” sustainment models. Moreover, when these strategies are properly implemented, the resultant outcomes can often be achieved at a lower cost than otherwise obtained through more traditional sustainment approaches (Kobren, 2009).

### **Drivers for Logistics Transformation**

Jacques Gansler and William Lucyshyn in their paper titled “Evaluation of PBL” have stated that there are several specific drivers for logistics transformation. These include the rising cost of maintenance and support for new and legacy



systems; long customer wait times, and the increased flexibility and agility required in the new and largely unpredictable military environment. Furthermore, the drivers for logistics transformation are coupled with ever tightening budget constraints and the documented performance improvements and savings from commercial logistics support operations show that there is a clear requirement to move from traditional support models. During the decade of the 1990's, private sector logistics, or its close synonym supply chain management, underwent fundamental changes that are beginning to have a profound effect on public sector logistic activities. These changes include:

- advances in information technology;
- more demanding customers;
- globalisation;
- emphasis on cost cutting and industry consolidation;
- enhanced importance of service and shorter product life cycles and,
- deregulation of the transportation industry (Gansler et al, 2004a)

In the traditional approach, the focus was on set levels or varying quantities of spares, tools, testers, special maintenance equipment etc., which was based on historic demand patterns, observed reliability and projected usage of the assets by the customer. The military services had to estimate and compute the requirements, then procure and store. This approach tended to increase the demand “whiplash effect” compounded by a “supply push” resulting in large inventories. The customer also bore the costs and risks of forecasting, ordering and maintaining inventory, warehousing, managing obsolescence, transportation, reliability analysis, configuration management and field engineering. This approach created incentives for the Original Equipment Manufacturers (OEMs) and vendors to sell more spare parts and maintenance while encouraging performance and reliability improvements be incorporated in the “next” generation of equipment, often resulting in weapon systems with low availability (Gansler & Lucyshyn, 2006)

### **Definition of PBL**

The essence of Performance-Based Logistics is buying performance outcomes, not the individual parts, and repair actions. Instead of buying set levels or varying quantities of spares, repairs, tools and data, the focus is on buying a predetermined level of availability to meet the buyer 's objective (Defence Acquisition Guidebook, 2006). PBL may be applied at the system, subsystem, and major assembly level depending upon unique program circumstances and appropriate product support strategy analysis. With PBL active management of the sustainment process, forecasting demand, maintaining inventory and scheduling repairs becomes the responsibility of the support provider. It changes the incentives for the supplier. PBL results in optimizing total system availability and at the same time minimizing costs and the logistics footprint (Gansler & Lucyshyn, 2006). The main goal of PBL is to achieve over-all optimal performance, instead of the success of individual parts or repair actions. (Kobren, 2004).

## **The International Experience**

The concept of PBL has become the preferred method of weapon system sustainment in various countries with USA taking the lead with a compendium of policies, guidelines and training initiatives. The approach called Performance-Based-Life-Cycle product support has been attributed with providing success in improvements in system readiness and reducing the cost of supporting platforms, electronic systems, equipment etc. US DOD policy Instruction 5000.02 "Operation of the Defence Acquisition System" states as follows:

"...PBL offers the best strategic approach for delivering required life cycle readiness, reliability and ownership costs. Sources of support maybe organic, commercial or a combination, with the primary focus of optimizing customer support, weapon system availability and reduced ownership costs."

US DOD further regulates its contracting environment relying in part on highly prescriptive legislation and on greater cost visibility and specific cost accounting standards to exercise control on market and contractor behaviour.

According to a paper by Frost and Sullivan the US experiences in conflict zones are helping the dissemination of PBL benefits as it is showing its practical efficiency and value and has demonstrated how a high reliability and availability rate has been achieved. Another program 'The Super Hornet' has demonstrated the success of the PBL strategy. The approach chosen was the optimisation of multiple PBL contracts with multiple OEMs. According to an evaluation by J. Gansler the Super Hornet mission capability improved from 57 percent in 2001 to 72 percent in 2005. It also highlights that there was a dramatic impact at subsystem level. The contract for the GE F404 engine improved its availability from 43 percent to 96 percent, while reducing cost per engine flying hour. The concept was to move from the idea of "readiness at any cost" to "cost-wise readiness".

The UK approach of logistics transformation originates from PBL and includes "contracts for availability" and "contracts for capability". The "contracts for availability" consider the availability of the mission system to defence with payments often based on the number of days the system is operationally available or the availability of the components supported by the contract. A contract of capability is a further extension of the pay for performance concept, where the contractor is to maintain the capability of the mission system and may own major systems that are provided to the defence on a lease basis. The UK approach to performance based management is embedded within UK Defence Industrial Strategy and also via the PACE (Performance-Agility-Confidence- Efficiency) strategy. The contract for RAF's fleet of Tornado GR4 combat aircraft namely Availability Transformation: Tornado Aircraft Contract (ATTAC) has demonstrated the successful Public-Private Partnership between the UK MoD, RAF and BAE Systems the Principal Systems Integrator. The contract not only ensured the required performance levels during the period and reduced traditional maintenance hours by 37 percent but also achieved

cumulative savings of 1.3 billion pounds as per the UK National Audit Office report “Transforming Logistics Support For Fast Jets” (2007). In Europe, higher performance, no contract additional costs and long-term commitment to the reliability of military assets are the drivers for the success of the PBL strategy.

### **PBL—Facilitator of Public-Private Partnerships**

Essentially, it is the intent of the PBL to form a long-term partnership between the government and industry early in the development of a system or a product. In the implementation stage of PBL, the government benefits in several ways, such as from obtaining more direct access to commercial practices that can provide logistic support, to additional incentives it provides for the industry’s performance, the potential reduction in cost, and the potential increases in system effectiveness. On the other hand, the industry’s benefits include: the potential of increasing a business’s scope and duration for a given program, the potential for entering into new business areas, and increased freedom to apply innovative approaches in product development when providing support to the government (Coogan). A study by Accenture found that across manufacturing companies, after-sale services and parts contribute about 25 percent of all revenue, and 40 to 50 percent of all profits. The study also states that with nearly double the profit potential of first time product sales, service management is the new frontier of competitive differentiation and profit enhancement. However, complex systems would require more sophisticated relationships between service buyers and suppliers. (Kim et al, 2006).

### **PBL and the Performance Measurement Regime**

The cornerstone of an effective PBL is without doubt accurate and specific metrics. PBL metrics should support the following five top-level desired outcomes:

- (1) **Operational Availability:** The percent of time that a weapon system is available for a mission or ability to sustain operations tempo.
- (2) **Operational Reliability:** The measure of a weapon system in meeting mission success objectives. Depending on the weapon system, a mission objective would be a sortie, tour, launch, destination reached, capability, etc.
- (3) **Cost Per Unit Usage:** The total operating costs divided by the appropriate unit of measurement for a given weapon system depending on weapon system, the measurement unit could be flight hour, steaming hour, launch, mile driven etc.
- (4) **Logistics Footprint:** The government/contractor size or “presence” of logistics support required to deploy, sustain, and move a weapon system. Measurable elements include inventory, equipment, personnel, facilities, transportation assets and real estate.
- (5) **Logistics Response Time:** This is the period of time from logistics demand signal sent to satisfaction of that logistics demand (Wynne, 2004)

Another outcome focus should be on maximizing inherent reliability, i.e, the best that can be achieved considering all circumstances. Tailoring the metrics to fit the operational role of the system is a vital element of PBL strategy (DAU, 2004).

Performance measures need to reflect desired defence outcomes. As these outcomes vary from one environmental domain to another (aerospace, land, maritime and electronic) and for each system, the typical performance measures use will also vary. The following table identifies some typical measures for each environmental domain, engines, and common item management against identifiable objectives and functions.

**Table 1**

<i>Domain</i>	<i>Objectives/Function</i>	<i>Performance Measures</i>
Aerospace	Achieve a level of availability	Availability of aircraft to operating unit (ASD) Mission Capable Aircraft (LIF. C-17A) Depot/scheduled maintenance effectiveness (minimum time)
	Targeted Flying Rate/ Program	Flying Hours Achieved
	Mission Completion	Mission Reliability/Success Rate
Electronic	Continuous operations	Availability/Allowable Downtime Number of re-starts/re-boots
	User Support	Help desk response times and resolution times
Land	Availability	System/equipment availability. This may include an overall availability figure and a minimum availability at each location, due to the wide distribution of equipment. Scheduled maintenance effectiveness (minimum time)
	System Use	Cost per operating hour/day
Maritime	Availability	At sea days per fleet (Armidale) Achievement of usage and upkeep program Scheduled/dockside maintenance effectiveness (minimum time)
	Available Capability	Ships operationally deployed or able to be deployed (eg, UK submarines).
	System Use	Steaming hours
Engines	Availability	Number of unscheduled removals Power-by-the-hour(R)/cost per unit use
Common/ Component level	Availability of spares	Demand Satisfaction Rate/Issue Effectiveness
	Waiting time for spares	Order Response Time (prioritised)
	System upgrades	Schedule achievement (others as per acquisition program)
	Safety	Certification compliance and Technical Data accuracy
	Maintenance Effectiveness	Maintenance turn-around time/recovery time

Source: PBC Discussion paper "Next Generation Performance Based Support Contracts."

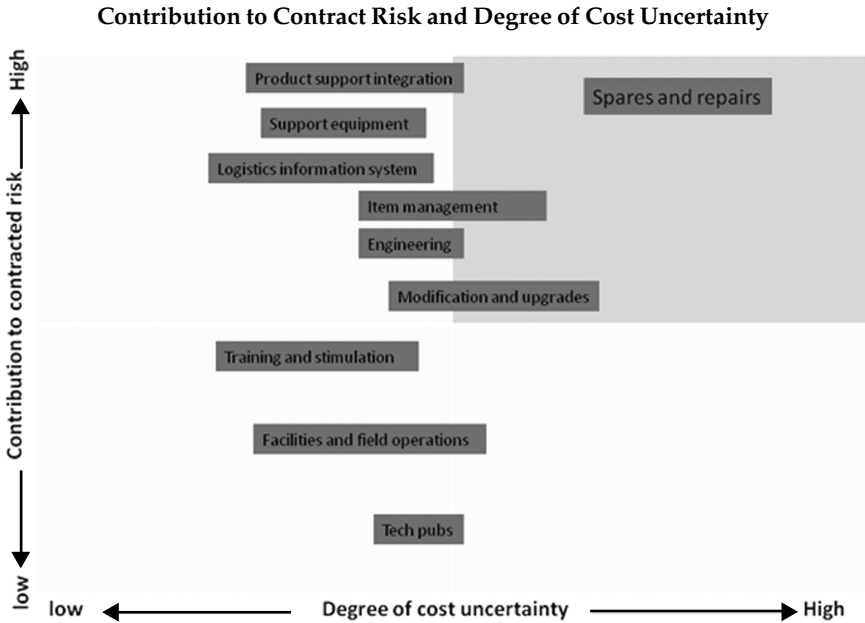
## **Risk and Cost Sharing in Performance Based Contracting**

Performance-based contracts represent a new paradigm and as described in the words of Macfarlan and Mansir: "The contract explicitly identifies what is required, but the contractor determines how to fulfil the requirement". In their paper "Performance Contracting in After-Sales Supply Service Chains" the researchers Kim, Cohen and Netessine have for the first time combined classic incentive contract theory with service parts supply chain theory to create a model of contractual relationships. The notion of what risk and cost sharing factors should be priced into the contract has also been incorporated in the model. PBL contracting should promote new and improved ways to manage spare parts inventory, reduce administrative overhead, negotiate contracts, and make resource allocation decisions. Kim et al obtained real-life maintenance data for a fleet of 156 fighter aircraft and analysed data on unit costs, daily failure rates and repair lead times for a representative sample of 45 line replaceable units. The data was aggregated into five subsystem groups: avionics, engines, landing gear, mechanical and weapons. Based on this data it was discovered that incentive terms in the contract model exhibit complementarity, i.e. incentives for both cost reduction and high availability move in the same direction as cost uncertainty changes. Their analysis also enabled them to make normative predictions with respect to how contracts are likely to evolve over the product life cycle. At the beginning of the product life cycle cost uncertainty is high and the optimal contract will typically assume less cost sharing and more performance incentive as the product matures. For instance performance incentive will be low when cost uncertainty is high and high when cost uncertainty is low.

The recent study by Deloitte (2008) has dwelt upon the challenges in accurately calculating the risks, and design sustainable and competitively priced contracts that are fair to all parties and that promote appropriate behaviour. According to the risk analysis in the study, a wide range of PBL contract elements are significant contributors to the quantification of risk. However, when the degree of cost uncertainty is factored into the analysis, one element stands out, spares and repairs. This is because of the unpredictable and stochastic nature of spare parts demand the period of the contract. Having the right parts at the right place at the right time is paramount to financial success under PBL. By focusing more attention on calculating the required levels and distribution of spare parts and repair capabilities throughout the support network, OEMs can more effectively price PBL contracts and could dramatically reduce the amount of risk and uncertainty they are faced with when executing the resulting contract.

The study has further identified three primary capabilities to quantify the cost and risk associated with spares and repairs:

- I. Ability to cope with complexity: Multi-echelon, multi-indentured parts network are significantly more complex and require sophisticated tools, more accurate data, and increased levels of knowledge to take advantage of them.



Source: Deloitte, 2008.

- II. Ability to deal with changing contract conditions: Key assumptions often change during the contracting process resulting in a wide range of unknowns. RFPs often require planning for multiple scenarios- for example, surge capacity in times of war, varying levels of system availability and multiple deployment options. It is no longer effective to run laborious, manual spread-sheet calculations to deal with each contract scenario.
- III. Ability to demonstrate adequate levels of due diligence when pricing the risk component. The “black box” approach to PBL pricing is no longer acceptable. It is imperative that a PBL provider is able to confidently model the complex and dynamic spares and repairs network during the pricing process- and to effectively manage it once the contract has been awarded. It is also essential to have an automated model for handling multiple conditions and scenarios.

A supplier’s software tool should help quantify the trade-offs and risks associated with alternative contracting parameter options for a wide range of scenarios and should capture factors such as changes in cost uncertainty as well as changes in the underlying program environment (i.e. including program scale, scope, product reliability, lower-tier supplier performance etc.). Based on the model of Kim et al, suppliers can set up a planning support system that can calculate cash flows and performance projections for the prime and each sub system supplier as well as for the customer over a finite planning horizon that would cover the term of the contract. Further, fleet configuration, usage

<i>Contract Type</i>	<i>Spares and Repair</i>	<i>Cooperative Partnership Contract</i>	<i>Contracting for Availability</i>	<i>Contracting for Capability</i>
Contract Detail	<p>A traditional arrangement whereby the contractor supplies the Department with spare parts with which to repair and overhaul its equipment. Maintenance is conducted separately either by the Department or a sub-contractor.</p> <p>The Department solely holds responsibility for the repair and overhaul and any risk associated with it.</p>	<p>The Cooperative Partnership is similar to the traditional spares and repair contract in terms of supply of spares. However, joint industrial and military teams undertake the actual repair and overhaul.</p> <p>Responsibility for the delivery of the equipment remains with the military, although risks are jointly shared with the contractor.</p>	<p>The contractor is usually the Design Authority for the equipment and is responsible for the repair and overhaul and the ultimate delivery of a fit for purpose piece of equipment.</p> <p>Provision of spares is sometimes included within the contract, as is the case with the Department's C-17 transport aircraft. However, usually the provision of enabling resources (spares, ground equipment, staging and manpower) is split between the contractor and the Department with risk and responsibility managed by the most appropriate partner. The contractor also brings to the partnership its technical expertise and commercial experience of supply chain management and asset tracking.</p> <p>The contracts are performance-based partnerships that commit both parties to contractual performance guarantees.</p>	<p>The contractor is responsible for the delivery of a capability, such as an aircraft that can fly for a set number of hours carrying a set number of passengers including any support, spares and repair that the aircraft may need within those hours.</p> <p>The risk and responsibility for delivery is solely with the contractor; the customer does not own the equipment and therefore has no requirement for a repair or support organisation.</p>
Example	<p>Spey engines which power the Royal Navy's Type 23 frigates.</p>	<p>Contractors MTU Aero Engines and the Luftwaffe have developed the contract to undertake maintenance of Tomodo and Typhoon engines.</p>	<p>RB199 Operational Contract for Engine Transformation for the Royal Air Force Tornado fleet.</p> <p>C-17 Globemaster III Support Partnership contract for the Royal Air Force's heavy lift transport aircraft.</p>	<p>Rolls-Royal Total Care whole engine package and Boeing Gold Care whole aircraft packages.</p>

Source: National Audit Office visits and interviews.

predictions and failure rate information must be captured and shared through technical integration between the operator and service provider and sometimes with first-tier vendors. Without this type of reliability analysis and pricing model, the PBL provider and business partners will be unable to adequately predict failure rates and required inventory levels, and will either run the risk of a stock-out situation or over compensate by building redundant safety stock. Either situation is undesirable and will erode potential contract profits (Deloitte, 2008). The UK National Audit Office (NAO) in their report on "Transforming Logistic Support for Fast Jets" (2007) have also emphasized that appropriate analysis of demand and usage data is also fundamental to calculating the level of repair service required from a prime contractor and it is essential to achieving an affordable contract price. The report brings out the continuum of contract types from "spares and repairs" to "contracting for capability".

### **PBL as a Means for Reducing Life Cycle Costs**

Long-term contracts are the preferred approach for PBL implementation, as cost reduction will be achieved when there is an assurance that the contract is for an extended period to guarantee an adequate return on investment. Furthermore, a contractor can leverage the buying of core materials like titanium, aluminium, steel etc. over a longer time cycle, while the government cannot take such decisions. Government, industry and academic studies show that PBL contracts regularly improve availability 20-40 percent and reduce costs by 15-20 percent (Miller, 2008). The UK National Audit Office has observed that PBL represents good value for money although there are risks.

### **The Indian Perspective**

The expansion of the inventory of the Indian Air Force (IAF) in recent years has resulted in tremendous diversification of platforms as well as force multipliers. The platforms have also become increasingly complex and involve integration of a range of technologies. The need for adequately trained manpower for such advanced systems has to keep pace with the inductions. Typically the maintenance philosophy has been based on the system of provisioning of spares for the number of maintenance echelons. Maintenance provisioning signifies precisely calculated assessment of requirements by forecasting the anticipated consumption of spares during the total flying hours to be accomplished during the Maximum Holding Period (MHP). This forecasting is done by relating the consumption/spares during preceding twelve months to the flying hours achieved by the aircraft during the same period and projecting them to the future MHP. However, there would be variations for non-recurring consumption and for fourth line servicing, which involves repair and overhaul. The anticipated overhaul arising can be calculated either by "formula method", i.e. by dividing the total planned effort by the time before overhaul or "follow the hours method" i.e. calculating the TBO based on a sustained monthly flying rate (Chatterjee, 2010). The efficacy of this philosophy has to be assessed with reference to the levels of fleet serviceability, which have actually been achieved. The audits report



no 7 of 2010-11 of the Comptroller and Auditor General has made a number of revelations on operation and maintenance of Mi series helicopters in IAF. It has been highlighted that serviceability levels were low and fell consistently short of the prescribed 75 percent. Combined with high Aircraft- on-Ground (AOG) levels, this was indicative of inefficiency in operations, low utilisation of Mi series fleet and poor repair and maintenance activities. The shortage of spares indicative of deficiencies in provisioning and procurement was also noted. The following specific issues on the maintenance aspects were brought out:

- For Mi-8 and Mi-17 helicopters taken together from 2003-04 to 2008-09 only 14 percent of AOG demands could be met within 24 hours and 22 percent demand took one to six months to be met.
- For repair of engines for the above series the base repair depot could complete 39 per cent of the allotted tasks. The reason was shortage of technical manpower and non-availability of imported spares.

The deficiencies in performance due to the logistics support and maintenance activities as brought out by audit cannot be generalised to the entire range of fleets in the IAF but certain systemic issues on the need to streamline provisioning and procurement are relevant. Performance based management will be a step in the right direction to overcome persistent problems of lack of trained manpower and the vagaries of spares supply.

A substantial amount can be learned from the experience of countries like USA, Canada and UK however the difference in defence industry environment and business practices will need to be taken into consideration and require significant adaptation. For instance the IAF has acquired the advanced jet trainer Hawk Mk 132 as "buy and make" with transfer of technology to HAL. BAE Systems, the Original Equipment Manufacturers (OEM), is already maintaining on a performance logistics model, the Hawk Mk 115 for the Canadian Air Force and the Hawk Mk 127 for RAAF Australia. However, because HAL has a transfer of technology and is manufacturing the aircraft in India the inter-linkages between the OEM and its sub vendors for an assured supply chain management will need to be put in place.

The oversight mechanisms in contract management will have to be formulated. Furthermore, it is equally important to have an institutional framework at the intergovernmental level to ensure that the commitments under a performance based model are being met and the partnership is not just that of a buyer and seller but as a stakeholder in the performance of the equipment supplied by that country during its life cycle, by ensuring the required levels of serviceability. A pricing philosophy for long term supply of spare parts is also essential.

The importance of performance metrics has already been highlighted. The IAF needs to have technically viable metrics for the systems to be maintained on the PBL model. For instance, the criteria for determining the serviceability status of a radar could be based upon a clear definition of; (1) fully operational (2) restricted operational (3) non operational and the criteria for various components like LAN, antenna, radar channels etc., including support systems, could be separately specified against the above three categories.

## Conclusion

While most analysts of public management systems, logistics professionals and contractors believe that the PBL approach creates a win-win situation for both the government and the defence industrial base and has tremendous potential to align customer and supplier incentives and performance across a complex value chain, there are some who have expressed that the absence of comparative measurable data on the performance of outsourced vs. in-house logistics makes it difficult to assess its effectiveness as a coherent strategy. However, in spite of the doubters, with the evolution of PBL there is greater clarity and definition of the varying ways in which it can be implemented at several levels. The lowest level of PBL implementation is at the component level, focusing primarily on supply chain activities. The government support infrastructure may continue to be used. Level 2 is at major subsystem level where the focus is not just on delivery speed but also encompasses repair processes, engineering and technical support, configuration management and so on. Level 3 marks the shift of focus to the conceptual objective of PBL that is on the availability and readiness of weapon system platforms. Level 4 of PBL is to achieve the ultimate objective of mission effectiveness (Vitasek et al, 2006). For India, which is currently going in for modernisation of its weapon systems, this is the right moment to consider a transformation in its sustainment strategy.

The implications that emerge, after taking into consideration the experience of several countries is that logistics transformation by adopting performance based approach has proven to be a viable solution to improve the effectiveness of weapon systems and platforms in the face of shrinking budgets for defence and an uncertain security environment. The dominant feeling is that it does represent "value for money".

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## Review of International Offset Experience

*Thomas Mathew*

Offsets are in essence compensations that buyers obtain from sellers for the purchase of goods and/or services. Such compensatory arrangements could form part of both defence and civil contracts. They are employed by nations for the development of specific sectors. Greece for instance uses it for the development of its defence sector, while Saudi Arabia employs it for strengthening its socio-economic sectors, generating local employment etc., in the process.

Offset transactions can be direct or indirect. The former are arrangements directly connected with the item being contracted. Though there may be different strategies for their implementation, they are characterised by this nexus. The purchase of parts from the buyer nation (eg: aircraft engines) for a contract for the sale of fighter jets for use in the planes being procured is an example of direct offsets. In contrast, the latter (indirect offsets) are unrelated to the item being procured. A seller purchasing from the buyer nation/entity e.g. agricultural products for a contract for the sale of tanks, would be an instance of this type of offsets. There could also be a hybrid of the two termed as “quasi-direct”. In such instances, offsets are obtained for items falling under the same sector but are not directly connected with the equipment under procurement.

Offsets can also be mandatory in which case they form an integral part of the contract itself. In other words, the buyer would have to invariably perform an activity as a part of the contract for selling his ware. Offsets also tend to vary on account of the regional arrangements forged by nations as the concept of offsets evolved. Regional agreements such as the European Union (EU), whose policies influence offsets, is such an instance. Another example is the agreement between Australia and New Zealand that also aims at the betterment of the business interests of local suppliers through the Australian-New Zealand Closer Economic Relations Trade Agreement (ANCERTA).

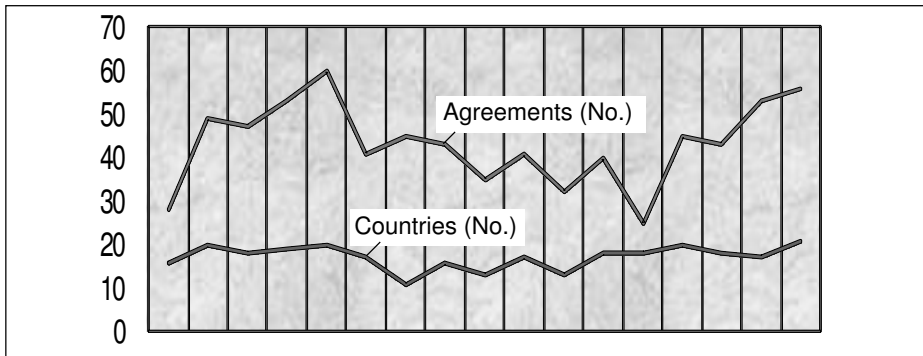
The evolution of the concept of offsets and its wider acceptance among nations has not, however, been incremental. Though the history of offsets can

be traced to the 1950s when coproduction arrangements were forged among the North Atlantic Treaty Organisation (NATO) nations during the heydays of the Cold War, it was not until the closing decades of the 20<sup>th</sup> century that the practice gained greater acceptance among nations. The policy gained greater adherents as nations found large purchasing contracts in general useful to wrench from the sellers technological and capacity enhancement opportunities that would not have been possible for these contracts. Consequently, there has been a sharp rise in the number of nations in the last two decades that stipulate offsets in defence contracts.

The growing perception of the advantages that could accrue by adopting the policy of offsets saw the rather small group of 20 offsets seeking nations swell their ranks to more than 130 since the 1980s.<sup>1</sup> Ironically, their number witnessed more than six times rise despite the strong arguments of economists that offsets render contracts inefficient and distort trade. Discarding the notion of inefficiency, the policy has been accepted across continents and "Almost all European (and other countries) have adopted formalized offsets."<sup>2</sup>

The data published by the US Department of Commerce, Bureau of Industry and Security would also reveal the growing prevalence of offset provisions in defence contracts signed by the country. The data on US defence contracts signed from 1993 to 1999 reveal that the increase in the offset agreement signed in this period was 60%. It further increased by another 30% from 2000 to 2009 (pl. see Graph 1).<sup>3</sup>

**Graph 1: US Offset Agreements: 1993-2009**



### Varying Strategies

What kind of strategies are nations adopting to implement their offsets policies? Does the fact that more nations demand offsets give more credence to the argument that countries find it advantageous to pursue this policy despite strong arguments that offsets are by their very nature economically inefficient and irrational? If offsets are being accepted as a beneficial strategy, then what do nations seek to achieve by adopting it?

Answers to these questions are not easy to find. By their very nature, defence contracts are shrouded in secrecy. Both the buyer and seller nations as a general

practice zealously guard details of defence contracts. Information on the experience of nations implementing offset policies is also difficult to source especially when they are related to the defence sector. Nations seldom publish or share their experience in enough detail for making an impact analysis. India too shrouds such information in the cloak of rather impregnable secrecy—for no ostensibly rational cause though. On the contrary, there is much to be gained by publishing these details and debating them to improve systems to achieve better value for the additional costs involved in offsets. Information from India's Defence Offset Facilitation Agency (DoFA) too was hardly forthcoming.

Despite the constraining factors, the international practices of 23 nations (11 European and the rest, non-European) were studied from material in the public domain.<sup>4</sup> The nations were chosen to provide contrasting experience.

This study benefitted from the discussions/interviews that the author held with select implementers of the offset policy in India, including some very senior functionaries in the Ministry of Defence.

This paper aims at:

- Studying the emerging international trends in defence offsets.
- Analysing the experience of select countries in the implementation of offsets with a view to understanding their preferences.
- Assessing the offset policy of India.
- Making policy recommendations for India in the light of the international trends in offsets and experience of other nations.

## MODERN TRENDS IN OFFSETS

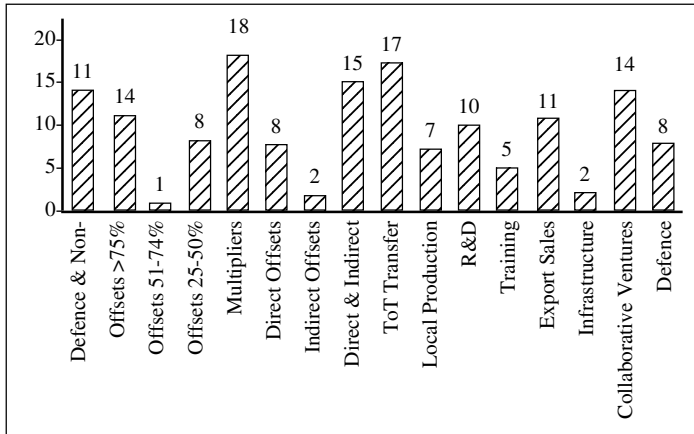
### Overveiw

Offsets are implemented variously by nations; "Nations tailor their offset policies to meet their specific circumstances and as such they differ in scope, complexity and implementation."<sup>5</sup> Strategies are adopted and calibrated to achieve their perceived domestic priorities including the strengthening of indigenous military-industrial complex and international goals. The strategies and goals would, however, themselves be influenced by the level of industrialisation, availability of technical manpower in the purchasing nation etc. Therefore, nations not only use different strategies to implement the policy but also aim at achieving different goals by using offsets (pl. see Graph 2).<sup>6</sup> For instance, out of the offset policies of 23 nations that were analysed, it is seen that 15 nations follow a mix of both direct and indirect offsets.<sup>7</sup> Similarly, 17 nations accord high priority for making Transfer of Technology (ToT) the second most preferred goal to be achieved through offsets.

### Increasing Demand for Offsets

Nations are generally prescribing higher offset requirements. Some European nations have, however, reduced their offsets requirement to 100% as a part of the agreement reached by the European Defence Agency in October 2010.<sup>8</sup> The reality is that the "magnitude of individual offset demands has increased."<sup>9</sup> Of the 23 countries, eleven countries each have requirements of above 75% of the

Graph 2: Features of Offset Policy



contract value. One country has offset requirements in the range of 51-74% and eight between 25-50%. The remaining two countries (Australia and Belgium) have prescribed neither the minimum nor the maximum offsets that they require<sup>10</sup> and the third, Egypt, has an ad-hoc policy.

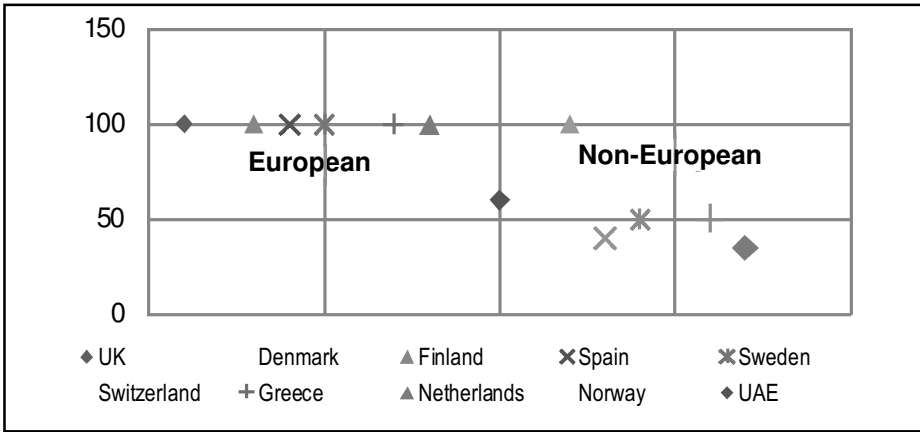
From the analysis of the offset policies of these countries, it is observed that European nations demand higher offsets than those from other regions. This is borne out from the list of nations that prescribe above 75% offsets. In this list, all except two (Canada and South Africa) are European countries. Among the eleven nations<sup>11</sup> of Europe, all except Belgium, where bidders are free to offer, have a minimum offset requirement of 100%.

Interestingly, Germany, which has not been included in the list of nations to analyse various offset policies and officially “regards offsets as a contradiction to its principle economic policy”, has arrangements that utilise contracts to achieve 100% in cooperative programmes.<sup>12</sup> Norway, which was an outlier in comparison to other European nations in the quantum of offset demanded, has now increased offset requirement to 100%.<sup>13</sup> Finland in particular had a provision for a minimum of 100% plus marketing consulting. Greece had also stipulated offsets between 80-120% offsets and so did some other nations also. It may be noted that the European countries that had demanded more than 100% offsets have now reduced to 100% on the basis of an agreement reached in 2008 by the European Defence Agency and implemented from 15<sup>th</sup> October 2010.<sup>14</sup>

In comparison to the European nations and Canada, the countries of other regions in Asia, Africa and the Middle East, except South Africa and UAE, prescribe low levels of offsets. These nations typically prescribe offsets between 25-50%. (see Graph 3)

European nations have also been more successful in translating their higher offsets to greater advantage in part on account of their superior technological base and their close politico-military links with the US and among themselves. Consequently, not only do they have the distinction of demanding, they also

Graph 3: Offset Requirements



receive more offsets than those of other regions. From 1993-2004, European nations as a whole obtained offsets valued at 99.1 per cent of their defence imports in comparison to 46.6 per cent for other nations.<sup>15</sup> Their success in obtaining offsets has been remarkable in that they obtained 100% or upwards thereof in 72.9 per cent of the contracts that they had signed.

The analysis of the offset policies of 23 nations from Europe and other regions that were studied support this conclusion while revealing the following:

- The mean offset demanded by European countries (excluding Belgium) is 100%, which is more than double that of 42.75 which is the value for non-European countries.
- Even nations that had lower offset demands have increased their offsets (Norway).
- Among non-European countries, other than Canada, only South Africa and UAE, stipulate offsets above 50%.
- The mean offset demand of the 20 countries for which data is available is 75%. If Turkey is counted as a non-European country, then the average offset demanded by the 9 non-European countries is 51.67%. The highest is demanded by South Africa (100%) and the lowest is by India (30%).

**Direct and Indirect Offsets**

Direct offsets can take the form of co-production, ToT, Training, sourcing of parts/subassemblies/equipment/software to be used in the production of items contracted for procurement.

Indirect offsets generally include ToT, imports and barter, counter purchase. The chart below depicts the common kinds of direct and indirect offsets.

The offset policies of the 23 nations reveal another dimension of the offset policy: the vast majority of them use both defence and civilian contracts to generate offsets. 14 of them use both defence and civilian contracts to generate offsets for the dual purpose of strengthening both these sectors. In contrast,

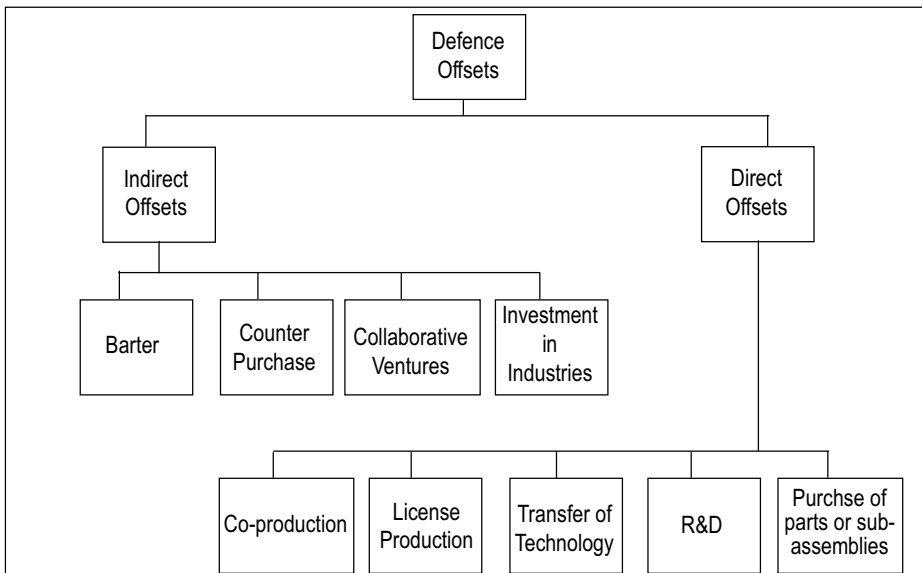
only 8 countries have as a norm prescribed offset requirements exclusively for defence contracts. India and UK are prominent in this category.<sup>16</sup> Of these 6 countries, four countries (India, Greece, Sweden and Egypt) have prescribed only direct offsets. 15 countries have a mixture of direct and indirect offsets revealing that they use the contracts to strengthen both civilian and defence sectors. Only two countries (Philippines and UAE) provide exclusively for indirect offsets. From the above, it is seen that 65% of the nations have a mixture of both direct and indirect offsets, around 34% demand offsets only in defence contracts and around 26% resort to direct offsets to augment their domestic defence industry. In comparison, only 8.7% rely exclusively on indirect offsets.

### Direct Offsets

Direct offsets in defence are preferred by nations that accord higher priority to the development of their indigenous defence production capability. Through this route they seek to gain access to technology and augment their scientific and productive capabilities which would have otherwise been difficult to achieve, or would not have been feasible if it not were for the defence contracts. But in actuality, the success of direct offsets is hinged on several factors. They range from close political ties to the seller nation, a state of indigenous military-industrial complex in the purchasing nation and the extent of its capability to absorb the technology or produce the items that may be sub-contracted as a part of the fulfilment of offset delegation. This would also require, as a corollary, a scientific pool of high calibre and technical capability in the buyer nation.

From the available data in the public domain, it is discernible that the direct offsets as a percentage of the total value of the offset contracts concluded by the US have fluctuated in the range of 38.30% to 43.52%. For the 5 years from 1995-

Chart 1





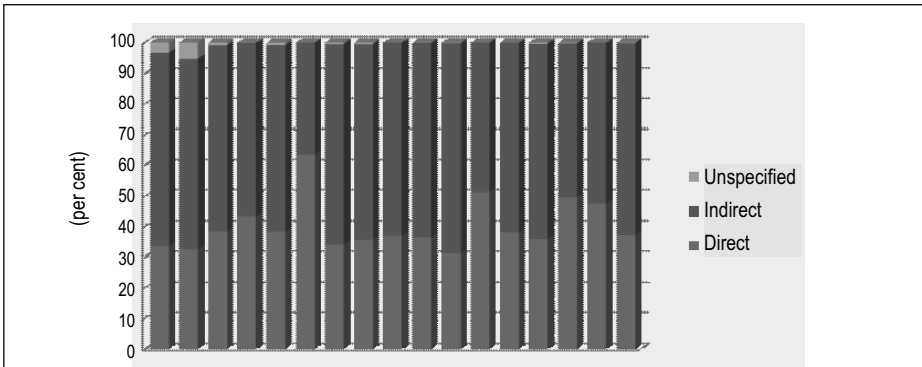
99 the percentage of direct offsets of proportion of the total offsets was around 43.52%. It then declined to nearly 38.30% for the next five years to increase to 41.7% for the period from 2005-09.<sup>17</sup>

**Indirect Offsets**

An overwhelming majority of 15 nations have a mixture of direct and indirect offsets. The international experience reveals that it is uncommon for nations to exclusively take recourse to either only direct or indirect offsets. As mentioned above, only six countries depend exclusively on direct offsets while only UAE and the Philippines depend exclusively on indirect offsets.

The data published by the US which has been the largest exporter since 1990, reveals that during the 17-year period (1993-2009) there has been higher preference for indirect offsets. Indirect offsets registered an average of 59.05% of the value of offset contracts during the above period and have through the years moved in the narrow band of 50-68.63% touching 36.43% only in one year (2001). However, the three five- year- averages of the above period fall within the band of 56-62% revealing that nations have a preference for indirect offsets. The socio-economic sectors in the Middle Eastern nations have specifically benefitted from the use of indirect offsets.<sup>18</sup>

**Graph 4: Offset Transitions by Type**



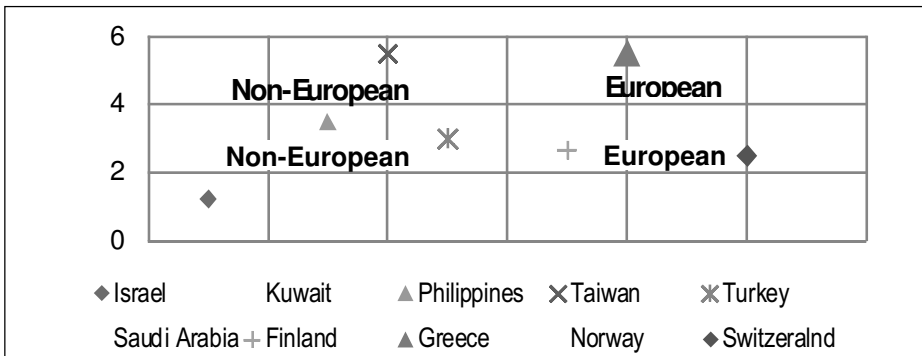
**Multipliers**

Multipliers are factors applied to the actual values of offset obligations to determine the credit that a buying nation is willing to assign for transactions in view of the importance it may be attaching to the fulfilment of particular obligations. These are used to direct the benefits of offsets to targeted sectors that are underdeveloped and/or non-existent in the buyer nations. Multipliers are, therefore, used to fill important gaps in the capability of the buyer nations by enhancing the values of transactions to the extent of the use of multipliers. For instance, Netherlands uses multipliers for technology transfer and applies a factor up to 10 for R&D activities.<sup>19</sup> Although Finland allows 0.3 to 3 multiplication factors, in the case of SMEs in defence sector, the factor can be as high as 5.<sup>20</sup> Greece and Taiwan even use multiplication factors up to 10.

Conversely, when a factor of less than one is used to value transactions, it implies the lower importance that a purchasing nation attaches to such transactions. Such factors are used to discourage transactions in offsets and resorted to when the particular offset obligations do not result in any desirable capability building in the purchasing nation.

Many nations today use multipliers. Of the 23 nations assessed, 18 use different multiplier factors. They range from 1-1.5 (Israel) to 1-10 (Greece).<sup>21</sup> Graph 5 reveals the divergent levels of the use of multipliers.<sup>22</sup> It also reveals that the European nations have higher multiplier factors than the non-European nations.

**Graph 5: Multipliers Used by Nations**



Even among European nations, different multiplier factors are used. The mean multiplier factor for European countries is 3.6 and is higher than that of Non-European countries for which the mean is 3.17.

### The Indian Experience

Just as the offset policy in Europe can be traced to the co-production agreements in the 1950s, India too had arrangements for the licensed production of Soviet aircraft in the 1960s. But it was only in 2005 that India formulated its offset policy and incorporated it in its Defence Procurement Procedure (DPP). The policy underwent modifications in DPP versions of 2006, 2008 and 2011. It has therefore around six years since the offsets policy was introduced and opinions are varied on how successful India has been in implementing its offsets policy. The overwhelming view is, however, that India has not recorded significant success in translating the offsets policy to develop its military industrial complex in any appreciable manner.

In addition, the system of monitoring is so weak that it has been reported that tents and domestic air conditioners have been permitted for the discharge of offsets under the nomenclature of "Troop Comfort Equipment."<sup>23</sup> It has also been reported that Symantec Anti-Virus CDs were labeled in India and exported and offset value was claimed for them in total, disregard of the causality principle that is critical for determining the genuineness of offset transactions.<sup>24</sup>

### ***DPPs and Offset Provisions***

The DPP 2005 laid the foundation for India's offset policy. For the first time, all acquisitions under the "buy" and "buy and make" category having a value of above Rs.300 Crores (US \$ 67.61 m)<sup>25</sup> were required to have an offset of 30% of the value of equipment being contracted. The offset obligation could be discharged by exporting Indian defence products and/or services and investments in the indigenous defence infrastructure were made eligible. However, the SCAP Categorisation Committee (SACPCC) could decide on whether the offset provisions should be included as a part of the acquisition or not.

As the policy lacked clarity and any formal structure for the implementation of the policy, it failed to yield any return. In view of this, the policy was modified in the 2006 DPP. It made offsets compulsory, providing for the establishment of joint ventures and established the DOFA.

### ***Offset Policy in DPP-2008***

The changes made in DPP 2006, however, yielded virtually no dividend and the policy was further modified in 2008. The modifications included the listings of items eligible for the discharge of offset obligation, introduction of offset credit banking and exempted the fast track acquisitions from offset obligations.

The policy was further modified in 2011 to include civil aerospace, internal security and training within the scope of eligible items for the discharge of offset obligations. Therefore, to this extent, India has departed from its strict policy of "direct" or "quasi-direct" offset provision in its 2006 and 2008 policies.

### ***Review of Indian Offset Policy***

From all accounts, India's experience with offsets has not been encouraging. Neither is the policy geared towards delivering optimum results, nor is the system of implementation robust. There has to be an almost complete overhaul of the offsets architecture as it is obtaining in India.

The need for undertaking this exercise cannot be over-emphasised. Defence offsets come at a cost and empirical studies have shown that the premium in the cost is transferred to the buyer and it is still unclear as to who benefits from such transactions.<sup>26</sup> In a study of a defence procurement in Belgium, it was concluded that the cost of the acquisition was hiked up between 20-30% of the actual value on account of offset provisions.<sup>27</sup>

Like other nations that implement an offset policy, India too would have to bear the risk of its policy not being able to derive optimum results and suffer economically inefficient transactions if the strategies adopted to implement them are not carefully calibrated. The higher risk of economic inefficiency bedevilling the contracts involving mandatory offsets and underscores the need for a careful calibration of the policy. This exercise is imperative as the sellers factor in the cost of the equipment, the inefficiencies, lack of military-industrial base, technical manpower etc. in buyer nations.<sup>28</sup>

It is more important for India than other countries to revisit the offsets policy as nearly 70% of India's defence wares are imported. India's defence budget is

growing in line with its economy, which is growing at 8-9 percent per annum. Given the current level of increase in expenditure it is estimated that India's imports in the decade beginning in 2011 could be US\$ 100 billion.<sup>29</sup> Although it is difficult to clearly reckon the offset value that could be involved in imports during this decade, the estimate is that it could be in the region of US\$30 billion. The implementation of this value of offsets is both an opportunity and a challenge at the same time.

In view of the foregoing, what are the changes that India should make in its offset policies? The following recommendations are based on international best practices, India's moderate defence industrial capability, state of its industrial technology base, and its steadily increasing defence budget.

### *Enhancing Offset Limit*

Among all the 23 countries that prescribe offsets, India is at the bottom with 30% offset requirements. The only other countries in the study that have requirements closer to India are Kuwait and Saudi Arabia. However, there can neither be any comparison between the industrial base to produce defence-ware, nor the level of defence imports of these countries and India. While India in 2010, imported defence equipment to the value of USD 3337 million, both Kuwait and Saudi Arabia together imported USD 804 million.<sup>30</sup>

Of the 23 nations surveyed, the mean offset demand prescribed by the 10 European countries is 100%. Given the large size of India's imports and the increasing sophistication of India's industries, there is little reason why its offset requirements should also be less than that of the mean of the European countries.

The entire 100% offsets cannot, however, be efficiently assigned to the defence sector. India, at present, would neither have the capacity to implement offset transactions of this aggregation if the offset limit is raised to 100%. Nor would sellers be in a position to discharge them as productively as they may if the policy is extended to the civilian sector.

It is recommended that India prescribe 100% offsets for defence contracts with 40% for defence and the balance 60% or more in strategic sectors like power, telecommunication, mining and transport and important social sectors like education and health. Extending offset to social sectors would bring attractive dividends. For instance, investment of technology and finance in taking education to villages through satellite links could have enormous long-term positive spinoff for India's economic growth.

India could, therefore, reserve 40% for direct, quasi-direct and 60% indirect offsets. India has sufficient industrial capacity to absorb offsets in these sectors including ToT. As defence expenditures come at a social cost to the nation and it would only be prudent for leveraging the influence large defence contracts give to buyer nation for the benefit of these sectors. It is not unusual for countries to use indirect offsets for the development of non-defence sectors. India could take a lesson from Saudi Arabia that used the Peace Shield contract in 1985 for barter, forging equal partnership with local businessmen and used the indirect offset provision for setting up local production of pharmaceutical, petroleum and food processing industries.

### *Use of Multipliers*

India does not use multipliers though it would bring immense benefits to the country. It is understood that this issue was debated extensively in the Indian MoD, but the majority did not favour the adoption of this strategy. Of the 8 implementers of the Indian offset policy who were sent questionnaires by the author, only two supported the use of multipliers. All those who opposed it stated that the time is not ripe for it, but have not elaborated on their contention. On the other hand, the two who supported the use of multipliers have credible experience in implementing offsets—one representing one of the largest companies in the aerospace industry.

International experience too, does not support the exclusion of multiplier for a country like India. Of the 23 countries studied, 18 use multipliers and their list includes technologically advanced economies like Israel, South Korea, Netherlands and Sweden. If these nations can resort to the strategy of multipliers to achieve development in targeted areas, there is little reason why India should not. In comparison to all the above nations, India requires most sharp focus for its development in critical areas as it has a large defence industry of middling sophistication that could benefit from the infusion of high technologies to fill existing gaps in defence production.

For a nation that is even slated to be the largest economy in PPP terms by the middle of this century defence is of critical importance not only for sustaining the present level of growth but also for protecting its national interests. The country's defence industry could get a boost by strengthening directional moves using offsets.

There are, therefore, strong reasons for India to introduce the system of multipliers. Multipliers could be used to fill critical gaps in existing technology in India after which several cases of defence equipment could be produced. For instance the multipliers could be used to obtain the technology for the engines of India's MBT tank, which have been bedevilled because of the lack of a powerful enough engine. Another area that could benefit from the use of multipliers is the Indian warship production capability in which we have made great progress but lack the domestic capability in the fire control systems. Another example cited by an interviewee is the use of multipliers for the "Towed Array Sonars". Multipliers could be used to obtain ToT for these systems.<sup>31</sup>

### *FDI in the Defence Sector*

India could do well to increase the share of FDI in defence. Foreign manufacturers would not set up industries in India unless they have the comfort of controlling and managing the entities that they establish. They would need the assurance of adequate returns on their investment and security of the technology that they transfer and it can only come from at least a majority shareholding. The present limit of 26% FDI in defence is a disincentive for any meaningful level of investment by foreign companies.

Furthermore, limiting the shareholding to a 26% holding will also cast additional burden on Indian companies intending to establish partnerships, as

they would have to raise the remaining 74%. As the defence industries are highly capital intensive, it would require huge outlays by Indian companies.

Unless the foreign entities have enough incentives, they would not establish units in India. The reality is that companies do not establish entities abroad that can create competition for the parent company.<sup>32</sup> Therefore, foreign firms should be given sufficient control over the entities that they create. In this way, they would be assured of control and continuing profit in a country whose defence budget could steadily grow. Such a policy could be used in conjunction with offset banking that is allowed in India. Multipliers could also be used for encouraging tie-ups with (Small and Medium Enterprises) SMEs that operate in the defence sector and are the critical building blocks of any large industry like several nations have done—e.g Norway and Finland. The latter even provides for an additional factor of 2 or 40% more weightiness for SMEs. Foreign companies would be less resistant to tie ups with SMEs when they have decisive control over both the management and crucial decisions that could make their technology safe. In the process, India could expect greater opportunities to absorb the manufacturing process etc. of important defence items when they are built in India.

There is neither any ostensible reason why FDI cannot be raised to 100% in special cases. Flexibility to decide on the quantum of FDI without any pre-determined ceiling, is required not only as a separate strategy to attract investment in the defence sector but also to better implement R&D as a component of offset, outsourcing from India, for production collaborative ventures etc. Large contractors who may bag orders to be fulfilled over a long span and where together their lifecycle would require the presence of the contractor in the buyer country directly or indirectly for three decades or so (as in the case of major platforms), would be inclined to establish fully owned subsidiaries in the purchasing nation if they have full control over the entity created. Without it there is little chance of any foreign entity establishing defence industries in India.<sup>33</sup>

If it is feared that it would be a threat to India's nascent domestic industry, it could also be stipulated that production of items being already produced in the country would have to be undertaken in participation with the existing domestic industry. And as for the commonplace argument that we could lose our technology, it is stated that we cannot lose what we do not have.

### *Involvement of domestic Industry in Defence Planning*

Indian defence industry should be involved in the planning, approval and monitoring of offsets. If defence offsets are to be directed, then it is necessary for offsets to fill the critical gaps. The nature of gaps that are in existence would be in the knowledge of the industry more than any other. They should also be made privy to India's fifteen-year Long Term Integrated Perspective Plan (LTIPP) and the five-year Services Capital Acquisition Plan (SCAP), which in turn flows into the two-year roll plan for Capital Acquisitions.

There is no major country in the world that keeps their acquisition plans

from their defence industry and there is no reason why India should be adopting a different policy.

### ***Introduce offset credit trading***

DPP 2008 allows for offset banking with a permissible time frame of two-and-a-half years. In practice, however, they may get along with the lead-time available for Request for Proposals (RFPs), a total of 5 years or more depending on the completion schedule of the proposal. The implementers of the offsets who were sent questionnaires suggested strongly that the offset banking should be made between 7-10 years. This is something that should be considered positively.

There is growing opinion that offset transactions should not end with the end of the project.<sup>34</sup> It is also argued that it may be more paying to allow for offset commitments to stretch across several projects rather than mandating its compulsory extinguishment at the end of the project.<sup>35</sup> One of the offset implementers to whom the questionnaire was sent clearly stated: "offset partners have tried to create capabilities that they could encash in future."<sup>36</sup> This clearly points to the fact that opportunities should be created for foreign entities to derive benefits on the long-term basis for them to be fully invested in India, which would be to the benefit of the nation. To fully harness the potential of FDI in India it would be necessary to look into the possibility of giving foreign entities majority holding, which could be dovetailed with offset trading.

Trading of offsets could bring in several benefits. It could encourage long-term investment in defence as companies making such investment would be assured of not only returns from the expanding markets in India, but also be confident of obtaining credits for the offset by trading them to winners of future contracts. Restrictions could be placed on the number of years credits could be held unless new technology is inducted.

### ***Directing Offsets***

The list of eligible items is at Annexure-VI of DPP 2011 is generic in nature. It would be desirable to list the technology that the Indian industry lacks and include them in the items that would be made eligible for the discharge of the offsets listing key technologies that should be inducted. On the other hand, listing out items that may be eligible for the discharge of offsets without them being a part of a well-conceived strategy to build capability in critical areas, may be counterproductive. Listing out items would give the sellers the option to even manufacture through a Joint Venture a small part of any of the listed items and discharge obligation without adding in any way to the strengthening of the capabilities of India's defence system.

The reorganized DOFA could be given the authority to fine-tune the exact nature of technology for inclusion in the RFP. By precisely directing offsets, nations have been able to achieve production of important defence items.<sup>37</sup> On the other hand, vaguely defined national interests also do not result in substantial benefits and what may accrue through offsets may not be appreciable.<sup>38</sup> When directed, foreign entities are assured of future orders for equipment on the

condition that they are technological upgraded from regular intervals to fill gaps in Indian technology.<sup>39</sup>

### ***Increase Threshold Value***

The threshold value or the minimum contract value for requiring offset transactions varies across countries. A study of 23 countries revealed that the threshold ranges from a low of US\$ million 1 (Philippines) to 18 (Switzerland) excluding India.<sup>40</sup> The mean of these countries is 9.167 million US\$.<sup>41</sup>

In comparison to the international mean, India's threshold is US\$ 67.61 million, making it the highest among the 23 countries. This would mean that India would stand to lose out on several opportunities for generating offsets. It is recommended that India would do well to accept both direct and indirect offsets. Furthermore, lowering the threshold could benefit many industries in exporting their products or obtaining technology to fill gaps in the civilian sector. It is recommended that the threshold be reduced to US\$ 10 million, making it near the mean of the 20 countries.

### **Strengthening DOFA**

Even with the current threshold and low rate of offset requirements, it is estimated that in the next 10 years (2011-20), the value of offsets to be discharged would be US\$30 billion. This would require the establishment of a strong agency that draws its expertise not only from the Government sector, but also from outside.

The present system is woefully inadequate to deal with the elaborate planning, evaluation and monitoring of offsets. Just as the defence acquisition wing was established in MoD, it would be necessary to establish a wing exclusively to deal with offsets. If the threshold is reduced to US\$ 10 million and the minimum requirement of offset is enhanced to 100%, with 40% for direct and 60% for indirect offsets, then it is necessary to have such an organisation.

The manpower for this organisation should be drawn from the Government including civilian ministries, Services, public sector undertakings—both defence and civil—industry associations and from the open market. As the efficacy of the offset policy would depend on detailed planning, implementation and monitoring, it is important for it to be headed by an Additional Secretary Officer designated as DG, Offsets.

### **Conclusion**

Most countries today demand offsets for the purchase of defence wares. Nations demand direct offsets to primarily augment their indigenous military capability while indirect offsets are used to develop other sectors including the socio-economic sector and create domestic employment opportunities.

The majority of nations use both direct and indirect offsets and do not depend exclusively on either, though the preference is for the latter. Multipliers are also being increasingly used to direct development in areas of priority.

There is virtually no one goal that is not sought to be achieved when using



these compensatory arrangements. Some prefer ToT, while others have preference for R&D related offsets. There is no 'one shoe fits all' model, rather, priorities are laid down by governments according to the conditions prevailing in their territories.

There is also greater demand for offsets. The majority of nations have higher offset requirements. The trigger for offsets also varies and India is at the highest end of the spectrum.

Despite the inherent loading of offset cost in contracts, nations obviously prefer employing them for the net benefits that accrue from them. Therefore, offsets are here to stay and would only become more sophisticated in the decades to come.

India has, however, been a late entrant in the field. Only six years have passed since it adopted this policy and all indications are that India has still not been able to put in place an imaginative policy and a cogent, effective and robust organisation to implement it.

Consequently, India's policies are in variance with the international practice in several parameters. It has a very high offset trigger, very low offset requirement, is predominantly direct in nature, does not allow ToT etc., and the organisation that has been assigned the responsibility of overseeing the offset policy is neither properly staffed, nor do they have any strong monitoring system. As a consequence, as the implementers who were interviewed have unanimously stated, the foreign sellers obliged to discharge offsets are having a field day getting away with "soft" offsets.

If offsets have to bring in net benefits, then there has to be strong incentive for the seller to seriously be involved in the implementation of offset transactions. At least 51% FDI has to be permitted in the defence sector. It need not be through the automatic route, but granted on a case-to-case basis. In special circumstances, if the seller is willing to set up production centres for equipment that India does not have the capacity to produce, then even 100% FDI should be allowed.

Multipliers should be used to direct capacity building in identified areas. Offset banking should be allowed to extend beyond the life of projects and sellers setting up production centres in India should be given assured orders over longer periods at rates using the price discovery mechanism.

Most important would be the creation of an independent DOFA headed by an officer of the level of Additional/Special Secretary to government of India and staffed by technical experts, financial managers, project management specialists etc. drawn from the government, services, private industry etc. The two fore most criteria for recruitment should be capability and integrity.

The present policy, therefore, needs to be revisited lest India should see its resources being drained inefficiently in contrast to implementing a policy that could yield rich dividends.

## NOTES

1. Susan Willett and Ian Anthony, *Countertrade and Offsets Policies and Practices in the Arms Trade*, Copenhagen Peace Research Institute at: <http://www.ciaonet.org/wps/wis01/> Accessed on 20 June 2011.

2. US Department of Commerce, Bureau of Industry and Security, *Offsets in Defense Trade Seventh Study*, July 2003 at: <http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/7thoffsetsreport.htm>. Accessed on 20 June 2011.
3. Data for the graph has been compiled from US Department of Commerce, Bureau of Industry and Security, *Offsets in Defence Trade: Fifteenth Study, December 2010* at: [http://www.bis.doc.gov/news/2011/15th\\_offsets\\_defense\\_trade\\_report.pdf](http://www.bis.doc.gov/news/2011/15th_offsets_defense_trade_report.pdf). Accessed on 20 June 2011.
4. The 25 countries contained in the Sixth Study of the US Department of Commerce, Bureau of Industry and Security, *Offsets in Defence Trade: Sixth Study*, at [www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/01rept.doc](http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/01rept.doc) was taken as the base and India was included to the list. The list of countries, however, got reduced to 23 as from the original list—Thailand and Germany were removed since they were listed as nations that do not have an official offset policy in the later publications (Australian site cited below.) In addition, New Zealand was also removed as the tenderers are allowed to make proposals and hence they have no fixed policy and therefore no features were available for analysis. This data was updated with the details available in the Australian site <http://www.defence.gov.au/deu/docs/offsets-Database.xls>, March 2010, the EU offsets portal site at <http://www.eda.europa.eu/offsets/>, the US Department of Commerce, Bureau of Industry and Security, *Offsets in Defence Trade: 12th Report to Congress, December 2007* available at <http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/final-12th-offset-report-2007.pdf>, *11th Report to Congress, January 2007* available at [http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/final\\_offsets\\_eleven\\_report.pdf](http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/final_offsets_eleven_report.pdf), *Tenth Study, December 2005* available, at <http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/offsetxappendicesreport.pdf> and the *Seventh Study, July 2003*, available at, <http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/offsetrpt7/offsetsappends.pdf>. Relevant details were taken from the later reports. All the above sources were accessed on 20 June 2011.
5. Kane, Ron, “National Governments and their Defence Industrial Bases: A Comparative Assessment of Selected Countries”, *Canadian Association of Defence and Securities Industries*, October 2009 at <https://www.defenceandsecurity.ca/UserFiles/File/IE/Annex%20G%20-%20International%20Research.pdf>. Accessed on 17 June 2011.
6. The different features have been taken from the US Department of Commerce, Bureau of Industry and Security, *Offsets in Defence Trade: Sixth Study*, and updated where possible from the data as stated at supra note.5
7. India has been excluded because of its predominant focus on defence.
8. Pl. see European Defence Agency news at [http://www.eda.europa.eu/news/10-10-15/For\\_the\\_first\\_time\\_ever\\_limit\\_on\\_offsets\\_in\\_effect](http://www.eda.europa.eu/news/10-10-15/For_the_first_time_ever_limit_on_offsets_in_effect). Accessed on 18 June 2011.
9. Hessler, Lee. R., “The Impact of Offsets on Defense Related Exports”, Defence Institute of Security Assistance Management at <http://www.disam.dsca.mil/pubs/Vol%2011-1/Hessler.pdf>. Accessed on 18 June 2011.
10. Pl. see the US Department of Commerce, Bureau of Industry and Security, *Offsets in Defence Trade: 12th Report to Congress*, Dec 2007 (at supra note. 4) for Australia and Australian site (at supra note. 4) for Belgium and Egypt.
11. The offset requirements have not been stated in the case of Sweden.
12. Germany has officially no offset policy. Germany reserves the right to introduce “work share equals cost share” in cooperative programmes. As German government requests no indirect offset the relative part of direct offset equals 100 percent in this case. Pl. see: <http://www.eda.europa.eu/offsets/>
13. Earlier, Norway had prescribed 30% offsets. Pl. see Sixth Study of the US Department of Commerce, Bureau of Industry and Security, *Offsets in Defence Trade: Sixth Study*, at [www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/01rept.doc](http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/01rept.doc)
14. Supra note. 8

15. US Department of Commerce, Bureau of Industry and Security, *Offsets in Defense Trade: Tenth Study*, December 2005 at: <http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/offsetxfinalreport.pdf> Accessed 20 June 2011.
16. In India, the Civil Aviation Ministry has introduced offsets for the purchase of planes. Offsets are also being considered in other Ministries. Since India has a compulsory requirement of offsets in the defence sector, though conditional, it has been included in the list of countries that have offsets only in the defence sector. See: <http://www.rediff.com/money/2008/dec/06national-offset-policy-soon-to-aid-local-industries.htm> for the details on the offset introduced in the Aviation sector.
17. Calculated from data available at US Department of Commerce, Bureau of Industry and Security *Offsets in Defense Trade, Fifteenth Study*, , December 2010 at [http://www.bis.doc.gov/news/2011/15th\\_offsets\\_defense\\_trade\\_report.pdf](http://www.bis.doc.gov/news/2011/15th_offsets_defense_trade_report.pdf)
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19. Kane, Ron, "National Governments and their Defence Industrial Bases: A Comparative Assessment of Selected Countries", *Canadian Association of Defence and Securities Industries*, October 2009 at <https://www.defenceandsecurity.ca/UserFiles/File/IE/Annex%20G%20-%20International%20Research.pdf>. Accessed on 17 June 2011.
20. Pl. see <http://www.eda.europa.eu/offsets/>
21. Greece has a very complex system of applying multipliers and the maximum permissible is the factor of 10. For the calculation of mean, where ranges have been mandated, the midpoint of the range has been taken. For instance, Israel has a multiplier in the range of 1-5 and, therefore, 1.25 midpoint has been taken for plotting the graph.
22. Though 18 nations use multipliers, only those of 10 nations have been plotted to make the graph as UAE, Belgium, Denmark, South Africa, Spain, Sweden and Netherlands have not revealed the factors they used under various conditions.
23. From the written replies to the questionnaire sent by the author.
24. From the interview with a middle level officer of MoD.
25. Converted at the rate of 1 US \$ = Rs. 47.61, the exchange rate as on 20.07.2011.
26. Peter Hall and Stefan Markowski, *On the Normality and Abnormality of Offsets Obligations*, Defence and Peace Economics, 1994, Vol.5, p-175. Quoted in Lloyd J. Dumas, *Do offsets mitigate or magnify the military burden?* in Jurgen Brauer and J. Paul Dunne, *Arms Trade and Economic, development: Theory, Policy, and Cases in Arms Trade Offsets* (Routledge London and New York, 2004).
27. Wally Struys quoted in Stephen Martin quoted in Lloyd J. Dumas, *Do offsets mitigate or magnify the military burden?* in Jurgen Brauer and J. Paul Dunne *Arms Trade and Economic, development: Theory, Policy, and Cases in Arms Trade Offsets* (Routledge London and New York, 2004), p-21
28. Stefan Markowski and Peter Hall, *The Defence Offsets Policy in Australia*, quoted in Stephen Martin (eds) *The Economics of Offsets: Defence Procurement and Countertrade*, Harwood Academic Publishers, The Netherlands, 1996, p-50.
29. *Economic Times*, October 4, 2010 at: [http://articles.economicstimes.indiatimes.com/2010-10-04/news/27620854\\_1\\_defence-sector-defence-procurement-policy-defence-ministry](http://articles.economicstimes.indiatimes.com/2010-10-04/news/27620854_1_defence-sector-defence-procurement-policy-defence-ministry)
30. Pl. see [http://www.sipri.org/contents/armstrad/output\\_types\\_TIV.html](http://www.sipri.org/contents/armstrad/output_types_TIV.html) Accessed June 20, 2011.
31. For elaborate reasoning on how multipliers could benefit India, pl. see: Mathew, Thomas, Essential Elements of India's Defence Offset Policy - A Critique, *Journal of Defence Studies*, Vol. 3, No. 1, 2009, Institute for Defence Studies and Analyses, New Delhi
32. Jurgen Brauer, *Economics aspects of arms trade offset* in Jurgen Brauer and J. Paul Dunne *Arms Trade and Economic, development: Theory, Policy, and Cases in Arms Trade Offsets* (Routledge London and New York, 2004), p-59.
33. In the questionnaire sent to the Director of HAL, he opined that "there may not be

much change in this view even if the cap is increased to 49% since even the OEM will not have total management control.

34. Ron Matthews, *Defense offsets: policy versus pragmatism* in Jurgen Brauer and J. Paul Dunne *Arms Trade and Economic development: Theory, Policy, and Cases in Arms Trade Offsets* (Routledge London and New York, 2004), p-95.
35. Udis, quoted in Ron Matthews, *Defense offsets: policy versus pragmatism* in Jurgen Brauer and J. Paul Dunne *Arms Trade and Economic development: Theory, Policy, and Cases in Arms Trade Offsets* (Routledge London and New York, 2004).
36. The name of the official and the name the company he represents are being withheld on the request of the interviewee.
37. Jurgen Brauer, Economics aspects of arms trade offsets in Jurgen Brauer and J. Paul Dunne *Arms Trade and Economic development: Theory, Policy, and Cases in Arms Trade Offsets* (Routledge London and New York, 2004).
38. The author had sent questionnaires to four large Indian entities to ascertain their views on this issue. It is, however, admitted that that all the four firms apposed limiting offsets to a shelf of projects. (In view of the overwhelming opposition to the limiting of offsets to a shelf of projects, the author would like to suggest application of multipliers, at least to attract offsets in critical areas. The list of items eligible for offset should have these identified areas).
39. For detailed justification, how directing offsets would benefit a country like India, pl. see Supra note. 31
40. Though the data relating to 23 countries was used throughout the paper, in regard to threshold value, details of only 20 countries were available. Canada, Egypt and Saudi Arabia do not prescribe threshold values.
41. Threshold value has been taken using the same principle followed in regard to Supra note. 4. Data sourced from [www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/01rept.doc](http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/01rept.doc), <http://www.eda.europa.eu/offsets/> and [http://www.defence.gov.au/deu/docs/Offsets\\_Database.xls](http://www.defence.gov.au/deu/docs/Offsets_Database.xls) Where countries were not listed in the first site, the second site was relied upon and likewise when the first two sites lacked clarity the third site was relied upon. Where-ever clarity was lacking, the same progression was followed. All currencies were converted to US\$ using the conversion rate as on 11<sup>th</sup> July 2011.

## International Offset Experiences and Policy Prescription

*Kogila Balakrishnan*

### **Offsets: A Changing Landscape**

Offsets are a trade tool, widely practiced in the defence sector, through defence procurement to promote industrial and technological benefit. Offsets practice started in 1940s as part of the US effort to standardize acquisition of military equipment, platforms and build a defence industry base within the NATO forces<sup>1</sup>. Since, offsets have never left the scene but has evolved in one form or another, be it countertrade, industrial participation, economic enhancement or collaborative projects<sup>2</sup>. To buyer nations, offsets have become more important than ever as a development tool that supports self-reliance and offers other economic spin-offs. To the contrary, there is a mounting request, from seller nations to reduce, eliminate offsets or at least introduce principles that will reduce the adverse effects of offsets. The issue is not of offsets policy itself but the execution and the implementation of offsets. The offsets community must find innovative methods of making offsets work better, with greater clarity and transparency.

### **Offsets Value are Ever-Increasing**

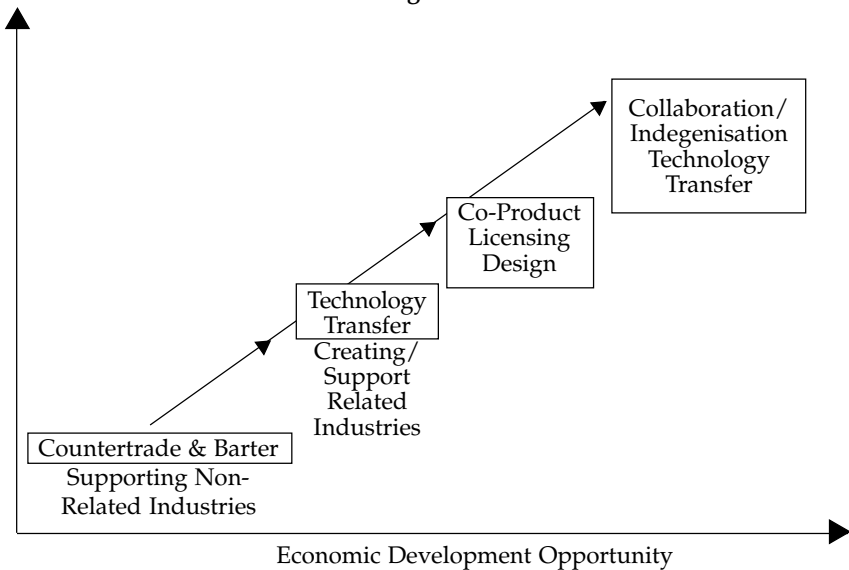
Today, offsets are widely practiced in many parts of the world including the Nordic region, Asia and the Middle East. From just around 20 countries in the early 1950s, today more than 130 countries have some form or another of offsets practice.

The US Department of Commerce Bureau of Industry and Security (BIS) has an extensive database of offsets value created through US businesses abroad. BIS captures offsets value, transactions, direct and indirect composition, offsets value by category and country from 1993-2009. The 15<sup>th</sup> BIS annual report show that during the period 1993-2009, U.S firms reported entering into 736 offset-

related defence export sales contracts worth \$108.22 billion with 46 countries<sup>3</sup>. The associated offsets were valued at \$75.90 billion.

In 2009, the report also illustrates that the total offsets agreement value has increased by 4 per cent from 2008 to 2009, forming 62.7 per cent of the total value of signed defence export sales contract<sup>4</sup>. This growing statistics goes on to prove that offsets are prevalent in most countries' procurement strategy. Although many other nations do not have published offsets transactions or value, nevertheless the current trend seems to prove that offsets are on the rise.

**Table 1: Evolving Nature of Offsets**



### **Evolving Nature of Offsets**

Based on both buyer and seller driven objectives, offsets strategy over the years have continuously evolved to become increasingly innovative, whereby from simple barter type of activities, this tool is today used to leverage high-end technology transfer, defence and related industry capability, and value-added activities such as co-production, licensing, design and manufacturing. Offsets are also being explored as a structured financing tool by countries with financial constraints, but recognize the need to acquire military assets to support defence and security capability. Countries such as Kuwait, UAE and Oman have explored the structured finance offsets strategy for industrial development<sup>5</sup>. The offsets evolution can be traced into 4 major waves over the past 50 years.

#### **First Wave**

The first wave of offsets was in the form of barter without any cash transaction. This was the simplest form of offsets between two countries whereby there was exchange of goods, mainly commodities. This arrangement was later slightly

modified to include other types of trading arrangements such as switch and clearing arrangements.

### **Second Wave**

The second wave of offsets was mainly focused on leveraging technology through defence procurement to create a defence industrial and technological base (DTIB) and supporting dual-use industries. Many of the first tier countries such as the United Kingdom, France, Germany and Italy used offsets to develop their defence industrial base. This strategy was also later emulated by the second tier DTIB countries such as Norway, Sweden, South Africa, Brazil, South Korea, Turkey and India. Eventually, even smaller countries such as Finland, Denmark and Indonesia followed suit.

### **Third Wave**

The third wave of offsets evolution took place when countries with limited DTIB started to view offsets as a tool to develop their non-defence sector. This was mainly in leveraging high technology, investments, smart-partnerships, academic collaborations, and human capacity building. This was widely practiced in the Middle East such as in Kuwait, Qatar, UAE, Oman, Malaysia and the Czech Republic. Saudi Arabia, for example mainly concentrated in using offsets to develop its upstream and downstream petro chemical industries. This included joint venture where US companies provided advice, expertise and qualified manpower in the exploitation of oil and development of infrastructure and industry. SABIC, the Saudi basic industries corporation became the joint venture partner of major international petrochemical companies to establish petrochemical plants. In 1992, there were 336 licensed industrial joint ventures in the Kingdom of Saudi Arabia. In the Czech Republic, offsets were used to manufacture Skoda cars and other investments. In Malaysia, offsets were used for the development of an electronic warfare school and investments for development of airports for Malaysian companies.

At the same time, the demand for offsets in the defence field also graduated from simple technology transfer and low level work share to countries positioning for higher value added activities such as design, co-production and licensing. Jobs need to be created to cater to the indigenous capability, capacity and skills developed. Furthermore, the development of the DTIB also requires that it cater to domestic and overseas market. Offsets, therefore, are also required to provide for buy-back and market penetration opportunities.

### **Fourth Wave**

The fourth wave of offsets innovation that influenced many nations is the eagerness to utilize the technology and industrial capability acquired to translate them into tangible outcomes. These include indigenization, employment, exports and technology development through licensing, collaboration, and co-production. These developments are proven by policy reviews in many countries

such as India, South Korea, UAE, Kuwait, Malaysia and several Nordic countries, which are demanding for more direct offsets in the form of work share to sustain their shrinking DIB.

India, for example, imposes direct offsets amounting to 30 per cent of the total value of the deal on contracts worth more than INR 3 billion (USD 64.72 million). The policy published in 2006 was targeted to win at least USD 10 billion in defence offset contracts by 2011.

According to the UAE Offsets Bureau, their offset policy was reviewed in 2010 with a hybrid model that concentrates on input and outcome. The focus will be on joint ventures with a minimum of 30 per cent of obligation providing and output of 70 per cent. The input can be in the form of equity, industrial enablers, knowledge empowerment; and the output will include profits, enhanced exports and salaries of local versus expatriate. UAE's offsets policy is aimed to meet the overriding aim of its economic vision 2030 to transform its economic base. The investments are targeted at high investment high-priority areas. This is reflected in the allocation of offsets multipliers to contractor investments that will lead to emiratization of nationals as well as exports. This is in line with the country's strategy to increase employment, exports and revenue through offsets. Kuwait Offsets Company has also reviewed its offsets policy, now concentrating on direct offsets requiring work packages.

In Malaysia, the economic enhancement programme or EEP has been put in place to ensure maximum local content, vendor development and work share mainly in the direct offsets field, ensuring the sustainability of the existing defence industries. The EEP is imposed on local companies who are the prime contractors and will act as the integrators of the systems and platforms. This is in line with Malaysia's objective of achieving a high-income nation status by year 2020. Currently, two major defence projects being the procurement of the armoured vehicle (8 by 8) and Littoral Combat Ship has demanded for a high value of local content (60 per cent) with the requirement to also establish an extensive sub-contracting base. These requirements are said to be vital to sustain both the industries 'in-country' and still retain a certain level of capability, particularly in the automotive and shipbuilding industry, but also some level of technology and industrial capability in the defence sector.

An increasingly popular approach to modifying the offsets strategy is to look at collaborative projects. According to Jane's Defence weekly, expectation of greater collaboration over the five years are strong: where industries who enter into collaborative programs based on value are: 74 per cent of USD 1 billion plus organisations; 83 per cent in the USD 250 million to USD 999 million bracket; and 65 per cent in the USD 100 million to USD 249 million bracket except joint working to become a greater feature of defence industrial practices<sup>6</sup>.

Collaborative approaches are seen as the way forward when there are financial constraints and lack of competent and skilled workforce to support the market demand and increase productivity and competitive advantage of nations. A collaborative approach means shared risks and equitable work share through multinational procurement programmes. Nevertheless, collaborative



programmes have proven difficult in the past due to communication issues, cultural differences, low level of trust, and intellectual property right issues. Several projects where collaboration has proven difficult include the Eurofighter typhoon, Joint Strike Fighter and the A400M. These projects have had issues such as cost over-run, project delay, technology sharing, denial to the access of black-box and lack of industrial trust and cooperation due to cultural differences. Within ASEAN, for example, Malaysia had called for the ASEAN defence industry collaboration. This concept was recently adopted at the ASEAN Defence Minister 's Meeting (ADMM). It is yet to see how and when this concept will materialize and the suggested projects to be shared and developed between the 10 nations.

## **Diverging Development: Western versus the Emerging Economies**

### ***Western Nations***

The recent financial crisis and economic downturn has had a significant impact on the defence sector in Western nations. There is a greater push for defence consolidation and rationalisation to create a more unified approach within the defence industry. The changing defence environment has also had a direct impact on the defence- offsets sector.

In the US, for example, there is a continuing debate on reducing the adverse effects of offsets<sup>7</sup>. The 15<sup>th</sup> BIS reported that a key recommendation of the comprehensive interagency team was that the US Government should continue a dialogue with nations and international organisations to promote global understanding of how the different types of offsets impact the industrial base; encourage the development of global offset principles to limit the adverse effects of offsets; and encourage countries to provide defence contractors with maximum flexibility in fulfilling offset requirements<sup>8</sup>.

Similarly, the European Defence Agency (EDA) published its code of conduct in 2008, which came into force in 2009. This has made most of the EDA member states change their offsets policy by January 2010. The code states that offsets, both required and accepted, will not exceed the value of the procurement contract (100 percent offset limit). It also states that offsets will be considered of a less significant weight in order to ensure that a procurement decision is based on best available and most economically advantageous solution for particular equipment.

Finally, the code states that participating countries will allow foreign suppliers providing offsets to select the most cost effective business opportunities within the purchasing country for the offsets fulfilment (subcontracting), enabling fair and open competition within supply chain where it is efficient, practical and economically or technically appropriate. The EDA has called for the gradual reduction in reliance of offsets within the EU member states, calling for greater efficiency, and transparency where offsets are demanded, and evolution towards use of offsets that help support the European defence technology and industrial base<sup>9</sup>.

The challenges of this model prevail over the merits as many of the EU countries are still bound by their own industries and technological needs and the requirements to have an indigenous capability developed. Collaborative projects such as the Eurofighter Typhoon and the A400M based on work share between nations still point out to an offsets model.

### **Emerging Market**

To the contrary, the emerging market defence requirements are on the rise, especially for countries such as India, Indonesia, and Malaysia. These escalating demands are focused on further enhancing defence industrial base in-country besides wanting great economic values for the huge outflow of currency. To ensure greater value for defence expenditure, governments of buyer countries are increasing their offsets demand. Most of these countries have reviewed their existing offsets policies to make it more stringent; demanding higher offsets value, higher multipliers, greater technology requirement and more work in-country.

### **New Issues and Development**

The contradicting international development between the west and the emerging economies is expected to provide 4 different outcomes based on recent development and analysis being; offsets supply, offsets demand, transparency in offsets practice, and innovation.

### **Offsets Supply**

The changing landscape in Europe, US and other developed defence industry markets, has arguably created the difficulty in providing for offsets. Most of the countries themselves are struggling to secure jobs, mainly in the high technology sectors. The increasing demand to create jobs for high skilled workers resulted in the governments of the exporting countries, mainly in the US, being extra cautious with regards to defence work leaving the country.

US BIS, for instance, has amended its offsets reporting regulation in 2009 to require that companies assign the appropriate North American Industry Classification System (NAICS) code(s) to each offset-related defence export sales contract and to each offsets transaction reported. This change is to gather a more accurate report on the economic impact of offsets on the U.S industrial base<sup>10</sup>. BIS report again captured the net impact in terms of input across all sectors of U.S economy resulting from offsets related defence export sales contracts. The results, however, indicating a positive overall net gain on U.S manufacturing opportunities arising from export sales contracts with associated offsets agreements, resulting in a positive \$7.4 billion in added 'input' opportunities for the U.S industrial base, and a net gain of 27,511 in employment opportunities created or sustained<sup>11</sup>.

Similarly in Europe, Turkey, Brazil and South Africa, there is a need to create more jobs to meet the demands of its young population and fresh graduates.

The question is as to how do these countries, which are mostly defence equipment exporters cum offsets providers, able to make available more defence work outside their countries to meet the increasing demands of buyer nations. What strategies are these countries to develop to be able to differentiate between jobs that they can keep in-country and the ones that they can outsource through their supply chain to meet the offsets demand?

### **Offsets Demand**

As we discussed earlier, offsets demand among buyer nations is also on the rise. Offsets policies are being reviewed to ensure greater clarification and to maximize offsets to buyer nations. For example, Malaysia had increased the offsets value from 50 per cent to 100 per cent. Indonesia is now developing its own offsets policy<sup>12</sup>. India, also has also reviewed its offsets policy to include civil and aerospace. Furthermore, recent trends prove that there is a demand from buyer nations to request for more direct offsets—defence related work such as in Malaysia, UAE, Kuwait, Indonesia, while it was as indirect offsets route previously. This proves that more defence work is to be created in-country.

Buyer nations have also introduced more stringent penalty for non-compliance and non-fulfilment of obligation. For example, Malaysia previously did not impose penalty on offsets but under the new guideline, a separate contract must be drafted for offsets with performance bond, showing how important offsets compliance and fulfilment is to buyer nations. BIS 2009 reported that almost half of the signed offsets agreements reported by the U.S industry contained liquidated damage penalties for non-performance of offsets obligation. There is an increase in obligation amount and requirement to post performance bonds/bank guarantees as part of the offsets agreements<sup>13</sup>.

### **Transparency in Offsets Practice**

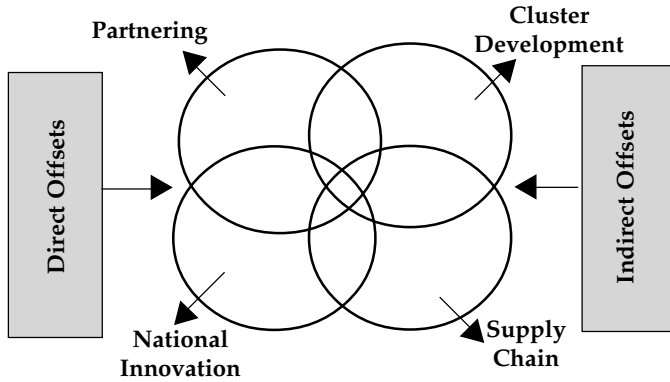
At the same time, there is also an increasing move to create greater transparency in the offsets world. Many of the recent offsets policy documents have incorporated clearer structure on bidding process, approval process and mechanism. These developments are related to the Al Yamamah incident and the subsequent Woolf Report, which spelled out in detail the offsets regulations, guideline calling for greater transparency and openness in the offsets trade. Transparency International (TI) has also produced various reports on these aspects calling for greater openness and transparent practice on offsets<sup>14</sup>.

However, the issue to be addressed here is not one confined to offsets alone but for the overall defence procurement and acquisition processes and practices.

### **Innovation**

The final aspect of offsets development in the international scene is the ever-increasing demand for offsets to produce innovative outcomes. The 4 areas of innovation as per table 2, either incremental or new in the offsets field, are cluster development, national innovation system, supply chain and partnering.

Table 2: Innovative Offsets Solutions



## Clusters

Clusters are groups of firms and sectors grouped according to their technology and networking characteristics. Clusters must compete and grow through innovation to be able to increase sustainability. Offsets were used in the past mainly to develop defence and aerospace cluster and was mainly identified as a pro-active strategy to develop late-comer clusters mainly linking with foreign partners and sources of technology and knowledge.

For example, in Malaysia, Boustead Naval Dockyard, a government owned prime-shipping company based in Lumut, with capabilities in the naval defence sector had used several of the government purchases such as the OPVs and NGPVs to establish a maritime cluster in Lumut and Manjung, Perak, in the northern region of Malaysia. There are around 200 maritime industries specializing in various capabilities in the shipping and related industries, which are based around Lumut and Manjung servicing Boustead. Similarly, a naval academy has been set up to train the Navy and industry on maritime technology. STRIDE, the government's defence research organisation, is also located within Boustead's vicinity to undertake research in the maritime sector. Boustead is also planning to build a maritime university.

Also, the development of several aerospace clusters around the world including in the southern region of France- covering areas such as Marseille, Marignane, which has specialised in manufacturing of aircraft parts and helicopter design. The industries have also created a vast array of support industries located all around Marignane, which is 20 minutes from the airport. The southern hub of France employs a large number of the locals to its aerospace industries, mainly high-tech and design houses, aerospace simulator development and training centres. Also, Seville in Spain is another aerospace cluster area, mainly for the production of the A400M parts and components, assembly, production of simulators. Companies such as EADS and Indra have their base in Seville.

In Abu Dhabi, an aerospace cluster has been planned with the purchase of civil aircraft for more than 50 billion from UAE airlines Emirates and Ethihad in military aircraft- C17, C130J and Rafael. The aerospace cluster up-north of England near Wharton, East of England with a 5.5 million population, is a remote coastal and rural area, diverse with no one natural central city for the region, but one of the very initial aerospace clusters to develop the Northern England regional economy. 9 key sectors of industries developed for joint working on research projects. Eastern Aerospace Alliances developed a cluster-based company engaged in aerospace and defence business. This cluster includes Marshall aerospace of Cambridge, BAES, MBDA, Astrium, Academic institutions include Cranfield, Cambridge, Hertfordshire, and related organisations such as the Imperial War Museum.

Malaysia's aerospace cluster or the Malaysian International Aerospace centre is based in Subang, Selangor within the Subang airport site and has many aerospace and related companies located nearby. These include Airod, Eurocopter Malaysia, Agusta Westland Malaysia, Zetro Aerospace, MAS Engineering, SMEA, Strand Corporation, Hampshire, and Spirit Aero. These companies are mainly involved in the MROs, manufacturing of parts and components, both composites and metal. The aerospace cluster provides more than 1000 jobs in the high tech sector, mainly related to MRO activities, MIGHT is responsible for the development and growth of the aerospace sector in Malaysia.

Other countries, which have also used offsets for cluster development include South Africa, Canada, Turkey and India. India's aerospace and defence clusters are spread all over with aerospace cluster in Bangalore – HAL, BEL, Barath Electronics, Nasik for Eastern aerospace equipments, Bombay with industries such as Mazagone Dockyard mainly as maritime cluster. In Turkey, Ankara has developed an automotive cluster with industries such as FNSS, TAI and its sub- contractors. In South Africa, since 1999, Durban based shipbuilding cluster formed 19 marine engineering and shipbuilding companies. The Durban cluster formed the basis of the South African shipbuilding consortium that established links with relevant firms in South Africa and looked at the strategic defence programme to revitalize the shipbuilding industry historically centred in Durban. Cartagena at the south end of Spain is being developed as a maritime cluster. This township has created a huge shipbuilding and submarine building industry, providing jobs, and sprawling supply chain in the maritime sector such as submarine training schools, research centres and related industries.

### **National Innovation System (NIS)**

NIS is technology related analysis focused on inputs (research expenditure) and outputs (patents). Interaction among actors involved in technology development is important and investments into R&D are pertinent in translating inputs into outputs. NIS directs attention to linkage of web interaction with overall innovation system. NIS depends on fluidity of knowledge flows-among enterprises, universities and research institutions, both tacit and codified

knowledge. These knowledge flows include joint industry research, public/private sector partnerships, technology diffusion, and movement of personnel. NIS stresses that the flow of technology and information among people, enterprises and institutions are key to the innovation process. The relationship between enterprises, universities and government research institutes are vital in the NIS system. Various hubs were created by governments in the past including the silicon valley in Seattle, USA, IT hub in Bangalore, Selatar in Singapore and Technology Park (TPM) in Malaysia as part of the NIS initiative.

Offsets are a conduit that could provide the impetus to improve networking among sectors and institution in the system and to enhance the innovative capability of firms and their ability to identify and absorb technology. Offsets are recently being used to develop technology parks that provide the platform for such interaction and networking to occur. These require the industries, governments, and universities to be co-located within this park to create high level of interaction, R&D growth, and rapid human capacity development. Recently there are several initiatives to create defence and security related technology parks using the offsets method.

In the UAE, the country is developing the Tawazun Industrial park in Abu Dhabi, established for civil and military manufacturing activities. The park is located 30 km from Abu Dhabi International Airport within Zayed military city, in the district of Shahama. Malaysia is in the process of developing a defence and security technology park, the first of its kind in South East Asia, in the Northern region of Malaysia, Perak Sungkai on a 1,200 hectare of land. Similar initiative is being taken in Turkey towards developing a high-tech technology park using offsets credits.

### **Supply Chain**

Offsets will continue to be used as a mode to enter the supply chain of tier one companies. Smaller nations view offsets as an important route to enter the supply chain and secure work.

There are many examples of offsets being used to position industries of buyer countries into the supply chain of seller countries. This is was the case in South Africa, Malaysia, Czech Republic, South Korea, Turkey, mainly in the production of parts and components. Similarly, in the UAE—Tawazun precision Industries (TPI) provides components to other TPI based firms—supply chain capability building—Caracal, TPI and Burkan.

This strategy is seen as an important way for nations to assist their industries penetrate international market and gain the exposure to be able to alleviate their technology capability to eventually compete in the international market without offsets funding. Nations will continue to use offsets to gain business and enter the supply chain especially in areas where they lack the knowledge and technological expertise. Malaysia for example will now embark on the production of composite fenestron parts for the manufacturing of tail boom for the EC 725 helicopters.

## **Partnering**

Partnering is becoming increasingly important, especially in times of resource crunch, escalating cost of defence production and research and development as well as commercialisation activities. Besides mergers and rationalisation, industries also source for partnering opportunities. Offsets has always been a popular route to explore and solicit partnering, especially between multinationals and local companies. Partnering is viewed as a viable model for technology sharing, reducing huge start-up costs for local companies, leap-frog and a much more practical way for multinationals to understand and immerse into the local business environment.

For example, in South Korea, actions are being taken to consolidate the defence industry by offering financial incentives to businesses that undertake mergers and acquisition (M&A) activity with country aimed primarily at strengthening defence companies' R&D capabilities. DAPA offers tax cuts and soft loans for companies to acquire smaller and medium sized companies.<sup>15</sup> This is because it is becoming more difficult for the Korean government to support smaller defence industries through internal acquisition. Policy supplemented by an update to country's offsets scheme in early 2010 allows for foreign firms' contractors to meet offsets obligation by investing up to 40 per cent in existing or new companies. Foreign companies are now interested in KAI manufacturer of T50 golden eagle and jet trainer and K TI basic trainer, (30.5 per cent) and Daewoo Ship and Marine Engineering (50.4 per cent).

Atlas Defence Technology (ADT), a subsidiary of Boustead, that specializes in combat management system has partnered with Atlas Defence of Germany under the New Generation Patrol Vessels (NGPV) offsets programme for the combat management system. ADT has been able to leverage foreign technology and knowledge through partnership. Similarly, Transmaris, a Malaysian company specializing in vessel management and coastal surveillance radar partnered with a Norwegian company Vis Sim.

## **What are the Challenges to Offsets Practice?**

There are various challenges encountered by governments, industries and others in the offsets industry. Firstly, the pertinent question to ask is whether nations have the sufficient resources to embark on a certain type of technology and industry activity. Nations must be ready to allocate sufficient resources if it is to embark on rapid industrialisation. The question is as to how the resources are allocated, developed and distributed? Are the resources allocated efficiently (these would include manpower and skills)? Is there sufficient skilled workforce to undertake work, especially if it were to be leveraged through offsets? Can the offsets request be met by the existing capacity and capability available? Are there any government strategies and policies being developed to address this issue?

Secondly, offsets initiatives are solely Government driven. Offsets are a policy tool used to enhance in-country capability. This means that the Government and the policy makers have to constantly review the policies to

ensure that the nation is absorbing the maximum value of offsets. Government driven initiatives most often requires constant monitoring, continuity and there must be appreciation of issues. The downside to this is that sometimes, changes and innovations would be slow and have to be externally driven by industries and technology recipients.

Third, in the offsets recipient selection process, do industries and governments truly access the industry capability? The question is as to whether the industries have the sufficient technological absorption capability? For a successful offsets, the fundamentals must be in place such as sufficient workforce, infrastructure and a minimum level of absorption capacity. In some developing countries, such resources, capability and capacities are scarce. Therefore, offsets can only absorb limited value or offsets activity, and not being able to maximize offsets packages.

Fourth, do host countries produce sufficient skilled human resources? Human resources are vital to ensure that the buyer nation is able to take on the offsets work or technology transferred. Does the buyer country, for example have sufficient aerospace engineers to take on aerospace related work? Are the universities producing sufficient graduates in biotechnology, nano-technology, green technology, space technology etc. in order to leverage such high-technology related work through offsets?

Malaysia, for example, has an unemployment rate of 70 per cent among its local graduates mainly in the IT and engineering sectors. Research indicated that this was due to the fact that the training and exposure provided did not meet the requirements of the industry. Is the Government willing to allocate sufficient resources and R&D capacity for development? It is vital to compare a nation's R&D commitment against its total budget. Is there a dedicated allocation for R&D? R&D is crucial for innovation and offsets project would require sufficient R&D related work, which has to be shared between the country, industry and OEM to embark on commercialisation. US, EU, China and Japan are the top 4 R&D spenders in the world. US spends 3 per cent of its GDP on R&D mainly space technology, medicine, education and science. Budget for fiscal year 2010 allocated \$50 million to the Department of Commerce's Economic Development Programme to boost R&D commercialisation. Russia, for example has 4,500 centres, which employs 2 million in R&D. The issue is whether all countries can afford to do the same?

Can countries that are competing for offsets fund to train its workforce and secure work packages also allocate offsets towards R&D? Are the industries prepared to invest in the commercialisation process? Malaysia for example has a very small amount of R&D budget allocated to defence and non-defence. Offsets have in the past not been used to capture R&D activities. However, in the future, certain percentage of offsets could perhaps be committed towards R&D and commercialisation leading to process and product innovation. The identified projects could be one partnered by the OEM and the local company with their research agencies and universities.

Finally, the global economic turmoil, followed by the sudden rise of people's demand for better quality of life through employment creation has created



pressure on governments' around the world to create job opportunities for its people. Offsets will be seen as a vital tool to create employment and to sustain industrialisation. Many nations are now reviewing their offsets policy to demand for more direct type of offsets work. However, the issue is whether there is sufficient work in the related areas around the world to go around? Can exporting nations and their industries cope with the alarming demands? What can they outsource and how much work can they move from their home market without creating turmoil within their own market. How can the industry offsets strategy cope with the similar needs of the various nations?

For example, OEMs have complained of a non-workable offsets policy that makes more commercial sense for overseas obligors to be able to generate value and benefits for Indian industry<sup>16</sup>. India, targeted to win USD 10 billion in defence offsets contract by 2011, although by end of 2009, less than USD 2 billion worth of work had been secured since the policy was introduced<sup>17</sup>.

The UAE offsets policy has also had negative reaction from OEMs claiming that 'the policy appears almost 'specifically designed to punish foreign defence contractors'<sup>18</sup>.

### **Suggested Policy Prescriptions**

Offsets will continue to remain an essential part of international acquisition practices. Nations need to re-evaluate their offsets strategy and develop offsets policies, which could leverage maximum industrial and technological development. Offsets providers also need to be more engaged and understand the buyer nations' offsets requirements for a winning strategy. A flexible offsets policy may provide greater opportunities for both offsets provider and offsets recipients to provide creative and innovative offsets solutions.

### **Offsets Recipient Consideration**

Nations should appoint a centrally coordinated Offsets Management Authority (OMA) to coordinate offsets. The OMA should be responsible for developing the strategy and vision for offsets; review of offsets policy and process, and offsets human capacity development. OMAs should be responsible to decide on the defence and non-defence as well as the direct and indirect offsets apportionment. Offsets programme requirements should consider in-country absorptive capacity, human skills and supplier base.

OMAs should be tasked to identify gaps in existing offsets policy and review the effectiveness of offsets programmes and projects. OMAs should also be transparent in the overall offsets management coupled with clear implementation and execution plan. OMAs should also constantly evaluate offsets processes to ensure that the existing processes provide clear governance structure and systems to monitor the successful delivery of the offsets programme. OMAs should invest in developing appropriate offsets management skills and negotiation skills. Special programmes should be developed to train the offsets authorities and staff to understand and manage offsets more effectively.

## **Offsets Provider Consideration**

Offsets providers must be genuine in wanting to fulfil offsets obligations<sup>19</sup>. Almost 70 per cent of the OEMs claim that they have genuine interest to perform but are often derailed by many factors such as political interference, conflicting and contradictory requirements and their own government policies on defence technology. Offsets providers should also consider comprehensive offsets proposal and business plans and be able to justify their proposals and credit claims. OEMs must create the environment for constant interface and engagement with government authorities and OMAs to be able to appreciate the offsets recipient nation's strategies and political-economic considerations.

## **Conclusion**

Offsets will remain a vital component of the acquisition strategy as long as technological and industrial gap exist. However, offsets take a much broader role within a nation's development plan. The dynamic international environment has resulted in a much more complex offsets practice. Both buyers and sellers are now required to be more innovative to be able to maximize returns. The issue at hand is not to eliminate offsets but to re-evaluate its effectiveness in order to make offsets work.

## **NOTES**

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3. US Department of Commerce, Offsets in Defence Trade: Fifteenth Study, [Online],(Bereau of Industry and Security, Us, 2010, (Accessed June 2011), available at [http://www.bis.doc.gov/news/2011/15th offsets defence trade report.pdf](http://www.bis.doc.gov/news/2011/15th%20offsets%20defence%20trade%20report.pdf)
4. US Department of Commerce, Offsets in Defence Trade: Fifteenth Study, [Online],(Bereau of Industry and Security, Us, 2010, (Accessed June 2011), available at [http://www.bis.doc.gov/news/2011/15th offsets defence trade report.pdf](http://www.bis.doc.gov/news/2011/15th%20offsets%20defence%20trade%20report.pdf)
5. Over the years, this practice is claimed to have brought financial assistance without much of indigenization and genuine technology transfer.
6. Jon Grevatt, Industry unites in call to cut India's red tape, Jane's Defence Weekly, p. 5.
7. Section 7(c) of Public law 108-195 amended section 123(c) of the DPA required the President of the United States to designate a chairman of an interagency team to consult with foreign nations on limiting the adverse effects of offsets in defence procurement without damaging the economy of the defence industrial base of the United States, or the US defence production or defence preparedness.
8. US Department of Commerce, Offsets in Defence Trade: Fifteenth Study, [Online], (Bereau of Industry and Security, Us, 2010, (Accessed June 2011), available at [http://www.bis.doc.gov/news/2011/15th offsets defence trade report.pdf](http://www.bis.doc.gov/news/2011/15th%20offsets%20defence%20trade%20report.pdf)
9. BIS report mention that the EDA code of conduct on offsets only applies when participating countries are making purchases under an Article 346 derogation of the European Treaty. The Article 346 derogation allows EU members to purchase articles

essential to national security outside of normal EU procurement rules, including the new EU Defence Procurement Directive.

10. Industry sectors, defined by NAICs, include both manufacturing and non-manufacturing (including services) sectors. In 2009, 88.3 per cent of the reported defence export sales contracts with offset agreements were manufacturing-related based on the total value of reported contracts. The top four industry sectors reported by industry for 2009 were aircraft manufacturing; other guided missile and space vehicle parts and auxiliary equipment manufacturing; radio and television broadcasting and wireless communication equipment manufacturing and other ordnance and accessories manufacturing. These four categories represent 71.4 per cent of all defence export sales contracts reported for 2009. BIS 2009 report.
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15. South Korea seeks industry consolidation' *Jane's Defence Weekly*, Jon Grevatt, p. 18.
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18. Wagstaff-Smith, Keri, UAE offsets policy sparks overseas contractor criticisms, *Jane's Defence Weekly*, p. 19.
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# Impact of India's Offset Policy on Military Industrial Capability and Self-Reliance

*S.N. Misra*

## **Introduction**

India ranks third in terms of arms import (\$12B) and ninth in terms of military expenditure (\$36.3B)<sup>1</sup>. Despite its fairly strong indigenous military production capability, India's dependence on imports is staggeringly high (70 per cent) over the years, showing no signs of abatement.

The MoD introduced offset provisions in its Defence Procurement Procedure in 2005 (DPP-2005) for capital acquisition schemes exceeding an estimated cost of Rs.300 Crores, i.e. around \$66 million to leverage its big ticket acquisition bring in FDI, JV arrangement, skill up gradation, Manufacture Repair and Overhaul (MRO) capability with a view to bolstering its military industrial capability, with concomitant impact on improving self reliance.

The offset guidelines were liberalized in DPP-2009 and 2011 by including provision for credit banking and civil aerospace and homeland security products. The Defence Production Policy (DPP-2011)<sup>2</sup> outlines a road map for indigenisation and improving our indigenous capability for critical items.

Prior to the issue of a formal offset policy, offset arrangements like license production and technology transfer; counter trade had been in vogue since early 1960s with Russia and a few western countries.

This paper examines the impact of offset license production during 1960s to 2004 and during 2005-2011 in bolstering our indigenous military capability and improving self-reliance. The offset realisation of around \$2B during 2005-2011 has been mainly for sub contractorisation of low end products and services, setting up MRO (Manufacturing, Repair and Overhaul) facilities, training and simulators. The expected inflow of FDI, JV and long term business partnership through co-production, design, development route with foreign OEMs (Original

Equipment Manufactures) has, however, not happened. Nor has there been any impact on export promotion.

This paper argues that procrastination in major policy issues like increasing foreign equity component to at least 50 per cent, including technology transfer in priority areas and assigning suitable multiplier be abdicated, and a fully empowered and technically equipped Offset Facilitation Agency put in place to oversee the implementation arrangements effectively.

### India's Military Industrial Complex

India's military industrial complex consists of 9 DPSUs, 40 OFs, 50 DRDO labs, 140 private defence companies, 5000 SMEs (Small and Medium Enterprises) involved in production of around 450 items<sup>3</sup>.

### Product Range: DPSUs and OFs

The nine Defence Public Sector Enterprises (DPSUs) are engaged in manufacture of wide range of products like helicopters, fighters, warships, submarines, patrol vessels, heavy vehicles and earthmovers, missiles and a variety of electronic devices, alloys, and special purpose steel.<sup>4</sup>

The forty ordnance factories are engaged in production of small arms and ammunition of all the weapon systems, clothing, armoured and transport vehicles<sup>5</sup>.

A very high degree of self reliance has been achieved in these areas except in the area of artillery guns of 155 mm calibre where army is still groping to fill up the void in towed and wheeled category thanks to the Bofors imbroglio.

The DPSUs and OFs have built substantial production capability largely through license agreements ('Buy and Make') since 1960s for tanks, ICVs, vehicles, missiles, frigates, submarines, aircrafts, and electronic devices.

An overview of performance of the DPSUs and OFs Value addition and Profit After Tax to Sales is placed below as Table 1.

**Table 1: Financial Performance of DPSUs/OFs (2009-10) (Rs. in Crs.)**

DPSU	VOP	VOS	PAT	Value Addition
HAL	13489	11456	19674	39%
BEL	5247	5219	7208	41%
BEML	3708	3537	222.8	39%
MDL	2856	3150	240.1	23%
GRSE	870.7	424.2	114.8	35%
GSL	866	472.9	130.7	37%
MIDHANI	373	371	44.6	57%
BDL	631.6	627	33.7	50%
HSL	608	618	2.3	-
TOTAL	28649.3	25893.1	3477.2	38%
OFS	11817	8715	—	85%
Grand Total	40466.3	34610.1	3477.2	50%

Source: SRI Reports.

The value of sales of DPSUs and OFs (Ordnance Factories) was of the order of \$7.7B during 2009-10 with Profit after Tax to Sales at healthy 13 per cent for the DPSUs.

### **DRDO: Major Programmes**

The 50 defence R&D labs/establishments are engaged in progressive enhancement of the self-reliance of defence systems.<sup>6</sup>

Some of the major milestones towards making the country self-reliant in the areas of military technology are:

- Prithvi (Surface to surface missile) in the ranges of 150 km and 250 km
- Agni-I (Surface to surface missile) with a range of 700 km
- Akash (Surface to air) missile with 25km range
- Brahmos (Supersonic cruise missile)—a JV product of India and Russia
- Light Combat Aircraft (LCA) Tejas, whose IOC (Initial Operational Clearance) is scheduled for December 2011
- Battle-field surveillance radar- short range, phased array radars
- Electronic warfare programme for the Army (Samyukta) and the Navy (Sangraha)
- Multi barrel rocket system (Pinaka) in 37.5 km range
- Hull mounted sonar HUMSA (NG)
- Torpedo Advanced Light (TAL) MK-1

The value of systems, products and technologies developed by DRDO and inducted into the services is in the range of \$11B<sup>7</sup>.

### **Private Sector Participation**

Consequent on opening up of the defence industry sector in May 2001, allowing Indian private sector participation with FDI cap of 26 per cent, a number of JVs have mushroomed between Indian and foreign companies.

Major private sector industries and SMEs are actively engaged in software development, engineering services, manufacturing and sub-assemblies, accounting for 25 per cent of components<sup>8</sup> to DPSUs, OFs, giving the 14 per cent share in the overall market. Private sector in India is still at a nascent stage compared to other developed countries. The private sector companies are associated with national and strategic programmes like LCA, MBT (Main Battle Tank), Pinaka, Arihant, Dhanush and Brahmos. Many of them have excellent facilities but significant limitation in terms of design capability and system's integration. The 'Buy and Make' (Indian) option in 2009 would provide private sector a window to TOT<sup>9</sup>, which was the exclusive preserve of DPSUs/OFs earlier.

They are now into cost effective production of fast patrol vessels and IPVs and outcompeting defence shipyards—thanks to the level playing field provided in Ship Building Procedure<sup>10</sup>. Even DPSUs like HAL are giving way to the Tata's in manufacture of aerostructures and cabins where foreign OEMs like Lockheed Martin and Sikorsky have shown distinct predilection for partnership with Tatas.

## Self-Reliance

A review committee headed by Dr. Kalam, the then SA to RM, with participation of all the Services and the DPSUs, in Oct 1993 took note of uncertainties in supply of defence systems by countries of the former Soviet Union, mounting pressure of embargo on critical technologies from developed nations and set a goal of enhancing the indigenous content in the defence inventory from 30 per cent (1995) to a possible 70 per cent by 2005—in a 10 years' time.

Self-Reliance Index was defined as the ratio of Indigenous Systems Procurement Cost to Total System Procurement Cost of the year.

The Committee identified the future systems required (Table 2).

**Table 2: Future Systems Required**

- 
- Automated Air Defence System
  - Satellite Based Navigation System
  - Air andSpace Based Early Warning System
  - C4 I System
  - Under Water Sensors andweapons
  - Medium andLong Range Guided Missile System with Launching from Multiple Platforms
  - Unmanned Air Vehicles
  - Stealth Air Craft
  - Air Borne EW (Electronic Warfare) System, (ECM andECCM) (Electronic Counter Measure)
  - Very small Aperture Terminals for Satellite Communication GPS (Global Positioning System) Receiver
- 

Despite impressive indigenous capability interests of investment and manpower in our DPSUs and OFs, the self reliance quotient has not moved beyond 30 per cent.

In the aerospace sector, predominant reliance on licensed manufacturing without taking adequate steps to bolster nascent design and development capability is attributed as a major cause<sup>11</sup> of our lack of indigenous capability in the fighters segment. Besides, the vertical disjunction between design, development and production agencies is a serious problem in aircraft design, development and production.

The Soviet Union brought the production agencies directly under the design bureau with remarkable results. Tony Saich observes that the major organisational problem with S&T System has been lack of linkage across vertical structure; particularly between the research and production sectors.<sup>12</sup>

The Defence Expenditure Review Committee (2009) accordingly makes a strong case for drawing a self-reliance road map for attaining the goal of 70 per cent indigenisation in a 15-20 year time frame.

## Gaps in Critical Areas of Technology

Self-Reliance is linked to indigenous capability to design, develop and produce critical subsystems like propulsion, weapon, and sensors of major platforms.

The areas identified by Dr. Kalam 18 years back remain largely unchanged (Table 3).

**Table 3: Critical Technology**

1	Gas Turbine Engine	(a) Single Crystal and Special Coating for turbine blade
2	Missile	Uncooled FPA seekers
3	Aeronautics	Smart Aerostructures Stealth Technology
4	Material	Nano Material, Carbon Fibres
5	Naval Systems	Super Cavitating Technology
6	Sensors	AESA, Radar, RLG, INGPS
7	Communication	Software Defined Radio
8	Avionics	Gen III, II Tubes
9	Surveillance	UAVs, Satellites

*Source:* DRDO, BEL and HAL.

Even aero-grade material used for fuselage by fighters and high quality steel required by frigates, submarines and aircraft carriers our dependence on imports is around 90 per cent. It is sometimes alluded to lack of economies of scale<sup>13</sup>, which is indefensible as India must have indigenous capability to produce such critical material required recurrently for producing aircrafts, frigates, submarines, and aircrafts carriers.

### **Budget Trends: Capital Acquisition**

There has been a significant spurt in acquisition by IAF and the Navy in recent years, major acquisition contracts signed being viz. MIG 29 upgrade (Rs. 3856 Cr.), Medium Lift Helicopters (Rs. 5600 Cr), C-130 J aircraft (Rs. 366 Crores) and LRMRASW (Long Range Maritime Reconnaissance and Surveillance) Aircraft) for the Navy (Rs.10684 Crores).

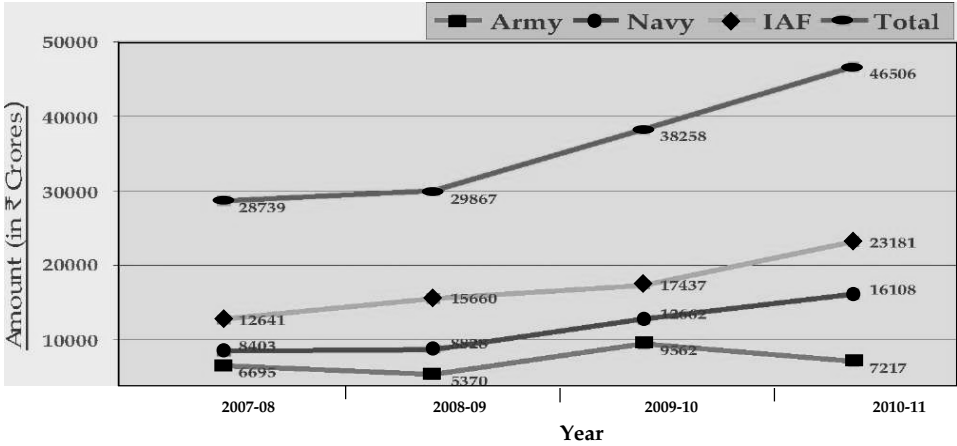
The trend of capital acquisition expenditure is placed below as Table 4.

**Table 4: Capital Acquisition Expenditure**

<i>Service</i>	2007-08	2008-09	2009-10	2010-11
Army	6695	5370	9562	7217
Navy	8403	8828	12662	16108
IAF	12641	15660	17437	23181
Total	28739	29867 (0.4%)	38258 (27.4%)	46506 (21%)



The trend analysis is as under Capital Acquisition Expenditure



Source: Defence Service Estimate MoD and MoD (Finance/Budget).

### Offset Contracts (2005-11)

The broad details of the 12 acquisition programmes and offset contracts concluded with foreign companies is placed below as Table 5 below.

Table 5: Offset Cases: Contracts Finalised (2005-10)

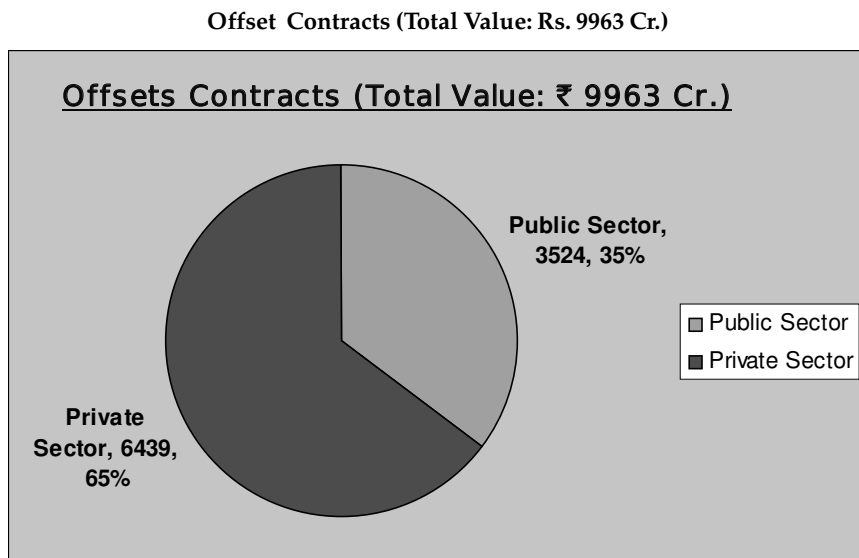
1	Medium Power Radar	IAI ELTA Israel	810	243
2	Upgrade of Mig-29 Aircrafts for IAF	ROE, Russia	3856	1233
3	Fourth Fleet Tanker	Fincantieri, Italy	800	240
4	Long Range Maritime Recce Anti-Submarine warfare Aircraft	Boeing, USA	10684	3205
5	HAROP UAVs	IAI, Israel	720	220
6	Medium Lift Helicopters	Rosoboron Export, Russia	4950	1485
7	C-130 J Aircraft	Lockheed Martin, USA	3666	1100
8	EO/IR Pods - Jaguar upgrade	RAFAEL, France	350	159
9	Fourth Fleet Tanker—under option clause	Fincantieri, Italy	800	240
10	Low Level Transportable Radar (LLTR)	M/s Thales, France	570	171
11	VVIP Helicopters	M/s Agusta Westland UK4227		1268
12	UAV	M/s IAI	1265	379
	Total		32698 Cr.	9943 Cr.

Source: DOFA, MoD.

### The Highlights of Offset Contracts

- A steady increase from \$ 48.6M in 2007 to \$519.5M in 2008, \$974M in 2009 to around \$ 700 M during 2010.
- The Aerospace sector accounts for 65 per cent and balance by the other services.
- Level playing field concerns has been turned on its head as the Indian private industry accounts for 70 per cent of value of these contracts.
- The DPSUs viz. HAL and BEL and Tatas and L&T from the private sector are major players.
- The SMEs and IT companies have also a fairly handsome share.
- There is no positive impact on exports.
- In terms of FDI inflow for infrastructure, production and R&D, the impact is minimal.
- Only one case of credit banking has been approved so far.

A pie chart showing an overview of contracts amongst private and public players is placed below:



### Major Areas of Offset Realisation

The major areas of offset realisation are (a) Sub contractorisation (58 per cent) involving supply of fuselage, cabins, radome, tail cone, data link, and other products (b) Engineering projects, project management, (c) Overhaul and repair facilities (16 per cent) (d) Various types of training facilities, simulators and (e) Ground handling and support equipments.

**Table 6: Per cent Share in Offsets**

Manufactured final assembly	58%
Simulators, Training Centre	18%
MRO	16%
GHE/GSE (Ground Handling and Support)	8%

Source: DOFA, MoD.

## Impact of Offsets

### *Aerospace Sector*

Neoclassical economy theory stresses the advantage of exchanging money for goods through conventional markets. However, purchase of aerospace goods provides multi-dimensional benefits like security, jobs, technology that may not be amenable to a single efficiency criterion. These high technology products are characterised by oligopoly.

Consequently, the establishment of a mutually satisfactory bargain can be enhanced if the dimensions of the bargaining problem are increased through price and offset terms<sup>14</sup>.

The aerospace sector is historically the prime beneficiary of offsets as most countries source their fighter aircrafts like F5, F15, F16 and F18 from USA with varying degrees of offset obligations.

USA accounts for nearly 60 per cent of global arms production, which was around \$ 471 B during 2008<sup>15</sup>. Of the 100 major global arms producing companies, aerospace products account for nearly 80 per cent<sup>16</sup>.

In India the aerospace sector is a near monopoly of HAL. Despite a formal offset policy has been promulgated in 2005, HAL has been beneficiary of technology transfer for quite some time through license arrangements. The impact of such offsets in major TOTs transferred by Russia for MIG 21(1960s-70s), MIG 27, MIG 29, and SU30 (1996) has enabled HAL to achieve high level of technology capability in manufacturing combat aircraft and engines.

The TOT arrangements, however, has not created defence industrial capability for supplying advanced weapons system that would be competitive with western equipment—nor has the technology gap closed<sup>17</sup>.

The types of work realised through offset arrangement in HAL are as under:

**Table 7: Types of Offsets in Aerospace Sector**

1. Build to Print	32%
2. Design to Build	21%
3. MRO Facilities	27%
4. Software Packages	12%
5. Design Packages	8%

Source: HAL.

### **MRO Capability**

In the defence sector it is contended that capability to undertake MRO, (Manufactures Repair Overhaul) upgrade and assemble is the most basic level capability<sup>18</sup>. In Malaysia, offsets have facilitated development of local maintenance, repair and overhaul capacity. Establishment of depot maintenance capability (MRO) was one of the key areas recommended by Dr. Kelkar through offset arrangements.

The offset contracts for MIG 29 upgrade and VVIP helicopters are in this genre. In case of the 'Globe master' contract, HAL is likely to benefit in terms of ROH (Repair Overhaul) facilities through offset.

Presently, North America and Europe contribute with more than 60 per cent of global MRO market. Singapore is also an emerging MRO hub. Substantial amount is spent by organisations in MRO than on acquisition. This should be a thrust area for HAL and the private sector in partnership with global companies.

### **Credit Banking**

A provision of banking credit with sunset and sunrise clause was introduced in DPP 2009. Of the 8 proposals received, only one has been approved so far in respect of M/s. Eurocopter.

There has been unusual prevarication in MoD to finalise such banking arrangements although the amounts involved are insignificant and that too from reputed OEMs. This has understandably embittered many foreign OEMs as they look for expeditious approval process.

There is also a perception that the policy makers are unnecessarily intransigent on sunset and sunrise period, which can have a flexibility of 5/7 years.

### **Indian Partners**

A questionnaire was sent to Indian partners involved in ongoing offset contracts to elicit their response to such arrangement with OEMs. From the feedback received, it showed that offset arrangement has helped HAL and SMEs in skill up gradation, boosting export and helping market penetration.

It would be seen that these contracts have favourable impact on export, skill up gradation with a potential for future business. Sustainment is another challenge. With defence being a very niche sector with specific skills requirement, it is important to develop training grounds for manpower.

### **Exports**

**Table 8: Trend of Exports**

<i>Entity</i>	<i>2008-09</i>	<i>2009-10 (in Crores)</i>
HAL	421	204.6
BEL	84	108.8
BEML	248	156.2
OFB	46	11.5
Total	799	481.1

Source: Annual Report, MoD.

It would be thus understood that except for BEL, there has been no impact of offset for promoting exports. A rank correlation between arms exports and size of defence industrial base during 1980-2006 for EDA (European Defence Agency) countries reveal a significant rank correlation (+0.76), showing that size of the DIB (Defence Industrial Base) was positively associated with arms exports<sup>19</sup>.

### **Technology Development Capability**

In terms of its impact on technology capability, offsets seem to have facilitated introduction of new products, registration of patents with Indian players getting associated with a wide array of foreign players.

Significantly these SMEs are investing handsomely in R&D (20–40 per cent) making them technically fleet footed and more confident of absorbing leading edge technology. They are leaner, more agile, have low setup cost, high level of skills, and cost effective production of smaller systems compared to many larger private sector companies.

Big private Indian companies, therefore, need to invest more in R&D to encourage foreign OEMs to collaborate in high technology products. The private sector companies like Tatas, L&T, and Pipavav, despite having excellent facilities, have inherent limitations in terms of design development capability and system integration. Japan's success in fast technology absorption was largely due to its highly skilled personnel and low cost of labour.<sup>20</sup> This holds an important lesson for major private players and SMEs in India. HAL and BEL also need to up scale their R&D investment to around 10 per cent from the present allocation of around 6 per cent<sup>21</sup> if they intend to successfully absorb technology in major programmes like the Fifth Generation Fighter Air Craft (FGFA), Multirole Transport Air Craft (MRTA) and Tactical Communication System (TCS).

For instance, in France, R&D activities absorb more than 15 per cent of the turnover of Aerospace companies. French research excels in propulsion and combustion, composite materials, aerodynamics, acoustics, and embedded electronics making France a leading player in the aerospace and defence sector<sup>22</sup>.

### **Cost Effectiveness**

It's unlikely that the offset arrangement will lead to cost reduction, based on current trends. Offsets are generally considered economically inefficient and welfare diminishing, reflecting trade diversion rather than trade creation. Economists like Paul Dunne aver that economic benefits of offsets are simply an excuse and unproven and Prof. Brauer calls for full audit of each offset contract.<sup>23</sup>

It is also important to define methods to monitor, control and document offset accounting process, as well as the audit process should be identified<sup>24</sup>. Brauer and Dunne in fact contend that offsets do not result in cost reduction, do not create sustained jobs and TOT is limited to the military sector, which is quickly outpaced by advances in technology.<sup>25</sup> Experience of a few countries can be recounted as under:

Australia has a no cost premium expectation—but this is illusory. The

administrative cost of offset alone is expected to cost arms sellers anywhere from 7–10 per cent of contract value.<sup>26</sup>

UK's participation in the US dominated JSF (Joint Strike Fighter) programme is estimated to be 4 per cent more expensive than outright purchase.<sup>27</sup>

Denmark acknowledges that offsets result in added cost and Finland estimates 10-15 per cent added cost per offset contract.<sup>28</sup> Skons reports that in the Finnish F/A-18 Hornet deal, the administrative cost was 3-6 per cent of contract value.<sup>29</sup> For Belgium, Struys' reports show that offset related costs are 20-30 per cent of imported item.<sup>30</sup>

Prof. Eriksson reports, based on a study on the effect of offsets on European defence industry, that 5-10 per cent is a reasonable range for the direct cost of offset.

However, Prof. Hartley observes that in the procurement of F-16 by a consortium of 4 European Countries in 6 out of 11 offset sales the respondents were of the view that it led to lower costs and new sources of supply with follow on business.

Germany asked for 100 per cent offset during its rearmament period and additional costs accepted if it led to technology transfer.<sup>31</sup>

The offset claims of the vendors need to be properly evaluated, as they would have a tendency to inflate them. Both overseas firms bidding for defence contracts and national defence ministries have incentives to exaggerate the benefits of offsets. Some critics consider defence offsets to be detrimental to the services with additional cost penalties of 10 per cent for 50 per cent offsets.<sup>32</sup>

Francois Duppont Thales assesses additional cost cushioned by OEMs in offset arrangements to be of the order of 5 per cent.

Based on a study of offset contract for acquisition of a fleet tanker from M/s Fincantieri, the following broad observations are made.

- The OEM has offset arrangements with Indian companies like BEL, L&T, OFB and Wartsila Co. for combat system, hangar door, AK630 gun and propulsion engines.
- Though the first Fleet tanker has been delivered, only 50 per cent offset obligation has been discharged and OEM has been requesting for change of offset partners.
- There has been delay by OFB in supply of the Kavach System.

Prima facie, a global RFP without offset conditionality would have been less costly by about 15 per cent based on preliminary assessment made.

In the absence of a reliable body of data, any evaluation of offset programmes is incredibly difficult in India. The publicly available data provides only the financial size of the offset with a very brief description of the work.

USA is the only country where regular and rigorous attempts are made to track the impact of Offsets in terms of jobs, technology and international competitiveness.<sup>33</sup>

There is a need for greater transparency in data availability to public domain in MoD in respect to offset contracts. Similar oversight mechanism as provided by General Accounting Organisation (GAO) also needs to be in place in India.

Bernard Udis's case study of Swiss F5 purchase had revealed that cost premium up to 10 per cent is reasonable for well-established offset programme.<sup>34</sup>

Where offsets compel prime contractor to identify lower cost suppliers, they are likely to improve economic efficiency. In an imperfect market, asymmetric information and complex transactions, as defence acquisitions generally entail offsets might enhance welfare of purchase.<sup>35</sup> In a buy-back arrangement OEM will look for cost effectiveness of the production line.

The general conclusions, however, seem to be that;<sup>36</sup>

- The defence offsets are more expensive than off the shelf purchase.
- They create little way of new or sustainable employment
- They do not make substantive contribution to the general economic development.
- No significant technology transfer takes place to either civilian or military sector.

### **Lessons and Major Policy Issues**

As the foregoing would show, offsets have helped in sub-contractorisation of low end products and services, setting up simulator and training facilities, transferring soft skills like project management, lean management, depot maintenance facility and GHE/GSE (Ground Handling/Support Equipments).

However, in terms of Foreign Direct Investment (FDI) in production and R&D, Co-production, and Joint Venture arrangements, the response so far has been rather tepid and disappointing.

Some of the major policy issues that need to be addressed urgently to realise full potential of offsets, as successful countries like Japan, South Korea, Malaysia, Turkey and Brazil have done, are relooking at the equity cap for OEMs and allowing technology transfer credit and multiplier for niche technology and dual use technology areas.

### **FDI Cap in Defence**

As per DIPP (Department of Industrial Policy and Promotion) guidelines, 26 per cent FDI is allowed in defence subject to industrial license under IDRA (Industrial Development and Regulation Act) 1951.

DIPP circulated an approach paper in May 2010, rooting for more than 74 per cent FDI in defence production to offer significant incentives to foreign companies for transferring leading technology.<sup>37</sup> While CII, FICCI are recommend increase to 49 per cent with value addition conditionality, foreign OEMs strongly advocate such an increase as it would make economic sense to them in terms of long term stake in India. Dr. Kelkar and Deepak Parekh also recommend FDI higher than 49 per cent if they bring in critical technology.<sup>38</sup>

Air Commodore Jasjit Singh supports the case for increasing FDI to 49 per cent. However, if the FDI is more than 50 per cent it would leave the partner subsidiary to the foreign partner with no control of the Indian entity. Even with 50 per cent, a MOA (Memorandum of Agreement) should be drafted so as to safeguard indigenous interest.

Admiral Puri, EX-CISC (Chief of Integrated Staff Committee), a major votary for indigenization, is of the view that existing FDI limit is good enough to encourage JV arrangements. CEO, Sankhya also shares the same sentiments.

Countries like China witnessed substantial increase in FDI inflow from \$5.8B in 1990 to \$67.3B in 2007—due to liberal FDI norms. A Case in point is their JV with Embraer where 51 per cent FDI was allowed<sup>39</sup>.

Dr. Arvind Virmani argued before the FDI group in 2000-2004 Planning Commission that 100 per cent FDI in high technology defence equipment is preferable to being perpetually dependent on imports for the same items.

In Malaysia, the FDI varied between 30-70 per cent depending on the quality of technology coming in and ensured technology transfer of manufacturing skills in high end subsystems.

Scientific Advisor to the Defence Minister is of the view that FDI increase may improve manufacturing capability but not design capability.

JV arrangement with Russia for Brahmos cruise missiles is considered a useful model. Brahmos model with 50:50 FDI participation using core competences of India and Russia is perceived as a successful model for future needs of the nation.

The Brahmos JV was formed with Russia in 1998 with a 50:50 equity participation (\$300 m). Today it has successfully delivered its product, has an order book of \$4B, which is to swell to \$12B soon. It has been made possible due to the commitment of both JV partners and commitment of services.

India has come to be recognized as an economic and technological powerhouse in the making. Manufacturing now accounts for above 27 per cent of India's GDP and contributes with 53 per cent of total exports, 79 per cent of FDI and employs 11 per cent of the workforce<sup>40</sup>. Sectors like Telecom with a FDI limit of 74 per cent has been receiving significant FDI inflow (around \$25B)<sup>41</sup> in the recent past despite the global financial crisis.

Therefore, there is a strong case for increasing FDI to 50 per cent, so that the JV arrangements ensure reasonable IRR (Internal Rate of Return) to the OEMs. Dr. Vivek Lall, VP of Boeing India, is of the view that increasing FDI cap to 49 per cent will be consistent with other sectors and foster long term investment.

India adapted a liberal FDI policy since 2000. Such enabling environment has benefited both power and telecom sector significantly where they are allowed 100 per cent and 74 per cent FDI respectively.

The following table would show the impact of liberal policy on FDI inflow into these sectors.

**Table 9: FDI Inflow (in \$ Million)**

Sector	2005-06	2008-09	2009-10
Power	87.1	984	1437
Telecom	6236	2534	2223

Source: *Economic Survey*, 2010-11.



The phenomenal increase in wireless density from 261m in 2008 to 729m during 2010 is a testimony to this. MoD is already witnessing the successful JV arrangement with Russians in the Brahmos Cruise Missile programme.

Dr. Jalan is of the view that defence ownership and investment must be restricted to domestic corporations.<sup>42</sup> The security concerns are presently being addressed through licensing conditions of DIPP like right to verify antecedents, lock in period for transfer of equity, right to inspector control and despatches in these facilities. Technology is a nonlinear tool, which could cause fundamental changes in the level of economic competitiveness. India has a long way to go in overall technology standing.

It is essential that in order to upgrade technological capabilities the offset policy must not only include manufacturing content but technology transfer content.<sup>43</sup> For that the FDI policy has to give enough economic incentive to OEMs to invest in India out of various alternative options and destinations.

USA and UK allow 100 per cent FDI by ensuring electronic access control to sensitive information and management processes. Such oversight mechanisms can be put in place to allay the security infringement concerns.

### **Technology Transfer**

Inclusion of technology transfer for identified key technologies seems to be gaining wide support in offset policy.

Often governments seek the transfer of new technologies into the domestic economy where through offsets the vendor agrees to establish to a local plant. Eventually, such new technologies diffuse throughout the economy, stimulating economic growth. Because of such diffusion the benefits to the society exceeds the benefits to the firm.

Therefore, Udis and Maskus suggest that offsets may be a more efficient way of acquiring technology than a straightforward purchase.

Many DPSUs like HAL, BEL, BDL, MDL, and Midhani have been recipients of technology predominantly from Russia and a few Western sources.

While substantial indigenisation has been achieved in non-critical technologies, in critical technologies the perception is that OEMs rarely provide manufacturing know-how leading to continued dependence on OEMs for upgrades.

Mr. Rao, CMD, recounting his experience in BARC mentions that there is no point in reinventing the wheel but better to purchase technology and use talent to improvise and improve. Importing CANDU reactor from Canada in the 1960s and the improvements made by BARC has ensured that we today are at par with the Canadians.

Dr. Pillai is of the view that France, Russia and Israel have been the most reliable partners in terms of sharing technology in the past. Liquid engines technology has transferred by France, during Prof. S. Dhawan's time, which is a real cutting edge technology. He is of the view that technology absorption capacities of the DPSUs is rather poor and lab(s) are the best agencies to receive technology.

Prof. Brauer, a renowned expert, is also of the view that just because India is a big buyer of defence equipment does not guarantee that counterpart countries will transfer relevant technology<sup>44</sup>. Even if transferred, it can become obsolete by the time it is installed and absorbed.

Dr. Kalam, father of IGMDMP programme feels that TOT in the past to DPSUs/OFs only provided some manufacturing capabilities but not key technologies. Admiral Suresh Mehta, Ex-CNS, is of the view that TOT should be a stepping-stone to leapfrog and develop indigenous manufacturing technology when transferred. Successful technology needs defined underlay and buyers must have capacity or a knowledge base to absorb superior knowledge smoothly. Know-why must be insisted and no restrictive conditions accepted.

Mr. Mohanty, Ex-CMD, HAL is, however, of the view that HAL succeeded in getting high-end technologies because of dealing with foreign suppliers with firmness<sup>45</sup>. Dr. Krishnadas Nair, Ex-CMD HAL, also emphasizes manufacturing technology gains though licensed production of aircrafts, engines, avionics and accessories.

Key technologies like Single Crystal blade for turbines was passed on by

Russia and successfully absorbed making Engine Factory Koraput an important destination for getting engine components machined by reputed engine houses like Pratt and Whitney.

A profile of indigenisation achieved in various products through technology concomitant transfer and concomitant cost reduction in DPSUs/OFs is placed below in Table 10.

**Table 10**

<i>DPSU</i>	<i>Product</i>	<i>Indigenisation</i>	<i>Cost Saving</i>
BDL	Milan	71%	60%
	Konkur	70%	30%
HAL	SU30(Air Frame)	55%	45%
	AL31FP( SU30 Engine)	65%	45%
	HAWK	40%	18%
Medak	ICV	90%	50%
Midhani	Titanium Alloys	60%	15%
BEL	Sonoboys	70%	30%

Source: CMDs, DPSUs.

It would thus be seen that import dependence has been substantially whittled down with cost economies because of substantive technology absorption in manufacturing by our DPSUs and OFs. Capacity to absorb high tech will depend on skill sets available and training. Many of the programmes like SU30 and P-75 witness serious time lags in technology absorption due to lack of such skill and commitment to value addition.

However, know how is rarely passed on; nor the ability to design and produce critical technology through the TOT route.

Some economists suggest that obtaining technology through offsets is a more efficient way than direct purchase while DGIDSA feels that buying TOT through a competitive route is a better option<sup>46</sup>. When TOT is part of a large contract, the risk is shifted to the vendor who will have greater incentive to transfer technology successfully.

Dr. Vivek Lall, VP Boeing, is of the view that the 'Buy and Make' policy is adequate for platform related technologies. However, technology based offset projects share IPR (Intellectual Property Rights, i.e. tools, processes, s/w, equipment, data etc.) and are designed to assist, industry, R&D institutions and universities. Evaluation of technology for offset credit is a tricky issue. Pre- and post sales figures of a TOT recipient is suggested as sensible approach for evaluation.

On the issue of multiplier, the Ministry of Defence seems to be needlessly prickly. It is universally accepted that multipliers are drivers for passing key technology and manufacturing capabilities. The weight age varies on the quality of offset provided. It is rightly observed that the quality of offsets is more important than quantitative per cent of offsets. SA to RM suggests that multiplier can be used judiciously to attract cutting edge technology like Seeker and FPA.

## **Dual Use Technology**

Impact on the civil aviation sector consequent on inclusion of this sector in DPP-2011 is too early to judge. However, indications are that it has generated enthusiasm particularly for security related products like aero structures and cabins. Japan has been the prime beneficiary of dual use technology in areas like electronics, cryptography, sensors etc.

Dr. Rama Rao's Committee strongly advocates such technology for air traffic control, imaging for agriculture, water and mineral resources, met. and oceanographic study and disaster warning. In the area of flight display, avionics and in flights entertainment and propulsion systems, dual use technology will have excellent commercial spin-off.

Malaysia's MOD has given primacy to promoting priority dual use items<sup>95</sup> as it helps sustainment of business.

Furthermore, civil shipbuilding could also be considered for offsets. In the report of PM's group on Growth of Indian Manufacturing Sector, Shri Krishnamurthy has advocated a mission made approach for building domestic shipbuilding capability and new shipyards.

To meet the growing demand of ships, both for maritime trade and to meet the requirement of the Navy and the Coast Guard, it is crucial that the shipbuilding sector is provided due impetus. This requires a multi-pronged strategy to revitalise the Indian shipbuilding industry, which would encompass modernisation of shipyards, induction of contemporary technologies and construction processes, enhancements in ship-design knowledge, fiscal incentives, and public-private partnership.

The implications of a vibrant and competitive shipbuilding industry, on maritime security, energy security, trade security and indeed the overall economic development of the nation are enormous. Shipbuilding should be viewed in this overall strategic context. Moreover, we have made considerable progress in this area and today we are amongst the few selected nations, which build their own warships and submarines. However, with our expanding maritime responsibilities and interests, the shipbuilding sector could be considered as part of the products eligible for meeting Offsets obligations.

Warship shipbuilding is a crucial sector and its revitalisation could benefit from the offsets route especially in light of the number and value of acquisitions planned in respect of warships and submarines.

Major Russia military aviation companies are also eyeing seriously for diversification to civil aircraft sector through joint programmes, as military aviation constitutes 92 per cent of their business. Joint R&D and production programmes like 'Regional Transport Air Craft' for the civil segment makes eminent commercial sense.<sup>47</sup>

However, some critics view that it is much more cost effective to go after civilian technology directly rather than reshaping military oriented technologies to fit civilian uses.

## **Conclusions**

The economic effectiveness of India's offset policy is too early to judge. License agreements in the past have built reasonable manufacturing capability in fighter aircrafts, naval platforms, tanks, and armoured vehicles but limited knowledge in design & development. Our weaknesses in core technology areas need to be identified and coordinated effort needs to be made to bolster R&D investment by all stake holders viz-a-vie the private sector, public sector and DRDO to at least 10 per cent of their sales<sup>48</sup>. This will facilitate quicker absorption of high-end technology and foster in-house innovation.

Research in future areas of technology like nano-manufacturing and intelligent manufacturing would have to be given priority. Countries like Israel who have focused on high technology R&D as part of their offset policy have significantly boosted their exports.

Joint R&D development initiatives like SR-SAM, MR-SAM, BRAHMOS<sup>49</sup>, FGFA (Fifth Generation Fighter Air Craft) and MRTA (Multi Role Transport Air Craft) are steps in the right direction. Exposure of designers to major design houses abroad will substantially value add to their design capability in niche areas.

There is also a need for better synergy between design, development and production agencies. Both public and private sector must be encouraged to value add rather than be mere integrators in technology transfer mechanism.

Virmani also strongly advocates the need for an enabling environment for public private partnerships and sustain the path of 'LPG' (Liberalisation Privatisation and Globalisation).

Dr. Deepak Nayyar is of the view that an economy like India must be able to make a transition from importation absorption to diffusion and innovation

so that acquisition of technology is followed by development of domestic technological capabilities.

The government has to play a pivotal role for bringing right synergy between the services, the DPSUs, DRDO, and the private sector. User commitment to indigenization initiatives is critical for improving self-reliance.

The Government must also encourage creation of Tier I and Tier II companies in the country. In critical areas like fight control, landing gear and composites, formation of JVs with established industrial players with 50:50 equity would be of enormous benefit.

In terms of policy facilitation, increasing the FDI cap, including technology transfer as a policy window for priority areas and allowing multiplier benefit would make India a better destination for FDI and long term investments by in OEMs. India certainly has the potential of a major manufacturing hub of defence subsystems and platforms and can be part of OEM's global supply chain as has been the experience in the automotive sector. Furthermore, China's experience in building manufacturing clusters is worth emulating.

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# Explaining China's Improving Defence Industrial and Innovation Capabilities

*Tai Ming Cheung*

## **Introduction**

China has set its sights on joining the ranks of the world's most advanced defence industries by the end of this decade to match its status as an emerging global economic and military power. The Chinese defence establishment has many of the vital ingredients needed for success: ample funding, pro-active leadership support, a thriving civilian economy, selective access to foreign technologies, and a strong and expanding appetite from the People's Liberation Army (PLA). But does this former bastion of autarkic central planning have the organisational capacity, management expertise, risk-taking culture, and sufficient research talent to carry out sustainable innovation, whether incrementally or on a more high-end basis?

A concerted drive has been taking place since the late 1990s to build a market-based and research-driven regime that would provide the discipline and competition required to nurture these critical but neglected capabilities. This has produced important gains in efficiency, profitability, and the development of more capable weapons. This paper examines the key reforms and drivers behind the improving fortunes of the Chinese defence industry.

## **The Chinese Defence Industry's Renaissance**

The Chinese defence industry's newfound dynamism contrasts with its struggle for survival before the end of the 1990s<sup>1</sup>. The defence sector had endured a prolonged downturn after the beginning of China's economic reforms at the end of the 1970s when defence spending was sharply curtailed in favour of economic development. This situation was exacerbated by the unwillingness of conservative defence industry leaders to reduce enormous waste, inefficiency, and widespread obsolescence. This meant that the approach to the reform of

the inefficient, backward and grossly oversized Chinese defence industry was hesitant, piecemeal and incoherent.

The inability of the defence industry to meet the PLA's modernisation needs became a grave security concern from the early 1990s as tensions worsened between Beijing and Taiwan. The PLA had to look overseas, most notably to Russia, to meet urgent operational requirements and this caused considerable consternation among Chinese decision-makers. This eventually led to the introduction of far-reaching reforms in the late 1990s to tackle critical weaknesses in the defence industry.

Reform measures included providing greater funding for research institutions, improving the integration of military and civilian technologies, far-reaching organisational changes to curb the authority and influence of the conservative defence industrial administrative apparatus embodied in the Commission for Science, Technology and Industry for National Defence (COSTIND), a revamping of loss-making defence conglomerates, and a more influential and direct role for the PLA in the management of the defence research, development, and acquisition process.

### **Medium and Long-Term Defence Industrial Development Plans**

The Chinese defence industry in conjunction with the PLA has drawn up major plans to guide weapons, technological and industrial development over the next 5-10 years. In the near to medium term is the 12th Five Year defence science and technology program that began in 2011. This provides detailed programmatic and procurement guidelines for projects that are in advanced stages of development and are expected to be ready for service during the plan's duration. Some of the defence industry's top development priorities during the 12th Five Year Plan include the development of the J-20 stealth fighter aircraft, which was unveiled in January 2011, and research, development, and production of large-sized aircraft carriers and the aircraft and naval assets required to support carrier-based operations<sup>2</sup>.

The principal long-term plan is the 2006-20 Medium and Long-Term Defence Science and Technology Development Plan (MLDP) that focuses on guiding defence-related basic and applied R&D<sup>3</sup>. There is also a national medium and long-term science and technology development plan (MLP) that covers the same period that also includes military projects. The principal aspirational goal of these plans is to reach the technological level of first tier global advanced military powers such as Western Europe within the next 10-15 years.

Of the 16 top priority technology development contained in the MLP, three are unnamed classified military projects while several other projects are being led by the defence industry and have potential dual-use applications<sup>4</sup>. They include the building of a 150 seat civilian airliner that represents China's bid to break the duopoly enjoyed by the U.S. and Europe in the global airliner industry, and the development of a new generation nuclear power reactor.



## **Shifting the Defence Industry from Technology-Push to Demand-Pull**

The major organisational reforms of the late 1990s allowed the PLA to gain primacy in guiding defence science and technology research and development (R&D). Previously, armaments development was overwhelmingly driven by the institutional interests of the state-owned defence industry and the PLA's requirements were secondary. The PLA General Armament Department (GAD), which is one of the principal command bodies of the PLA general headquarters, is responsible for ensuring that military end-user needs are being served. Created in 1998, the GAD has quickly established itself as a powerful player in managing the often-competing interests of the military and defence industry.

To ensure that defence companies were in compliance with its requirements, the GAD has created a series of incentive structures and monitoring mechanisms. First, the GAD has imposed tougher competitive and evaluation procedures in the development and procurement of weapons systems. In theory, defence enterprises have been required to improve their performance to meet these more stringent demands or face losing work. In practice though, the still highly regulated nature of the Chinese weapons market has impeded the effective application of these procedures. As only 'limited competition' is permitted within the defence sector, enterprises have not had to face the rigors of fully-fledged market competition.

Second, one of the main ways that the GAD has been able to implement demand-pull mechanisms has been through the procurement process by withholding or postponing orders for equipment that do not meet its requirements. The military had no option but to accept the output of the defence economy during the Maoist era, but it was able to become more selective in the reform period. As the quality of indigenous equipment steadily declined, the PLA became increasingly reticent to procure these arms and began to look over-seas for weapons that met its needs in the 1990s, especially from Russia. Although military chiefs continued to reaffirm the importance of self-reliance, the new realities of this demand-pull pressure forced the defence industry to re-examine how it could improve its performance or risk losing valuable contracts that could lead to further contractions in the defence-manufacturing base.

Third, considerable efforts have been made to link military strategy and doctrinal planning with weapons and technology development. The separation between the military and defence industrial bureaucracies during the central planning era had led to a gap in joint planning over their long-term development strategies. While consultation and coordination did regularly take place between the two establishments, this was primarily concentrated on annual, three and five year economic and administrative plans. Little attention was paid to long-range strategic planning efforts that often played a crucial role in shaping the evolution of force doctrines and weapons requirements. GAD now works closely with the State Administration of Science, Technology and Industry for National Defence (SASTIND), the successor of COSTIND and the government's primary defence industry regulator.

## **The Growing Clout of Defence Conglomerates**

The rise of China's ten major defence corporations is further marginalizing the operational role of SASTIND. Over the past decade, these state-owned conglomerates, each of which consists of several dozen to more than 200 subsidiaries, have sought to transform themselves from bloated loss-making quasi-state bureaucracies to become fully-fledged market-driven enterprises. They have been slimmed down, allowed to shed heavy debt burdens, and given access to new sources of capital. Combined with a strong pickup in defence and civilian orders over the past decade, these companies have become highly profitable. The defence industry's ten principal conglomerates earned Rmb 70 billion in 2010, which was the highest in its history<sup>5</sup>. The aviation, space/missile, defence electronics, and naval sectors have been the chief beneficiaries from this rising tide of defence procurement, while the ordnance industry has enjoyed considerable success from sales of civilian products such as motor vehicles.

These corporations are now engaged in an ambitious expansion strategy with the aim to turn them into global arms and strategic technology champions. A key plank of this approach is to increase the size of these enterprises so they are able to compete with their much larger Western rivals. This has been expressed in a number of mergers and acquisitions taking place in the past several years. One of the most important was the consolidation of the aviation industry in 2008 with the merger of the country's two dominant aviation-manufacturing companies into Aviation Industry Corporation of China (AVIC), which now has monopoly control of the Chinese aviation sector<sup>6</sup>. Another important consolidation was the 2009 takeover of China Satellite Communications Corp. by China Aerospace Science and Technology Corp., one of the country's two chief aerospace groups.

These mergers will help support a concerted push in arms exports that the Chinese defence industry has begun to undertake in the past few years. Chinese firms have become increasingly active in the international arms market through attendance at defence exhibitions and leveraging the growing defence diplomacy of the PLA around the world. China has had some major successes in selling competitively priced military equipment to Pakistan, Egypt, Nigeria, and other developing countries in Africa and Asia. Some Chinese defence firms have also been able to leverage close ties they have developed in their arms relationships to sign mining deals for raw minerals such as precious metals and oil in Africa and Central Asia.

The revamping of these defence corporations is pivotal to the defence industry's aspirations to be a leading innovator. First, they now own and manage a growing segment of the R&D apparatus. Second, their growing financial clout allows these firms to invest heavily in innovation activities. Third, their collaboration with foreign companies and engagement in foreign markets makes them important conduits of external knowledge and technology. Fourth, it is in the core interest of these firms to support the development of institutional mechanisms that will safeguard the results of their innovation activities—especially the strengthening of intellectual property protection rights. Modest

progress is being made in building legal and patent systems to safeguard local firms. However, the authorities have turned a blind eye to protecting the intellectual property of foreign companies and have supported unauthorized copying and reverse engineering in cases involving critical foreign strategic technologies, as Russian defence firms have discovered in the past few years.

### **Opening Up to Capital Markets**

One of the most significant initiatives in the modernisation of the Chinese defence industry since the mid-2000s has been its opening up to capital markets and the non-state economy to allow defence industrial firms to raise new sources of financing. This reform was detailed in the 2006-2010 11<sup>th</sup> Five Year Program, which called for the deepening of “reform of the investment structure of defence industry” and diversification of major investors into the defence sector<sup>7</sup>. A key goal is to expand the sources of funding available for defence firms to tap into and reduce their heavy reliance on the state. Chinese officials have said that the limited access to investment funds has been a major factor holding back the defence economy’s growth and technological modernisation<sup>8</sup>.

The authorities are especially eager to attract domestic state-owned, private and even foreign firms to acquire equity stakes in defence companies as well as allow them to list on the country’s two stock markets in Shenzhen and Shanghai and also in Hong Kong. COSTIND issued a series of policy guidelines and regulations in 2007 to define the framework of this market liberalisation. According to Wu Fenglai, a senior defence industry official involved in drafting these reforms, this policy initiative “signifies that the reform of the defence science and technology industry has entered a new historical phase, which will certainly have a far-reaching impact on the building of a new defence science and technology system”<sup>9</sup>.

Defence industrial firms have been allowed to list on the stock markets since the early 1990s, but under tight restrictions that precluded entities involved in military-related work. The more permissive regulatory regime now would allow firms with military programs to make stock market or private listings to outside investors as long as they satisfied secrecy regulations and their defence projects were not deemed to be too sensitive.

This financial opening up of the defence economy was slowed down by the 2008-2009 global financial crisis as stock and capital markets in China and around the world sharply cut back on their willingness to provide funding to companies. With access to these markets temporarily curtailed, defence companies appeared to slow down their pace of reforms, especially restructuring themselves into shareholding entities that would allow them to issue shares to outside investors. Defence regulatory authorities had hoped that all state-owned defence firms would be reorganized into shareholding outfits by 2013, but only 22.5 per cent of these firms had completed this shareholding restructuring by the end of 2007, compared with 65 per cent in the national economy.

The number of defence industrial firms listed on the Chinese and Hong Kong stock markets in 2010 numbered in the mid-60s, and only a handful were

able to conduct initial public offerings in 2008 and 2009. Many defence enterprises decided instead to borrow from state-owned banks to take advantage of the government's generous stimulus program. This suggests that instead of looking to the stock markets as its principal source of fund raising, defence firms may rely far more on other modes of capital acquisition, especially the corporate bond market, bank lending, and non-stock market private placements.

### **Overhauling the Research and Development Base**

The defence R&D apparatus has been undergoing a far-reaching overhaul and expansion to overcome serious organisational, management, and operational problems that have crippled its ability to conduct high quality work for much of its 60-year history. The development of a robust defence R&D system is a top priority in the MLDP, which emphasizes a number of key goals<sup>10</sup>. A top priority is the shifting of ownership and funding of key portions of the state-controlled defence R&D apparatus to the country's defence conglomerates. The primary goals of this reform include reducing the dependence of the R&D apparatus to state funding; increasing the amount of investment that firms devote to R&D, especially in applied and commercial development; and speeding up the exploitation and commercialisation of proprietary R&D output.

A stipulation in the MLDP is that defence enterprises and research institutes should invest at least 3 per cent of their annual revenues for R&D during the course of the plan. This is a highly ambitious and unrealistic target as Chinese large and medium sized enterprises spend less than three quarters of one per cent of their annual revenues on R&D<sup>11</sup>. Nonetheless, several defence conglomerates have pledged to meet or exceed this ratio. China Electronics Technology Group (CETG), one of the country's leading defence electronics outfit, said that it would spend no less than 5 per cent of its annual revenues for R&D while China Ordnance Industrial Group Corp. has said that it would require its subsidiaries to plough back at least 2.5 per cent of their sales into R&D<sup>12</sup>.

A second top priority in the MLDP is the development of an extensive defence laboratory system that would pave the way for long-term technological breakthroughs. Around 90 laboratories belonging to both the defence industry and PLA have so far been established<sup>13</sup>. It will take some time though before these research outfits are able to conduct high quality R&D because they lack experienced and top-rated scientific personnel.

A third goal of the MLDP is the breaking down of barriers that have kept the defence R&D system separate from the rest of the national R&D base and forge close linkages with universities and civilian research institutes. Considerable progress has been made in the past few years with many top research universities, such as Tsinghua University, establishing sponsored research facilities with the defence sector. Large sums have also been invested to upgrade the research standards of the 9-10 science and technology universities directly under the PLA and defence industry.

## **Cultivating Scientific and Engineering Talent**

The Chinese defence economy has strong and growing demand for new generations of well-trained scientists, engineers, managers, and skilled factory workers to replace the greying ranks of its 2 million workforce and fill new positions created by the rise of new high-technology sectors. While the country's higher educational establishment is able to produce large quantities of science and engineering graduates to satisfy demand from both the civilian and defence economies, the quality of this talent pool is far from adequate.

The number of natural science and engineering (NSE) graduates from Chinese higher education institutions has surged since the late 1990s. In 1998, there were around 250,000 NSE first-degree graduates, but this more than tripled to 800,000 by 2006. By comparison, the U.S. produced 250,000 NSE graduates in 2006<sup>14</sup>. Upwards of 70 per cent of the Chinese graduates are engineering majors.

Perhaps a better gauge of advanced educational quality that contributes to innovative capacity is the number of awards for postgraduate degrees. Around 10-12 per cent of all NSE degrees issued annually in China are at the masters or doctorate level, which in 2005 numbered around 120,000. For doctorate awards, China has made significant strides. The country issued 1,900 doctorates in 1993, but this climbed to 21,000 in 2006<sup>15</sup>. The U.S. awarded 22,500 doctorates in 2006, although 24 per cent of them were given to Chinese nationals<sup>16</sup>. Although these figures are impressive, they barely tap into the full potential of the Chinese human resources talent pool<sup>17</sup>.

The Chinese defence S&T educational establishment has also undertaken a major expansion in its training capabilities over the past decade, although on a more modest scale compared with the civilian sector. The country's seven major civilian defence science and technology universities registered an 86 per cent increase in their total student populations between 1999 and 2005<sup>18</sup>. The total number of students in these universities numbered 230,000 in 2005. The quality of these students also increased, with the number of postgraduate students accounting for a greater proportion of total numbers. The ratio of postgraduate to undergraduate students rose from 1:4.3 in 1999 to 1:2.2 in 2005<sup>19</sup>.

These civilian defence S&T universities are a major, although not exclusive, pipeline of human talent to the defence industry. Of the 284,000 students who graduated from these universities between 1999 and 2005, 18 per cent or 52,000 went to work in the defence economy. More significantly, 35 per cent of those going into the defence economy, or 18,000 people, were postgraduates, which indicate that the quality of human talent being recruited by the defence S&T establishment is of a higher quality than the rest of the national innovation system.

This influx of younger talent is transforming the demographic make-up of the defence economy. The ageing of the defence S&T workforce had been a deep concern during the 1980s and 1990s as many of the senior and rank-and-file pre-Cultural Revolution-era employees were reaching retirement age. But an analysis of the age structure of the technical workforce at AVIC 1 in 2003 provides

a window into the demographics of the general defence economy. 42 per cent of the employees are under 35 years old and only 9 per cent are 55 years or older. Moreover, between 2000 and 2003, when AVIC 1 cut its technical workforce by 16 per cent from 100,648 employees to 86,818 employees, the biggest demographic change was in the increase of its 36-45 years old generation from 28 per cent to 32 per cent of the workforce and a decrease in its 46-54 years band of employees from 21 per cent to 17 per cent of the technical staff.<sup>20</sup>

Although these statistics show a corporation with a relatively young workforce, it also suggests that there may be a shortage of senior, experienced employees.

This passing of leadership from older to significantly younger generations does appear to have taken place at the senior levels of the defence economy over the past decade. Fourth and fifth generation post-Cultural Revolution educated scientists, engineers and technocrats in their mid-40s to mid-50s are assuming top corporate, bureaucratic and project management posts and replacing their second and third generation elders. Many of these new leaders have science and engineering degrees from defence industry-affiliated universities.

### **Civil-Military Integration and Spin-On**

A major initiative has been underway since the early 2000s to forge close linkages between the civilian and defence economies to allow the defence industry to gain access to more advanced and more globalized civilian sectors<sup>21</sup>. This has led to the development of some modest functional and geographical pockets of civil-military activity have appeared since the early to mid-2000s. The electronics, information technology, high technology, and automotive sectors have been in the vanguard through the efforts of CETG and non-state owned firms such as Huawei Technologies Ltd. and Zhongxing Telecommunications Equipment Co. Ltd<sup>22</sup>.

Geographically, cities such as Mianyang in Sichuan Province have been designated as military-to-civilian science and technology zones because of their concentration of industries with significant civil-military potential, including areas such as optical technology, composite materials and space, and aviation-related technology<sup>23</sup>. But civil-military integration (CMI) overall has barely scratched the surface of the Chinese economy. Less than 1 per cent of the country's civilian high-technology enterprises are estimated to participate in defence-related activities<sup>24</sup>. The ability of the Chinese defence economy to successfully adopt CMI practices will require major structural and operational reforms. It will need to be more transparent, adaptable, and market-oriented, but this clashes with its insular and secretive nature.

### **Access to Foreign Sources of Defence Science and Technology**

The Chinese defence industry has been a semi-pariah in the global defence industry since the end of the 1980s when Western countries imposed sanctions because of China's military crackdown on civilian protestors. This embargo looks

set to continue for the foreseeable future because of strategic concerns over China's growing military might, especially from the U.S.

Beijing, however, has been able to sidestep this embargo by forging a close relationship with Russia, which has been a principal source of military technology, equipment and knowledge since the beginning of the 1990s. This has been a fruitful marriage of convenience for both countries. China has acquired upwards of \$30 billion of weapons and defence technologies from Russia from 1992 to 2009, and this has played a vital role in enhancing the qualitative modernisation of both the PLA and defence economy<sup>25</sup>. These sales have also kept the struggling Russian defence industry financially afloat.

Although self-sufficiency is an often-expressed goal in China's defence technological and industrialisation modernisation goals, this is a long-term strategic aspiration. The operational focus over the next 1-2 decades is to pursue a dual-track development strategy of acquiring and absorbing foreign technology that both complements and supports indigenous weapons R&D. The defence industry has employed a number of approaches in the pursuit of Russian and other foreign technological products and processes since the 1990s ranging from off-the-shelf purchases to license production that allowed the transfer of technological products and manufacturing processes that were at least a generational leap ahead of existing Chinese technological levels.

The approach that offers the greatest opportunities for technology transfers and the nurturing of domestic industrial capabilities is joint design and development. China asked Russia on several occasions in the last decade to undertake the joint development of new generations of weapons and supporting systems, but Moscow has been lukewarm because of concerns that this would allow the Chinese defence industry to fast track its development and rapidly catch up with Russian defence technological levels. Nonetheless, Russia has been willing to pursue some joint projects with China because of the strategic desire to retain close defence technological ties with one of its premier customers.

Russian suspicions and worries about Chinese intentions were confirmed in the mid-2000s when the Chinese defence industry was discovered to have been indigenizing Russian weapons systems through unauthorized reverse engineering and the substitution of Russian components with Chinese parts. Platforms such as the Su-27 fighter, Su-33 carrier-capable fighter, and advanced defence electronic systems such as the radar and data link systems for the Sovremenny II 956E destroyer and the Fregat M2EM 3D and Mineral-ME radar systems have all been successfully copied by China<sup>26</sup>.

The Chinese defence industry appears to have made this reverse engineering strategy a central tenet of its near-term development approach and this has caused a major slow-down in Russian arms sales to China in the past few years. Besides illicit reverse engineering, Chinese military, defence industrial and civilian intelligence agencies have aggressively sought access to non-public and classified technologies and knowledge from foreign countries using a wide assortment of legal and clandestine means.

## **Barriers to Improvement**

Despite encouraging progress in the renewal of the Chinese defence industry, serious structural weaknesses remain that could frustrate the goal of closing the technological gap with the West. One overarching problem is the widespread duplication and balkanization of industrial and research facilities. The defence industry has around 1400 large and medium-sized factories employing more than 1.6 million workers scattered across the country, especially in its land-locked interior, and often possessing outdated manufacturing and research attributes. Intense rivalry, local protectionism, and huge geographical distances mean that there is little cooperation or coordination among these facilities, preventing the ability to exploit economies of scale and hampering efforts at consolidation.

Weak links in critical technological sub-sectors is holding back broader progress. One of the biggest Achilles heels is the aero-engine sector, which has struggled to develop and produce state-of-the-art high performance power plants to equip new generations of military aircraft. This has forced the defence industry and the PLA Air Force to be dependent on engine imports from Russia for its Chengdu J-10 and Shenyang J-11 fighter aircraft.

GAD officials also complain that the defence industry continues to suffer from excessive monopolisation. Reforms in the late 1990s to introduce controlled competition in key defence industrial sectors do not appear to have had much impact and this has hampered the PLA in its efforts to counter the domineering authority of the ten powerful defence conglomerates<sup>27</sup>.

## **Conclusions**

The Chinese defence industry is making robust progress in its quest to catch up and become a leading global player within the next 1-2 decades. The most impressive progress has occurred in the opening up of the defence economy to the capital markets, the promotion of civil–military integration, the strengthening of the GAD's role in managing weapons development, and the reform of the big defence conglomerates.

Results have been mixed in the revamping of the research and development apparatus, nurturing of a new talent pool of skilled scientists and engineers, and the building of a new regulatory and standards-based regime. Access to external sources of military and dual-use technologies and knowledge appear to be improving, especially with the resumption of more cooperative engagement between China and Russia and the deepening integration of China's civilian technology sectors with global innovation networks.

This progress in the development of the defence economy's innovation capabilities will continue on an upward trajectory and could even accelerate, as long as China's central leadership is committed to the goal of building a world-class military industrial complex, funding remains plentiful, and end-user demand continues to be strong. This is likely to be the case even as a new generation of leaders takes over the reins of power in 2012-13, since they also subscribe to the view defined in the country's MLP that having a world-class



indigenous innovation capacity is critical to China's long-term national security and economic competitiveness.

If China's leaders were to see the country's national security once again as seriously threatened as during the Maoist cold war era, there could be another concerted drive to attain breakthroughs in critical defence technological capabilities. This seems to be happening in the area of asymmetric capabilities with the development of long-range precision ballistic missiles and kinetic anti-satellite systems. China's present approach appears to be the selective targeting of a few critical areas for accelerated development while the rest of the defence science, technology, and innovation system pursues a more moderate pace of transformation. But as the country grows more prosperous, more technologically capable, and its security interests become more global and complex, this targeted strategy is likely to be broadened.

### NOTES

1. For a detailed review, see Tai Ming Cheung, *Fortifying China: The Struggle to Build a Modern Defense Economy* (Ithaca; Cornell University Press, 2009).
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3. Summary of the Medium and Long-Term Science and Technology Development Plan for the Defence Industry (Commission of Science, Technology and Industry for National Defence, 20 June 2007). <http://www.costind.gov.cn/n435777/n1146913/n1440180/n1440183/105777.html>
4. Chinese Internet blogs have suggested that the three classified defence projects are an inertial confinement fusion laser project known as the Shenguang (Éñ'á) program, the second generation Beidou satellite navigation system, and a hypersonic vehicle technology project.
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10. Summary of the Medium and Long-Term Science and Technology Development Plan for the Defence Industry.
11. Organisation for Economic Cooperation and Development (OECD), *OECD Review of Innovation Policy: China* (Paris: OECD 2008), 154.
12. 'Major Initiatives of 11 Military Industrial Enterprise Groups on Promoting Indigenous Innovation', (Commission of Science Technology, and Industry for National Defence, 4 July 2007). Available online at: <<http://www.costind.gov.cn/n435777/n1146913/n1440180/n1440190/108392.html>>.
13. Hou Guangming, *The Organisation and Policy Research of Military-Civilian Technology Transfers* (Beijing: Science Press 2009), 5.
14. National Science Board, *Science and Engineering Indicators 2010* (Arlington, VA: National Science Foundation), O-7. The OECD though has different estimates of Chinese NSE graduates. It reports that there were 0.5 million NSE graduates in 1995 and 1.5 million in 2005. While these numbers include postgraduates, the discrepancy with the NSF figures is significant. *OECD Review of Innovation Policy: China*, 316.
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16. *Science and Engineering Indicators*, National Science Board, 2-27.
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## Self-Reliance Through Smart Acquisition

*Prahlada*

### **Introduction**

It is a well-known fact that defence acquisition is a complex process which involves multiple stake-holders having expertise in threat scenarios, military affairs, technology, operational requirements, national policies, industry capability and potential, financial management, and contract and project management. Stakeholders belonging to different departments and organisations are having their own policies, procedures and priorities. This sometimes leads to working for cross-purposes and, hence, gives rise to potential conflict of interests. Thus, there is a need for synchronising the policy and procedures of different departments and organisations with the Defence Procurement Procedures (DPP) for effective defence acquisitions.

Procedures for defence procurements, initially laid down in 1992, were comprehensively reviewed and a revised Defence Procurement Procedure was introduced in December 2002. The refinements in these procedures have been undertaken periodically amendments and additions incorporated in 2003, 2005, 2006, 2008 and 2009, and the DPP-2011 is now currently in vogue. Despite several refinements in the procedures for defence procurements, the aim of achieving greater self-reliance in defence acquisitions and to establish a level playing field for the Indian defence industry (both public sector and private sector), is still some distance away. Similarly, expediting decision-making and simplification of contractual and financial provisions has been achieved only partially.

In 2005, the Kelkar Committee had studied all aspects related to defence acquisitions and after interacting with all stakeholders had made comprehensive recommendations. The Committee had also recorded the perspectives of various stakeholders. In the succeeding paragraphs, the present status of the Kelkar Committee Recommendations have been noted. After that the current perspectives of all stakeholders have been reviewed to identify likely reasons for the slow progress made in this area.

It is felt that now the time has come to go through a “paradigm shift” in the defence acquisition process to move faster towards achieving the goal of self-reliance. The current focus of “Buy Global” has to make way for the “Make” category acquisition. This will require major changes in the thinking and in the approach of all the stakeholders including the users leading to certain procedural changes. These aspects are examined in the succeeding paragraphs and certain changes to the procedures have been recommended, which would accelerate the self-reliance process.

### Perspective of Stakeholders in Defence Capital Acquisition

The major stakeholders are:

- Users (Services)

**Table 1: Status of Progress on Implementation of Kelkar Committee Recommendations**

<i>Sl.No.</i>	<i>Kelkar Committee's Recommendation</i>	<i>Status of Implementation</i>
1.	<b>Information sharing of requirement of Armed Forces with the Industry.</b> Armed Forces to prepare a public version of “Technology Perspective and Capability Roadmap (TPCR) to be put on the MoD Website.	Till date no TPCR document has been made available. After 2002, no new Long Term Integrated Perspective Plan (LTIPP) has been made available. Thus, DRDO’s 5-year Plans are based on day-to-day Interactions with the Services and DRDO’s understanding of the Services’ requirements.
2(a)	Entry Points for the Industry in the Acquisition Process <ul style="list-style-type: none"> <li>- Participation in SCAPCC and SCAPCHC.</li> <li>- Consult for ToT and MToT purpose at RFP stage.</li> <li>- Allow all identified industries to be able to contribute in finalising the RFP for both “Buy” and “Buy &amp; Make”.</li> </ul>	Currently, industry participation is ensured by the following: <ul style="list-style-type: none"> <li>- Services issue RFI prior to finalising SQRs.</li> <li>- Industry bodies, like CII, FICCI, ASSOCHAM, DPSUs, OFB are invited to make presentations to the SCAPCC prior to deliberations on proposals by SCAPCC.</li> <li>- Views expressed by the reps of the industries are thoroughly debated, and have helped in appropriate categorisation in some cases.</li> <li>- Pvt industries currently are not consulted regarding ToT and MToT or formulation of RFP for “Buy” and “Buy &amp; Make”. However, the concerned DPSU or OF is consulted for ToT &amp; MToT.</li> </ul>
2(b)	- Amend constitution of Defence Production Board in order to have representation of the industry incorporated.	- Not implemented by DDP so far. DDP does not have any dedicated JS representing the interests of Pvt sector.

Sl.No.	Kelkar Committee's Recommendation	Status of Implementation
2(c)	<ul style="list-style-type: none"> <li>- Provide level playing field to private sector industry and gradually move away from the process of nomination.</li> </ul>	<ul style="list-style-type: none"> <li>- This aspect is being kept in view during the deliberations of SCAPCC, SCAPCHC and DAC. But, DPSUs and OFs still enjoy preferential treatment.</li> </ul>
3.	<p><b>Raksha Udyog Ratna (RURs).</b></p> <ul style="list-style-type: none"> <li>- Participation of Indian industry at the level of design, development and production of major weapon systems and platforms by firms of proven excellence and having adequate technical, managerial and financial strength.</li> </ul>	<ul style="list-style-type: none"> <li>- RURs identified but not implemented so far.</li> <li>- However, industry bodies (CII, FICII and ASSOCHAM) are getting opportunity to showcase their capability through response to RFIs from the services and also through presentation to SCAPCC. This has brought some qualitative change in the categorization process.</li> </ul>
4.	<p><b>Promoting Participation by SMEs.</b></p> <ul style="list-style-type: none"> <li>- Setting up a "Defence Technology Product Development Fund (DTPDF)" to fund SME's design and development work.</li> <li>- Provide institutional support to the SMEs to reduce transaction cost while tendering.</li> <li>- Framework for RURs to promote SMEs on transparent basis.</li> </ul>	<ul style="list-style-type: none"> <li>- DTPDF has not really been utilised as was intended.</li> <li>- On the other hand, DRDO has involved SMEs in large number of DRDO projects. As on date, there are more than 500 industry partners who have actively participated in DRDO R&amp;D projects both at development and production stages.</li> </ul>
5.	<p><b>R&amp;D in Defence</b></p> <ul style="list-style-type: none"> <li>- Inclusion of reps of CSIR and ISRO in Def R&amp;D Board.</li> <li>- Periodic external review of the functioning of DRDO by an independent high-level committee.</li> </ul>	<ul style="list-style-type: none"> <li>- Yes, implemented DRDO took the initiative for constitution of Prof Rama Rao Committee by MoD for reviewing the functioning of DRDO. The Government has accepted a large number of the recommendations of Prof Rama Rao Committee, which are under implementation.</li> </ul>
6.	<p><b>Procedure for acquisition of "Make" category.</b></p> <ul style="list-style-type: none"> <li>- IDS to expedite the formulation by procedure for "Make" category.</li> <li>- Setting up a committee to examine the proposal for establishing a professional agency for acquisition in MoD.</li> </ul>	<ul style="list-style-type: none"> <li>- The "Make (by Industry)" procedure has been incorporated in the DPP and refined periodically. However, it has not succeeded in achieving the desired result. Only a few proposals of the Services have been categorized as "Make (by Industry)".</li> <li>- MOD is having a relook on procedure for "Make" proposals.</li> </ul>
7.	<p><b>R&amp;D Support for Industry.</b></p> <ul style="list-style-type: none"> <li>- In medium and low technology areas, DRDO should off-load as much as possible to industry.</li> </ul>	<ul style="list-style-type: none"> <li>- As laid down in DPP, DRDO is concentrating on "Strategic, Complex and Security—sensitive" areas. DRDO has also worked out lists of Systems and Products, which can be developed by the industry directly.</li> </ul>

Sl.No.	Kelkar Committee's Recommendation	Status of Implementation
	<ul style="list-style-type: none"> <li>- MoD should adopt a DARPA like model for giving R&amp;D work for higher technologies to the private sector and other scientific institutions.</li> <li>- Upgrades of existing Platforms (in service) which have adequate lead-time should be done preferably by indigenous industry.</li> <li>- Policy on "Shared Development Costs" in "Make" Category among Armed Forces, R&amp;D Organization, both public and private industry.</li> <li>- Accepting the principle of acquiring at least a minimum quantity to sustain the financial viability, provided the developer adheres to the required quality and time schedule.</li> </ul>	<ul style="list-style-type: none"> <li>- Policy on "Shared Development Costs" in "Make" Category was proposed, but did not find consensus.</li> <li>- Concept of Minimum Order Quantity (MoQ) is now being accepted, but, however, with preconditions.</li> </ul>
8.	Placing funds for R&D work with Service HQ.	Funds have been made available.
9.	Strengthening of IDS	Achieved to a great extent.
10.	<p>Life Cycle Cost and Training of Officers dealing with procurement and acquisition.</p> <ul style="list-style-type: none"> <li>- At College of Military Mgmt, Hyderabad.</li> <li>- Establishment of a National Defence University.</li> <li>- Creation of an autonomous body for Aero Space Development.</li> </ul>	<ul style="list-style-type: none"> <li>- Training of officers is being organized at various institutions.</li> <li>- Training is also being imparted through seminars and workshops.</li> <li>- Life cycle cost is being assessed in selected high cost acquisition proposals.</li> <li>- Indian National Defence University is being set up.</li> </ul>
11.	<p><b>Offset Policy.</b></p> <ul style="list-style-type: none"> <li>- For all acquisitions from foreign vendor above Rs 300 Crores, Offset at 30 per cent rate.</li> <li>- Defence Production Board to monitor implementation of offset agreement.</li> </ul>	<ul style="list-style-type: none"> <li>- Offsets are being implemented.</li> <li>- Review is under progress. It is expected that acquisition of technology through offsets will be included and enforced to get significant benefits.</li> </ul>
12.	<p><b>Defence Exports.</b></p> <p>In connection with defence exports, the committee has recommended.</p> <ul style="list-style-type: none"> <li>- Maintain licensing regime and re-examine the concept of negative list.</li> <li>- Export control regime on case-by-case basis for exports to countries in India's strategic neighbourhood.</li> <li>- Set-up an export marketing organisation and explore alliances with DESO in UK and DGA in France.</li> <li>- Allow marginal cost pricing to DPSUs and OFs.</li> </ul>	Govt is moving cautiously.

- DRDO
- Production Agencies (both public and private)
- Other S&T bodies

**Users' Perceptions.** Generally, Users worldwide are highly focused about their modernisation needs to keep pace with the rapid technological advancements in military weapon systems and platforms. They demand immediate results and expect fast track speed of acquisition processes. They do not want to wait for indigenously developed systems, which require longer development periods followed by detailed trials (many times more than one iteration). This causes delays in their modernisation process. Some users argue that the operational urgency of their requirements are not understood by other stakeholders and their proposals do not progress with the speed they want. A majority of users feel that most of the complex weapon systems and platforms must be imported to hasten up the modernisation process. They also add that even after completion of development and trials, the lead-time taken for 'productionisation' by the industry is very high due to technology gaps and capacity limitations. There is further delay in establishing world-class quality, which comes through streamlining production over numbers. Users framework encompasses the following:

- (a) Quality—World class.
- (b) Time Frame—As per their operational requirement and modernisation needs.
- (c) Cost—Competitive to global market.
- (d) Quantity—Users are not able to forecast their long term requirement, but production capacity limitation is not acceptable.
- (e) Users generally lack "ownership" of an item under development, though they exhibit strong bond with the equipment, once inducted.

### **Perspectives of Manufacturing Industry (both public and private)**

The industry is generally focused on profits, risk-free business, large volume orders, contract for annual maintenance and regular repeat orders to keep their production lines running smoothly. Public sector industry avoids open competition with the private industry and demands protection from the Government. Many times, this protective approach may be justifiable based on the facts of technical expertise, available infrastructure, under-utilized installed capacity and reasons of security sensitive nature of systems. However, if the nomination of the production agency is done for even those items for which the Pvt Industry has the capability to produce, then it acts as a disincentive to the private industry and for subsequent projects. The domestic industry (both public and private), in general are also facing problems related to "quality control" and "inadequate capacity" in areas like heavy engineering, armament and missiles. Private industry hesitates to make investments in infrastructure and production capacity, unless large volume orders are assured. They do make claims about their capability to develop and produce even complex and security-

sensitive systems; despite they sometimes are not able to demonstrate proof of their expertise and technical capability. The Pvt industry keeps complaining about not being provided a “level playing field” vis-à-vis the public sector. However, the public sector industry feels that the private industry are being pampered, despite not having the necessary technical expertise and infrastructure.

**Perspectives of R&D Organisations.** R&D organisations feel that users find it expedient to take the “Buy Global” route for all complex weapon systems and platforms without thoroughly examining the “Make” route well in advance. Due to lack of long term joint planning, neither R&D organisations nor the industry (private and public) are able to plan in advance, ways of meeting users’ requirements in time. Many times, major requirements of the users become known at a very late stage. R&D organisations feel that, for indigenously developed systems, MK I (at 80 per cent acceptance level) should be inducted and order placed to the industry for certain minimum quantity, while R&D organisations continue to improve further to meet total QRs. R&D organisations are playing a major role in enabling the industry (both in public and private sectors) and in enhancing production capability and capacity.

### **Limitations of Collegiate Decision-making**

Decisions on AoN and categorisation are taken in a collegiate manner in categorisation committees. The views of the technical and financial experts do not necessarily get the weight-age deserved by them. Many times, the decisions are arrived by the majority deciding against technical/financial inputs on the grounds of operational urgency. Since, for three decades (early 70’s to late 90’s), there has not been much defence capital acquisition, almost all the capital acquisition proposals from the Services are labelled as “Operationally Urgent” to fill the void. This may be true on ground, however, a via-media approach of “Buy” 50 per cent and “Make” 50 per cent could simultaneously meet the Services’ immediate requirements, as well as help the cause of “Self-Reliance in Defence through Indigenous Development”.

### **“Defence Acquisition” vs “Defence Procurement”**

The “Defence Procurement Procedure” document lays down procedures for “defence procurement”, but does not cover all aspects of “defence acquisition” in a holistic manner. It will be appreciated that “defence acquisition” is much more than “defence procurement”. “Procurement” is focussed on getting a particular system or equipment for operational use, whereas “acquisition” is supposed to be focussed on acquiring the system equipment along with the capability to carry out product-improvement, design and development of Mark II and futuristic products. Thus, it is “acquisition” that aims at “self-reliance” in real terms, whereas “procurement” results merely in “meeting an emergent need”, while the dependence on the OEM continues forever. This aspect can also be better understood by applying similar logic to R&D and production:



- (a) "Technology" is much more than "manufacturing and assembly". "Technology" encompasses design know-why, know-how, tools & jigs, documentation, processes and expert personnel, which can be used for future product development independently. Whereas, "manufacturing and assembly" is only part of what all goes in realising a specified product and has very limited utility for designing and developing a new product.
- (b) "R&D" is much more than "Design and Development" (D&D). While in research one needs to horizontally integrate innovation and fundamental research on one side and engineering and manufacturing on the other end of D&D. Thus, D&D is a subset of R&D. Thus, for empowering industry, what is required is "acquisition" rather than "procurement", and total participation of R&D and manufacturing entities

**"SMART" Acquisition.** SMART here is used as an acronym and is used to provide a more comprehensive definition for goal-setting:

- S**—Specific—to meet operational needs
- M**—Meaningful—to get maximum mileage out of Acquisition
- A**—Acceptable—to all branches of Users
- R**—Realistic—QRs
- T**—Time-bound—deliveries

Urgently what is required to be done is that all stakeholders (users, R&D organisations and industry) come together shedding narrow perspectives of individual organisations and set a common goal for self-reliance through indigenous R&D and empowering of the industry. "SMART" principles that are to be applied to ensure "acquisition" must meet the following requirements:

- (a) Very specific terms with no ambiguity, but meeting QRs.
- (b) Meaningful terms to leverage maximum benefits.
- (c) Acceptable—Quality, capabilities and features for all stakeholders within users.
- (d) Realistic and pragmatic QRs.
- (e) Time-bound deliveries.

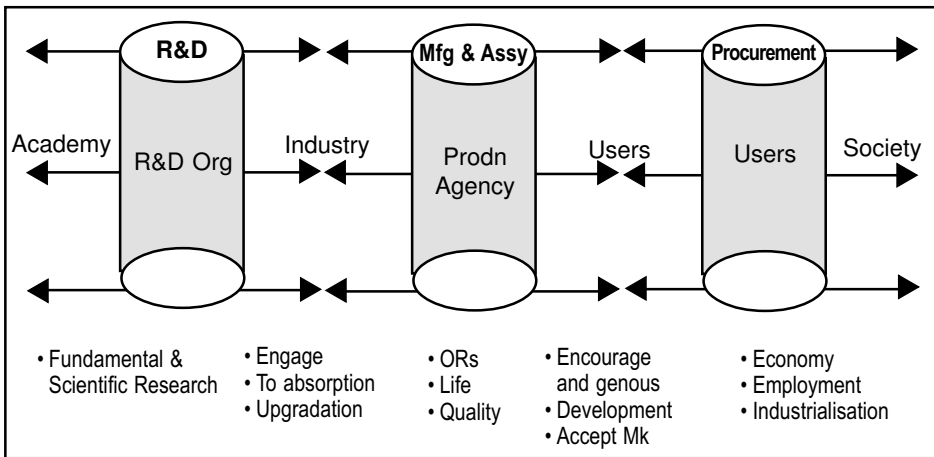
This is the most important aspect, which may seem very difficult to achieve in the existing environment with diverse policies, priorities and view-points among various stakeholders. However, an initiative can be undertaken to bring all stakeholders together to make a beginning synergistically in the direction of "SMART Acquisition" for empowering of the industry to achieve self-reliance.

Concerted efforts have to be put to jointly identify "Make" projects and implement the same expeditiously. Once a decision about mode of acquisition is arrived at, all stakeholders should remove their blinkers and display "Total ownership" by very closely working together with understanding for each-other's problems and assist with a helping hand to find solutions. It is felt that this

would show desired results and the dream of self-reliance in the defence could be fulfilled to a great extent. Also, ToT absorption through “Buy and Make (Global)” is required to be made successful by serious interest by the industry for getting the technology despite passive attitude of the foreign OEMs after bagging the Order.

Furthermore, all stakeholders should come out of their respective silos, expand understanding, get-together, synchronise their own individual organisation’s policies, priorities and perceptions with those of the other stakeholders (Fig. 1).

Figure 1: Building Synergy Among Stakeholders



**Summary**

In this paper, it has been highlighted that despite the several refinements in the procedures for defence procurements, the aim of achieving greater self-reliance in defence acquisitions and also to establish a level playing field for the Indian defence Industry (both public sector and private sector), through expediting decision making, simplification of contractual and financial provisions has been achieved only partially. The progress made on various important recommendations of the Kelkar Committee in 2005 on defence acquisition has been reviewed and the perspectives of the various stakeholders has been analysed. It has been highlighted that divergent policies, views and priorities of various stakeholders sometimes work at cross-purposes to the goal of self-reliance in defence acquisition. Furthermore, the difference between “acquisition” and “procurement” has been explained, highlighting the fact that what is happening today is more of “procurement” rather than “acquisition”, and thereby the lagging in self-reliance. Similarly, more of D&D is happening rather than covering innovation, research, engineering and manufacturing. As far as technology is concerned, it is limited to manufacturing and assembly rather than encompassing “technology” per-se. Furthermore, it has been recommended that all stakeholders should get together, synchronising their own individual

organisation's policies, priorities and perceptions with those of the other stakeholders and also apply the principles of "SMART Acquisition" to work synergistically to achieve the national goal of "self-reliance" in defence acquisition. Some changes to the existing procedures have been suggested in this paper, which if implemented, will expedite the process of self-reliance in defence.

The author wishes to place on record contributions made by Maj Gen B B Jha in shaping this article.

## Indian Ordnance Factories: An Agenda for Change

*Anuradha Prasad*

### I

#### **Introduction**

Economic growth and the consequent increase in the availability of resources have enabled India to plan for an ambitious programme of defence modernisation. The successive amendments in the policy framework regulating defence acquisition have stressed upon the expansion of indigenous manufacturing capabilities—both public and private sector—to meet the modernisation needs. This has created a unique growth opportunity for the indigenous defence industry. The Indian Ordnance Factories being the oldest and the largest industrial setup and forming an integrated base for indigenous production of defence hardware and equipment have the potential and the opportunity to become a leading player in the acquisition programme of the Indian Armed Forces, and to position themselves as a link in the global defence supply chain. Yet, the organisation, which functions as a government department, faces many challenges in achieving this objective.

In the above background, this paper will analyse the functioning of Indian Ordnance Factories—their strengths, achievements, weaknesses and constraints—and make out a case for restructuring of the organisation.

### II

#### **Defence Expenditure—A Perspective**

India is currently enjoying sustained high rates of economic growth. Except for a blip in the global crisis year of 2007-08, the real GDP growth has been around 8-9 per cent per annum, which has provided space for an increase in public expenditure including expenditure on defence. Most analysts agree that the medium and long term outlook for the economy continues to be strong,

notwithstanding the concerns regarding growth moderation in the current fiscal year. Even though a larger share of the additional resources have gone to priorities other than defence as seen in the decline in the share of defence expenditure in the total Central Government expenditure, the trend is towards high real growth in defence expenditure for the near future.

Year	Defence Expenditure at Current Prices in Rs crore	Defence Expenditure at 2004-05 Prices in Rs crore	Year-on-Year Growth at 2004-05 Prices	Share of Defence in Central Government Expenditure
2005-06	80,549	77,317	1.9%	16%
2006-07	85,510	77,132	-0.2%	15%
2007-08	91,681	78,200	1.4%	13%
2008-09	114,223	91,314	16.8%	13%
2009-10	141,781	105,397	15.4%	14%

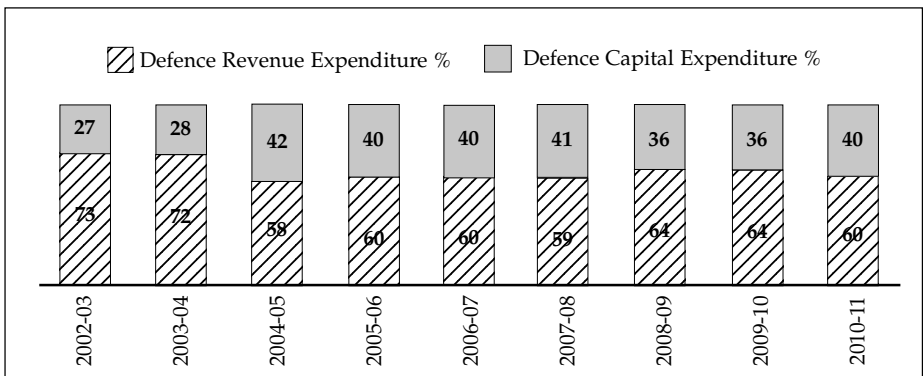
Note: One rore = 10 million.

Source: Government of India Expenditure Budget of various years. Expenditure at constant prices has been arrived at using GDP deflator published by the World Bank, World Development Indicators.

Expenditure on defence acquisition is represented by the Capital Outlay on Defence Services in the Union Budget. Two noticeable features stand out in the analysis of expenditure trends. First, is the increase in the share of acquisition expenditure in the total defence expenditure with the year 2004-05 being the watershed. The share of defence acquisition expenditure jumped from below 30 percent to 42 per cent of total defence expenditure in 2004-05 on the back of major acquisition contracts such as the aircraft carrier and the MiG 29K aircraft from Russia and the Scorpene submarines from France. Since then, the share of acquisition expenditure has been around 36 to 40 per cent.

A second significant change has been the improvement in the absorptive capacity of defence acquisition as reflected in the narrowing gap between the

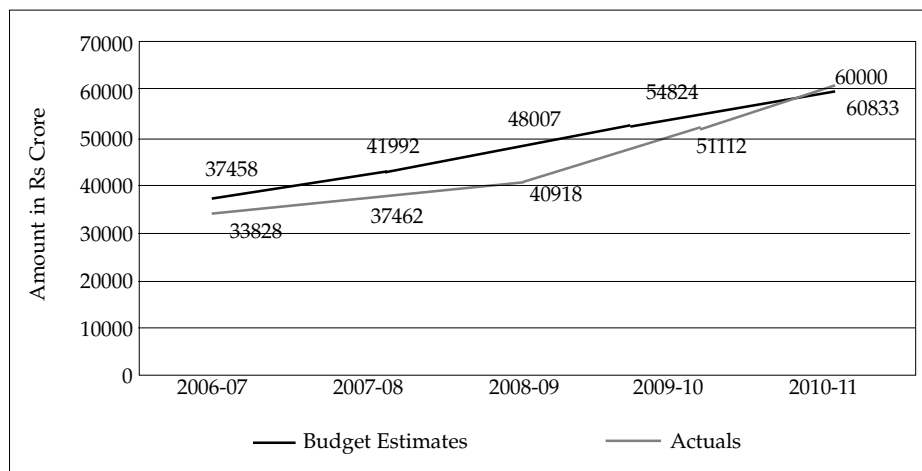
**Figure 1: Percentage Share of Revenue and Capital Expenditure in Total Defence Expenditure**



Source: Government of India Expenditure Budget of various years. Figures for 2010-11 are Revised Estimates.

allocations voted by Parliament in the budget estimates and the actual funds utilised every year.

**Figure 2: Defence Capital Expenditure—Budgeted and Actual**



Source: Government of India Expenditure Budget of various years. Comparison for 2010-11 is based on Revised Estimates vis-à-vis Budget Estimates

### III

#### Implications for Indian Defence Industry

What do the above trends augur for the defence industry in India?

The first Defence Production Policy announced in January 2011 has as its objectives—achievement of substantive self reliance in the design, development and production of equipment, weapon systems and platforms required for defence in as early a time frame as possible; creation of conditions conducive for the private industry to take an active role in this endeavour; enhancement of potential of SMEs in indigenization; and broadening of the defence R&D base of the country. The policy states that in order to synergise and enhance the national capabilities, formation of consortia, joint ventures and public-private partnerships will be encouraged. A notable measure announced in the Policy is the government's intention to set up a separate fund to provide necessary resources to public/private sector including SMEs as well as academic and scientific institutions to support research and development of defence equipment and systems enhancing cutting edge technology.

India has been among the top ten countries in the world in terms of defence expenditure and has now become the largest arms importer in the world having received 9 per cent of the volume of international arms transfers during 2006–10, with Russian deliveries accounting for 82 per cent of Indian arms imports<sup>1</sup>.

It has been estimated that India currently imports around 70 per cent of its

equipment needs and that for this pattern to reverse and the indigenous procurement to increase from the current 30 per cent to the target 70 per cent over the next five years, the output of Indian firms would need to more than double each year<sup>2</sup>—a Herculean ask in the current scenario.

However, the greater availability of resources and the policy framework provided by the government have created opportunities for the domestic defence industry to become partners with the overseas suppliers so as to meet the increasing demand of the Armed Forces and to position themselves as key links in the global defence supply chain.

The acquisition categories of 'Buy and Make', 'Buy and Make (Indian)' and 'Make' under the Defence Procurement Procedure (DPP-2011) provide the industry with the opportunity for optimum utilisation of potential as well as growth. 'Buy and Make' covers purchase from a foreign vendor followed by licensed production and indigenous manufacture in the country. Acquisitions under the 'Buy and Make (Indian)' category introduced in 2009-10, cover purchase from an Indian vendor forming joint venture/establishing production arrangement with foreign OEM followed by licensed production or indigenous manufacture in the country with at least 50 per cent indigenous content on cost basis. Acquisitions covered under the 'Make' decision include high technology complex systems to be designed, developed and produced indigenously.

The above acquisition categories for promoting indigenous production are complemented by the offset policy under the DPP. The policy requires foreign vendors in large acquisitions of Rs. 300 crore or more to offer minimum offsets of 30 per cent to be implemented by direct purchase of eligible products, components or services from Indian industries and/or investment in Indian firms and joint ventures. The policy has been rationalised and expanded over the years so as to encourage foreign firms to enter into long-term relationships with their Indian industry partners with concomitant benefits to both.

Brauer (2002) had placed India at the lowest rung of a three-tier hierarchy of arms producers. The US and Russia are first-tier producers, who are completely and independently able to design and construct highly sophisticated weaponry across the entire weapons spectrum followed by a large cohort of second-tier arms producers including France, Britain and also former developing nations such as South Korea, Taiwan, Spain, Portugal, and Israel that are now "graduated" in arms production capabilities to the ranks of industrialised nations. The defence industrial production of these countries is characterised by the increasing 'transnationalisation' of arms design and production i.e. arms production becoming modular with systems being co-developed across nations and plugged in wherever in the world they are needed. The third tier of arms producers as per Brauer's categorisation are countries that are falling behind technologically. The best of them produce good platforms but are highly import dependent as regard to weapons, control systems and sophisticated sub-systems. India is included in this category. As per this analysis, developing nations can graduate to higher levels of arms production sophistication as their underlying civilian industrial capabilities increase and as they become more integrated into the 'transnationalisation' of arms production efforts<sup>3</sup>.

India’s sustained strong real GDP growth underpinned by a significant expansion in its manufacturing, engineering and information technology industries has created a propitious environment for the Indian defence industry to “graduate” to the higher level of arms production. However, for the indigenous manufacturers to capitalise on the opportunity provided by the growing market and a favourable policy framework, they need to have requisite technical and financial capability to absorb critical technologies and derive benefits from offset agreements.

IV

**Indian Ordnance Factories—Opportunities and Challenges**

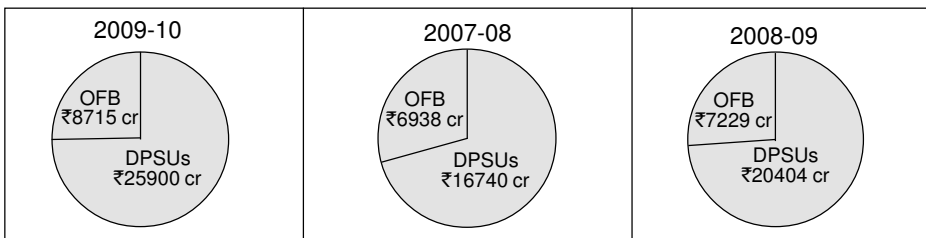
The Indian Ordnance Factories being the oldest and the largest industrial setup and forming an integrated base for indigenous production of defence hardware and equipment have the potential and the opportunity to become a leading player in the ambitious acquisition programme of the Indian Armed Forces.

**Share of Indigenous Defence Production**

The Ordnance Factories along with the Defence Public Sector Undertakings (DPSUs) have dominated the defence industrial production in the country. Even though the sector was opened up to 100 per cent private sector participation in 2001 and successive policy pronouncements have reiterated the commitment to encourage larger involvement of the private sector in design, development and manufacture of defence equipment in a level playing field, private industry involvement is still relatively nascent. While industrial licences have been issued for manufacture of various defence equipment and some joint ventures have been formed between foreign OEMs and Indian private sector majors such as TATA, L&T and Mahindra and while there are also a number of small and medium enterprises supplying components and spares to DPSUs, Ordnance Factories and large private sector houses, private sector participation is yet to gain significant momentum.

The total value of sales of defence PSU and Ordnance Factories is as under:

**Figure 3: Sales: DPSUs and Ordnance Factories**



Source: Annual Reports of Ministry of Defence.



## **Organisation**

The Ordnance Factories function under the Department of Defence Production in the Ministry of Defence are a conglomerate of 39 factories spread over 24 locations all over the country. The first factory was established in 1801 at Cossipore in Kolkata and the 40<sup>th</sup> factory is being set up at Nalanda, Bihar, for production of bi-modular charges for 155 mm ammunition. The 41<sup>st</sup> factory is being set up at Korwa in U.P. for production of carbines. The organisation is headed by an Ordnance Factory Board (OFB) at Kolkata, chaired by Director General Ordnance Factories.

## **Strengths and Achievements**

The OFB has a large asset base of land, buildings, modern plant and machinery, and a skilled manpower of around 100,000 employees recruited through merit based open competition. Over the years the organisation has progressed from labour intensive manual operations to automated computer based manufacturing systems. The emphasis has shifted from production of basic and intermediate inputs to production of finished stores with the organisation establishing itself as a system integrator<sup>4</sup>.

The range of OFB products is wide and diversified and includes: armoured vehicles like tanks and infantry combat vehicles; mine protected vehicles; military transport vehicles; weapons including tank guns and anti-tank guns, field and artillery guns, mortars, anti-aircraft and air rocket launchers, naval guns and small arms; various types of ammunition; troop comfort items like uniforms, high altitude & combat clothing, tents, etc.; opto-electronic devices including night vision devices; and a large number of spares. The technologies applied cover a broad spectrum of engineering, metallurgy, chemical, textile, leather, and optical technologies.

Some of the achievements of the organisation have been as under<sup>5</sup> :

- Development of Mine Protected Vehicle
- Development by in-house R&D of Chaff Launcher Kavach for the Navy
- Indigenisation of Anti-aircraft sight (PZU-7)
- Development of Commander 's Thermal Imaging Night Sight for tank T-72
- Indigenous production of 5.56 mm Carbine INSAS
- Co-production of 155 mm artillery ammunition
- Development through in-house R&D of 155 mm/45 calibre Bofors up-gradation, 40 mm Multi Grenade Launcher weapon and ammunition, 30 mm HE Rudra Grenade for AGS-17, 100-120 kg Aerial Bomb, A-7 ammunition for AK-47
- Patent for development of Micro-alloyed Ultra High Strength Steel
- Development of capability for making strategic aluminium alloys and qualification for supply of extrusions for aircraft applications.

In order to meet the increasing requirements of the Armed Forces, OFB is

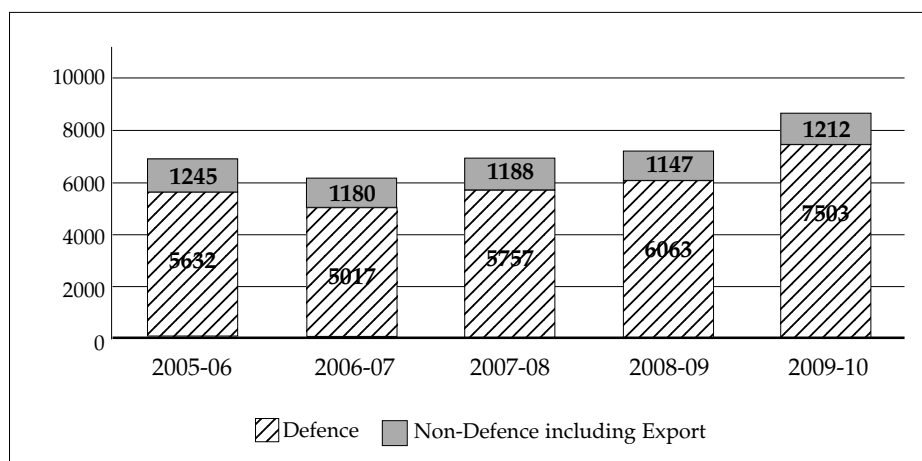
undertaking substantial capacity augmentation. Augmentation projects in respect of mine protected vehicles, armoured vehicle engines, T-72 tank variants and spares for T-72 overhaul are currently under execution. In addition, augmentation projects for Pinaka rocket system, high calibre weapon systems, T-90 tanks, BMP-II infantry combat vehicles and MBT Arjun tank are in the pipeline.

### Financial Performance

The Indian Armed Forces are the major customers of the Ordnance Factories and place orders to the OFB on non-competitive 'nomination' basis. Whenever adequate capacities are available, the Ordnance Factories also supply to the paramilitary & state police forces, civil market (civil trade) and export.

The value of OFB issues/sales to defence sector has been increasing in nominal terms after a dip in 2006-07. Sales to non-defence customers including exports have however, shown an uneven trend during the last five years.

**Figure 4: OFB Sales—Defence/Non-Defence in Rs crore at current prices**



Source: Annual Reports of Ministry of Defence and Annual Accounts of Ordnance Factories prepared by Principal Controller of Accounts (Factories)

OFB has earned a surplus in each of the last five years. Surplus has been earned on sales both to defence and non-defence sectors even though as per government policy, sales to defence are to be at cost.

OFB Surplus	2005-06	2006-07	2007-08	2008-09	2009-10
Rs crore	201	431	420	156	353
As %age of sales	2.9	6.9	6.0	2.1	4.0

## Areas of Concern

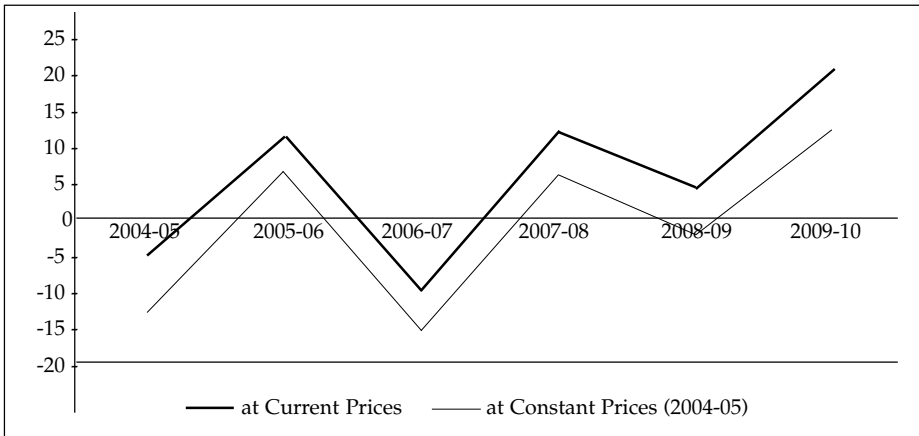
The question then arises—are the Ordnance factories well-placed to use the opportunities presented by a confluence of the demand of the Armed Forces for capability modernisation, the increased availability of resources to fund such modernisation and a policy structure that seeks to promote the development of indigenous manufacturing capabilities?

This sub-section discusses some important areas of concern that constrain the Ordnance Factories from realising their full potential and increasing their market share.

### Lack of Sustained Growth

OFB has registered a fluctuating trend of year-to-year growth in sales. This is indicative of either lack of sustained demand or inability to meet the existing demand. In OFB's case a combination of both seems to be applicable.

Figure 5: PFB - Percentage Growth in Sales



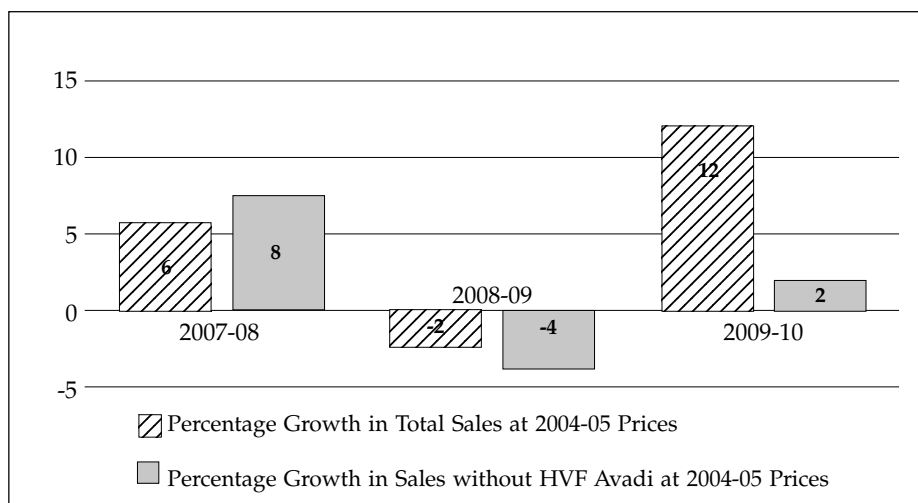
Source: Sales data published in Annual Reports of Ministry of Defence. Growth at constant prices has been arrived at using GDP deflator published by the World Bank, World Development Indicators.

On the demand side, the recent jump in sales is attributable to the T-90 tanks being manufactured in Heavy Vehicle Factory (HVF) Avadi under ToT from Russia. The first lot of fully assembled tanks has been supplied to the Army in 2009-10. The graph below shows the growth in sales from 2007-08 to 2009-10 with and without the production of HVF Avadi.

The above trend shows that Ordnance Factories other than HVF Avadi have seen minimal real growth in demand from the Armed Forces.

### Shortfall in Meeting Targets

At the same time OFB has not been able to meet the existing demand of the

**Figure 6: OFB Sales Growth with/without HVF Avadi**

Source: Annual Reports of Ministry of Defence and Annual Accounts of Ordnance Factories prepared by Principal Controller of Accounts (Factories)

Armed Forces. Supply to Armed Forces depends on annual indents given by the latter based on which annual targets of production and sales are decided by the OFB for each factory. There has been consistent shortfall in meeting such targets.

Year	Number of Items for which target fixed	Number of items manufactured as per target	Number of items for which target was not achieved	Percentage of shortfall
2003-04	368	270	98	26.63
2004-05	388	255	133	34.28
2005-06	352	257	95	26.99
2006-07	438	321	117	26.71
2007-08	507	360	147	28.99

Source: C&AG of India Report No. 17 of 2008-09 (Defence Services).

The shortfall in achievement of targets is often attributed to the practice of annual periodicity of indents by the Service Headquarters since any delay in the indents delays the procurement of inputs as the Ordnance Factories can begin the procurement action only after receipt of a firm indent and target. Some measures have been implemented recently so as to allow OFB to better manage the production programme. The organisation already had the authorisation to procure inputs for 25 per cent of target quantity in the absence of indents. This has now been followed up with authorisation to procure inputs for three years requirement. Army HQ also now gives a 5-year roll-on indent for ammunition. All these measures have enabled the factories to plan for the input material in advance.

## Low Productivity and Cost Inefficiency

Despite the availability of large pool of skilled manpower and investment in modern plant and machinery, many of the Ordnance Factories suffer from low productivity and lack of cost effectiveness.

This paper has attempted an illustrative comparison of labour productivity and inventory management ratio between the Vehicle Factory Jabalpur and M/s Ashok Leyland. Vehicle Factory Jabalpur is a dedicated manufacturing unit to meet transport needs of the Armed Forces. Its current product range includes general staff vehicles like 2.5 Ton LPTA-713, 5/7.5 Ton Stallion Mk-III vehicles and 2 KL Water Bowser, designed to operate in extreme climatic and terrain conditions from snow bound mountains to sand dunes. The factory is also producing high technology mine protected vehicles<sup>6</sup>. Ashok Leyland has been a private sector leader in India's commercial vehicle industry.

A comparison of labour productivity ratios shows that the per unit employee cost in Vehicle Factory, Jabalpur is more than four times that of Ashok Leyland while the output per employee is around one third. The inventory turnover ratio, which is the rate at which the average inventory is converted to sales, has been lower in Vehicle Factory Jabalpur with a sharp decline in 2009-10 as a result of decline in value of production and increase in inventory holding.

Indicator	2008-09		2009-10	
	Vehicle Factory Jabalpur	Ashok Leyland	Vehicle Factory Jabalpur	Ashok Leyland
No. of Employees	4909	11,938	4368	13,662
No. of Vehicles Manufactured	3731	54,431	3652	63,926
Output per employee (Total value of production/ Total No. of employees) in Rs crore	0.15	0.49	0.17	0.50
Per unit employee cost (Employee cost/No. of articles produced) in Rs lakh#	3.83	1.04	4.79	1.04
Sales per employee in Rs crore	0.14	0.5	0.17	0.53
Inventory turnover ratio (Value of production/Average inventory*)	3.83 times	4.06 times	2.74 times	4.56 times

# One lakh = 100,000; \* Average inventory = (opening inventory + closing inventory)/2

Source: Annual Reports of M/s Ashok Leyland and Annual Accounts of Ordnance Factories prepared by Principal Controller of Accounts (Factories) Kolkata.

It can be argued that Vehicle Factory Jabalpur with a far lower volume of production does not have the scale economies that are available to Ashok Leyland. Also, the low volumes of specially designed military transport vehicles are not attractive enough for the private sector. Nevertheless, the comparison between Vehicle Factory Jabalpur and Ashok Leyland raises questions about

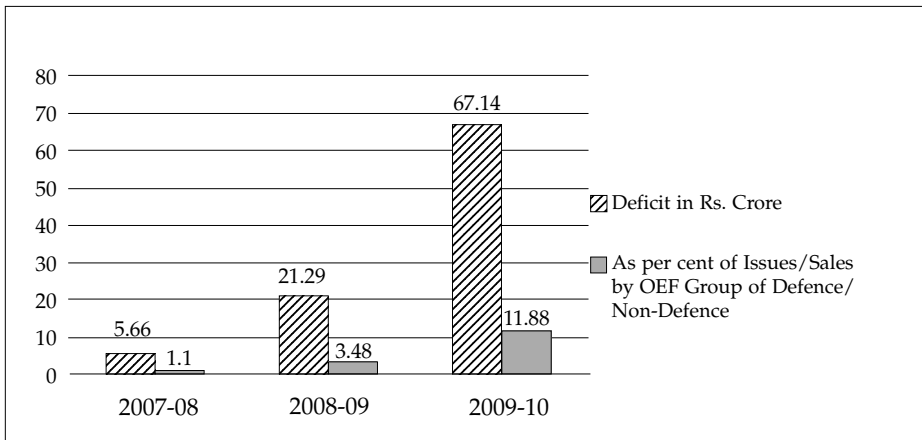
the opportunity cost of OFB continuing to run a production line when the requirement can be effectively met by the private sector.

One of the reasons given for low productivity is that Ordnance Factories maintain excess capacity in plant, machinery and manpower, as war-time reserve. However, the argument of 'surge' capacity being responsible for low productivity does not sit well with the recurring shortfall in meeting the existing demand.

While a similar comparison as above is difficult to establish for other Ordnance Factories due to lack of correspondence between the product range of individual factories and private/public sector peers, there are other indicators of inefficiency in the organisation.

The Ordnance Equipment (OEF) Group of factories which produces clothing, uniforms, blankets and other troop comfort items has the lowest production share at 6 per cent of the value of production but accounts for 17 per cent of the direct labour cost of the Ordnance Factories Organisation<sup>7</sup>. The OEF Group for the last three years has been incurring a deficit, which has been increasing i.e. its value of sales/issues has been consistently lower than the cost of production.

**Figure 7: Deficit of OEF Group of Factories**



Source: Annual Accounts of Ordnance Factories prepared by Principal Controller of Accounts (Factories) Kolkata.

### Pricing Distortions

An inference can be drawn from the above trend that OFB has had to cross-subsidise products of the OEF Group to blunt the criticism of the Defence Services, who have been vocal about the poor quality and high cost of these products and have increasingly demanded recourse to private sector purchase. However, such cross-subsidisation results in pricing distortions.

Pricing of OFB products supplied to the Armed Forces is supposed to be on cost basis i.e. cost of production is to be recovered without charging any profit.

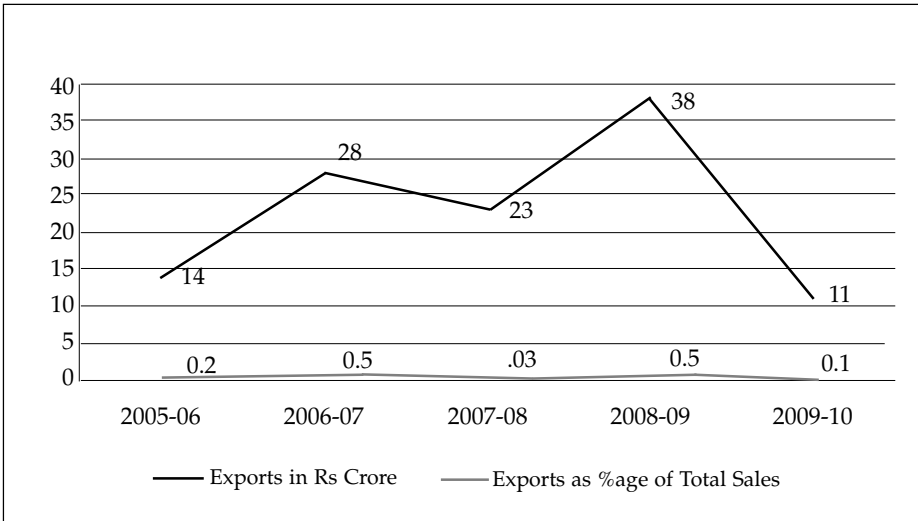
For the non-defence sector, OFB generally charges a profit over the price charged to the Armed Forces. Supply to civil trade and export is at full cost recovery plus profit that the market can absorb<sup>8</sup>.

Cross-subsidisation of low technology civil use items such as those manufactured by OEF group of factories pushes up the prices of weapons and ammunition thus, eroding OFB’s competitiveness in the international market for these core products, since price for exports is to be benchmarked to the base price for supply to the Armed Forces plus profit.

**Low Level of Exports**

Although increase in volume of exports to utilise the available capacity remains an important objective of Ordnance Factories organisation, the value of exports has been minimal being less than one per cent of total sales.

**Figure 8: OFB - Exports**



Source: Annual Reports of Ministry of Defence and Annual Accounts of Ordnance Factories prepared by Principal Controller of Accounts (Factories).

Some of the factors inhibiting the growth of exports are—a highly competitive export market for small and medium calibre weapons and ammunition, licence restrictions on export of items of complex technology like tanks and armoured personnel carriers, a negative list of countries for export and lack of a brand image and proper marketing infrastructure. Pricing distortions may have also contributed to the OFB products becoming non-competitive in international market.

**Constraints**

What have been the reasons for poor labour productivity and inefficiency in Ordnance Factories?

The organisation has so far enjoyed the advantage of monopolistic functioning with a captive customer base. Thus, even for items like uniforms, boots, blankets and transport vehicles where there is more than sufficient private sector capacity within the country, the Defence Services have to mandatorily meet their requirement through the Ordnance Factories and it is only for the quantities that OFB cannot supply within the requisite time frame that the Services can go to the private sector. The para-military forces and the state police also place orders on OFB on single source basis.

Monopolies are generally associated with inefficiency, high prices and lack of dynamism and Ordnance Factories are no exception. In the absence of commercial principles in the supplier-customer relationship between OFB and the Armed Forces, there is little incentive for timely deliveries or cost efficiency. OFB is able to pass on full costs to the captive customer and is not liable to pay any penalty for delays or poor quality of products.

One of the reasons for low level of cost consciousness in the organisation is the absence of a hard budgetary constraint. OFB works on the net budget system wherein funds are allotted in Government of India budget for expenditure during the year and the corresponding receipts from issues to Armed Forces are netted against the expenditure with a deficit resulting in drawal of additional funds or a net surplus reverting to the Consolidated Fund of India, as the case may be. Thus, OFB bears zero financing cost for its operations.

In this system of functioning, assessment of OFB's performance is mainly with reference to achievement of targeted issues to Armed Forces with the cost of products not receiving as much attention. Thus, even though there has been large scale induction of modern machines for improvement of productivity as well as restructuring of the industrial cadre with change in composition from semi-skilled and skilled workers to skilled, highly skilled and master craftsmen, the standard labour estimates of 1990s and even earlier vintage continue largely unchanged. The standard percentages of normal wastage in the production process have also not been revised. The result is unrealistic and loose cost estimates, which allow drawal of excess labour and higher than warranted wastage feeding into a high cost of production.

Being a government department, OFB is subject to government rules and regulations in matters of financial and personnel management. The resulting lack of flexibility makes the organisation process-oriented with emphasis on compliance with rules and regulations rather than achievement of results. Despite being a production organisation, the accountability for the product's quality does not lie entirely with the OFB. The quality assurance function in Ordnance Factories is the responsibility of Directorate General of Quality Assurance, a separate organisation under the Ministry of Defence, Department of Defence Production. While OFB has started self-certification of its products, the items as of now are restricted to low tech items like clothing and general stores<sup>9</sup>. Being fully dependent on government resources, OFB also does not have the autonomy to make investments as per the market requirements or to enter into joint ventures or co-development and co-production arrangements.



A major constraint for OFB has been lack of access to advanced technology for product up-gradation and diversification. In-house R&D is undertaken mainly for process and product improvement, indigenisation and some reverse engineering activities. The Defence Research and Development Organisation (DRDO) carry out the basic R&D work pertaining to indigenous design and development of arms, ammunition and weapon systems as required by the Armed Forces. Ordnance Factories are thus, only users of technology developed by DRDO or received as a follow-up of an acquisition process by the Defence Services involving transfer of technology (ToT). This dependence has constrained OFB's efforts at product up-gradation and improvement. It has been observed that low levels of R&D and the resultant disassociation from complexities of R&D work leads to problems in assimilating technologies and translating them into production. The low R&D base has also sometimes hindered the factories from formulating well-crafted ToT documents for contracting with the foreign OEMs<sup>10</sup>.

The Defence Production Policy and the DPP-2011 provide opportunity to OFB to partner with foreign OEMs in joint ventures and co-production arrangements to meet the domestic demand as well as exports. The offset policy especially provides opportunity for growth and access to new markets. The list of products eligible for discharge of offset obligations including products for internal security added in DPP-2011 covers almost the entire range of items being produced by OFB. However, high costs, pricing inefficiencies and lack of commercial approach are obstacles to OFB capitalising upon the opportunity.

While OFB along with the DPSUs has so far been the preferred production agency in acquisitions involving ToT, this situation is going to change with the increasing strength of the Indian private sector in a growing economy. The private industry is gearing itself to participate in the forthcoming acquisition projects and the large production houses like TATA, L&T and Mahindra have entered in to JVs with foreign OEMs. The JV between BAE Systems and Mahindra & Mahindra for platforms in land systems will compete with OFB for products like armoured personnel carriers and mine protected vehicles. The existing FDI limit of 26 per cent is seen as one of the limiting factors on the transfer of state-of-art sensitive technology by foreign OEMs to their domestic partners. However, as the situation changes under the pressure of market forces, there is a real threat that OFB's position in the indigenous defence industry will be undermined.

## V

### **The Way Forward**

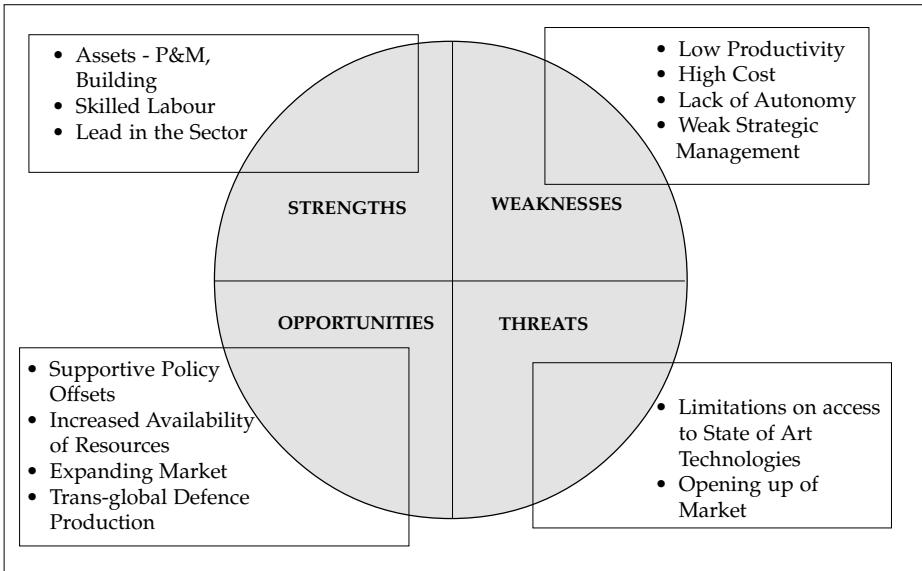
With more than 200 years of experience in supplying weapons, ammunition and equipment to the Armed Forces, the Ordnance Factories have many strengths such as a huge asset base, a large pool of skilled human resources and a lead over the other market entrants. But the organisation is beset with weaknesses resulting from inconsistency between functioning as a government

department and the requirements of a modern industrial entity in a competitive market. Status quo cannot, therefore, continue if the organisation is to capitalise on the opportunities and compete for a share of the expanding market in a level playing field.

So what should be the roadmap for change?

OFB itself appears to favour greater autonomy within the existing structure. However, autonomy with continued protection from competition will not address the issue of low productivity and high cost. Autonomy has to be

**Figure 9: OFB: A SWOT Analysis**



accompanied with restructuring to ensure that the Ordnance Factories are able to leverage their strengths and grow in a competitive market.

The restructuring of Ordnance Factories organisation has been considered by several expert committees in the past. The present management structure was created in 1979 pursuant to the recommendations of the Rajadhyaksha Committee and was intended to provide greater autonomy and flexibility to the organisation. More recently, the Kelkar Committee in 2005 had examined the entire gamut of issues relating to defence production and acquisition. Among the issues it had deliberated upon were the changes required to facilitate defence PSUs and Ordnance Factories to assume the role of designer and integrator, enabling them to build consortium of industries around them for product development and production<sup>11</sup>. The Committee had recommended that the existing Ordnance Factories should be grouped into three categories depending upon the critical nature of the equipment produced by these units and that thereafter each of the three groups should be converted into a defence PSU. The recommendations have not been implemented.

In the above background, a phased reform may be more do-able vis-a'-vis a complete corporatisation of all Ordnance Factories. Towards this end, the following path is suggested:

- A. Factories producing low-technology dual-use items like clothing, uniforms, blankets, other troop comforts, general staff transport vehicles, cables & wires may be divested and transferred to private sector ownership. Government ownership of these units has no special advantage rather; their inefficiencies and losses have acted as a drag on the units that are competitive. As seen from the illustrative comparison of Vehicle Factory Jabalpur and Ashok Leyland, there are sufficient capability and scale economies in the private sector for efficient production of such items. There are also multiple players to ensure competitive procurement. The concerns of labour could be addressed by offering all the affected personnel the option of an attractive severance scheme or transfer to the new corporation. A third option of being retained in a surplus cell for retraining and redeployment as per requirement within the Ordnance Factories organisation could also be considered. The modernisation and capacity augmentation plan of OFB includes appointment of about 8000 skilled manpower<sup>12</sup>. Some of this requirement could be met by redeployment of the surplus personnel.
- B. The factories involved in production of weapons, ammunition, armoured vehicles, defence application opto-electronics, propellants and explosives forming core ordnance production may be retained for the present as a Government organisation. This Government entity may be given management autonomy along with finance, HR and quality assurance structure as suited to a production organisation. However, the organisation should operate on commercial principles and compete to secure orders on a fixed price basis in a transparent manner. To facilitate commercial functioning of such Ordnance Factories within the Government framework, a marketing and export corporation may be created. This corporation will bid for orders, conclude commercial contracts and enter into joint ventures or co-production arrangements as per market requirements. It will be the interface between the customer and the producing units. In setting up the proposed corporation, the experience of Antrix Corporation—a wholly owned Government of India company—which functions as the marketing and commercial arm of Department of Space could be drawn upon.

## VI

### Conclusion

“The global Defence industry is truly at an inflection point and we see it continuing to move rapidly east—toward China, India, and the Middle East. These countries are expected to be large markets for A&D industry products and services, as well as participants in the supply chain”<sup>13</sup>.

The Indian Ordnance Factories Organisation being the largest and oldest departmentally run production organisation in the country should seize this opportunity. However, for the organisation to realise its potential in a changing market, it needs to restructure itself. Divestment of the units involved in production of low technology dual use items will enable OFB to focus on high cost high technology core areas. Further, creation of a marketing and export corporation for the units remaining in the government fold will provide flexibility to respond to the market. At the same time exposure to competition and development of commercial practice will lend dynamism to the organisation and enable better utilisation of resources to create value for the organisation and for the defence sector.

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## Defence Acquisition: A Shipyard Perspective

*PR Raghunath*

### **Background**

Mazagon Dock Limited (MDL) is the premier shipbuilder to the nation and perhaps the most heavily loaded lead warship-building shipyard in the world, engaged in producing world-class stealth frigates, destroyers, submarines and high technology commercial vessels. Thus, MDL is a key stakeholder in the defence acquisition process.

Warships, being a high technology platform involving multidisciplinary activities, require a sound acquisition program to keep pace with the changing and challenging demands. A robust acquisition process therefore needs to factor in the shipyard's inherent strengths and also address areas of weakness. This paper attempts to evaluate the extant acquisition process from the perspective of the shipyard and suggest a few avenues for improving the process for the benefit of the nation.

### **Defence Acquisition and the Shipyard**

Each nation's defence acquisition strategy gets shaped by the history and culture of the nations; their governmental structures, the military interfaces and political and economic conditions. Defence acquisition, although not easy, is crucial to military success. It provides the Armed Forces with the battle-winning equipment, support, and infrastructure they need to defeat our enemies—current and potential. Acquisition therefore involves the complex and challenging task of running large numbers of projects simultaneously. These projects need to keep pace with the leading edge of technology and innovation.

Acquisition of a new generation warship calls for considerable top-level planning and large investments in technology, human resources and funds. Given the magnitude and importance of the process, most nations have a well-defined and structured acquisition system to manage the process. The acquisition

**Figure 1: Fifty Year Track Record  
Major Front Line Warships and Submarines**



**Leander Class Frigates** **6 nos.**  
**India's first indigenously built Frigate**  
 Length      Breadth      depth  
 113.40      13.09      8.60



**Godavari Class Frigates** **3 nos.**  
**India's first indigenously designed and built missile Frigate**  
 Length      Breadth      depth  
 125.61      14.44      9.00



**Corvette** **3 nos.**  
**MDL was selected as lead shipyard to built Corvette**  
 Length      Breadth      depth  
 91.11      10.45      5.90



**Missile Boat** **4 nos.**  
**MDL was selected as lead shipyard to built Missile Boat**  
 Length      Breadth      depth  
 56.10      10.20      5.40



**Destroyer** **3 nos.**  
**Largest indigenously designed guided missile destroyer**  
 Length      Breadth      depth  
 163.20      17.40      9.65



**Submarine** **2 nos.**  
**India's first indigenously built SSK class submarine**  
 Length      Breadth      depth  
 63      6.5      6.0



**Stealth Frigate** **3nos.**  
**India's first indigenously built Stealth frigate**  
 Length      Breadth      depth  
 143      16.9      9.2

process has three distinct phases viz.; definition of requirements, realisation through design and production, life cycle support planning and implementation. Presently indigenous defence shipyards are involved only in the second phase of 'realisation through design & production'. Some of the nuances associated with the acquisition of a complex naval platform are given below:

- (a) **Through-Life support:** Over the years, the strategies for design and construction of warships have evolved based on the technological advancement in various fields, the growing complexities and risks of development of sophisticated new systems, the need for flexibility in roles of the warship and the desire to avail construction resources of different yards to reduce build periods to the minimum. Indian Navy's expectations from its procurement are cost effective, high quality and reliable products, integrated logistic support, lean order capability, prompt delivery, provision for up gradation and product life cycle support. In other words the Navy looks for support across the entire spectrum of a product—conception to cremation.
- (b) **Customisation for marine environment:** Naval systems as compared to land systems have an innate requirement of ruggedization to meet the harsh marine and stressful environment. The Indian subcontinent poses a greater challenge due to its diverse climatic conditions. For instance, a weapon designed for Europe, would need to be customised to meet the ravages of the Indian tropical conditions. The armament being designed or developed in house by R&D joint ventures or import, should therefore, be developed keeping these factors in mind as they have a direct bearing on the life as well as the maintainability of the system.
- (c) **Keeping Pace with technology:** Being capital driven and technology intensive, Naval Systems require substantial investment in state-of-the-art infrastructure, human resources and a solid R&D base. Today, the source technology for defence electronic products are increasingly 'commercial off the shelf' in nature and these are adapted and ruggedized to meet military requirements. Much of the brainware is drawn from commercial software modules, which ride on commercially available hardware ruggedized to military STDS. These same civilian technological innovations find naval applications in radars, sonars, and communications and combat management systems. Much of the mechanical systems such as pumps, compressors, engines and generators, HVAC systems etc., are also based upon commercially available designs ruggedized and reengineered for naval applications. Therefore, advancements in technology are no longer percolated from the defence sector to the commercial sector but it has now been reversed. However, there are 'unique to Navy' technologies such as naval weapons, hybrid propulsion plants, NBC protection, etc.

Indigenous acquisition of warships began with the initiative for the creation of



defence shipyards in 1960 and this has fructified into a well-established process of designing and building a wide variety of platforms. This initiative has come a long way and has already paid rich dividends. Today there are not many countries in the world which can claim to have comparable capability to produce such a wide variety of warships starting from fast attack crafts to patrol vessels, missile boats, landing ships, cadet training ships, tankers, frigates, destroyers, submarines, and of late even the aircraft carrier.

The Indian Navy has long prided itself to be a builder's Navy. To this end, Mazagon Dock Limited as the lead shipyard, has been the backbone of the indigenous warship building and has provided the muscle through production of sophisticated world class stealth frigates, destroyers and submarines for the Indian Navy. A selective glimpse of the wide gamut of naval platforms built and delivered by MDL to the Indian Navy in the past five decades is given at figure-1. This journey has neither been smooth nor easy. The key challenges encountered by the shipyard include sourcing of weapons-sensor-communication suites and propulsion packages from diverse and disparate sources across India and abroad, and integrating these into the indigenous and in-house design of the ship. The Indian Defence shipyard is still grappling with the nuances of acquisition that was brought out above.

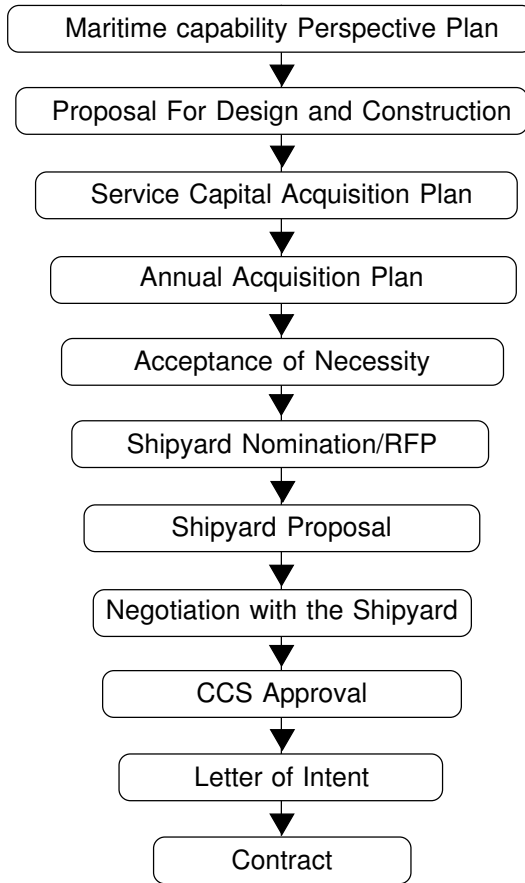
### **Warship Acquisition Procedure in India**

Defence capital acquisitions have been categorized under four main heads, namely; 'Buy', 'Buy and Make' 'Buy and Make (Indian)' and 'Make' decisions. Naval shipbuilding is a capital and technology intensive, complex activity, which is why it has been addressed by a separate procedure for design, construction and acquisition of naval ships, submarines, yard crafts, auxiliary ships, and Coast Guard vessels through design and construction.

Naval acquisitions have again categorized two sections as follows:

- (a) Section 'A': Acquisition of naval and Coast Guard ships, submarines, yard crafts and auxiliary crafts etc., by nomination to DPSU or to any other Indian shipyards.
- (b) Section 'B': Acquisition of naval ships, coast guard ships, submarines, yard crafts and auxiliary crafts etc. on competitive basis.

In India, the sanction for a warship project is given by the CCS and the apex production authority is the Secy. (DP) in the MOD. The CNS on behalf of the President of India executes the project contract with the shipyard. The acquisition management, in terms of day-to-day monitoring, selection of equipment, and considerations of revisions of time frames, are all undertaken by the Navy. Within the Navy, the production Directorates actually carry out the acquisition management functions. The decisions on equipment selection are primarily taken by the Staff Directorates and the Material Branch Directorates – agencies who are not directly dealing with the project but who factor in the aspects of modern technology, standardisation, life cycle support and in-service feedback.

**Figure 2: Stages Of Warship Acquisition**

The MOD does conduct or attend the project reviews at the Apex Steering Committee level and CPRMs. However, all the decisions pertaining to equipment in terms of the level of technology aspired, scope of supply and desired time frames for development have a significant cost and time implication. The fact that every decision on equipment or systems has a financial and time dimension usually gets mired in other more important considerations of operational requirements and updated systems. There is no systemic control on a consistent basis to enforce the time and cost discipline.

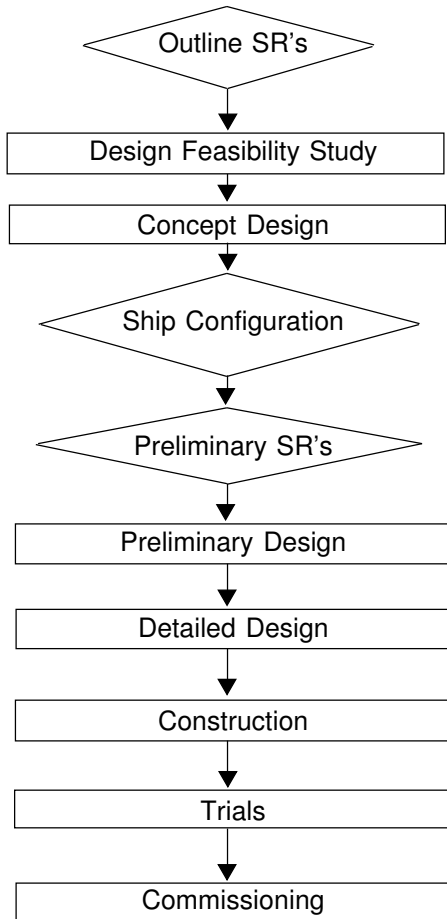
### **Warship-building Issues and Challenges**

Issues and challenges faced by warship building yard are complex and cannot be viewed in isolation. Being a multidisciplinary technology intensive activity various agencies, which are part of the acquisition system are involved and any change has cascading effect on the progress of the project. A few of the major

issues often faced and points finger towards shipyard alone are being enumerated in succeeding paragraphs.

### Stages in Ship Design and Construction

- (a) **Shipyard Capacity:** There is an often projected perceived inadequacy in warship construction capacity, which is not so much due to lack of capacity in shipyards, but mostly due to our system of ordering ships where there are considerable delays between initiation of projects and accompanying changes in specifications. These invariably necessitate complete redesign and regeneration of production drawings, which brings avoidable pressures on the industry in terms of build periods and adds to the cost considerably. There is also avoidable bunching of orders, like it has happened in current orders under execution.
- (b) **Build Periods:** Indian warship building suffers from extended build periods. It would be seen that build periods in the earlier frigates when



the shipyard had just started learning the process were indeed not too bad compared to the current levels. In fact a classic example is INS Godavari. Though it was a first-of-its-class, it still remains the frigate, which was built by MDL in the shortest possible time. The ship had a far more complex weapon and sensor suite compared to the earlier Leander Class ships, which were rather primitive. Despite the complexity, the ship was completed in a record time. If the issue is analyzed carefully, the answer will strike immediately. In the case of Godavari, the propulsion and platform systems were maintained by the same as the earlier Leander Class, six of which MDL had already built. In terms of complexity of fitting out and especially on matters concerning material hold-ups, these are the very systems, which directly affect build periods. If we bring changes in these systems, the build periods will stretch almost exponentially. This achievement in Godavari further underlines the advantages of series production. While it is an accepted fact that our build periods are longer, internationally, warships take a long time to build. While deliberating on the long build periods, many fail to analyze the factors, which lead to this. The developmental nature of many of our major equipment or systems and our preference to source from indigenous vendors, most of whom are not able to supply even minor items like valves and fittings on time, compound the problems for the builder. However, the indigenous self-reliance that has been built up over the years is a great achievement. We might be paying some price in terms of build periods, which can be corrected by series production, consistency in platform system design, improved fitting out specifications, standardisation, etc. Indian Defence Shipyards are definitely at par in terms of efficiency and productivity with other similarly placed industries in India. The production rates achieved by them without adding to their employee strength would bear out these facts.

- (c) **Preparatory Period:** One of the reasons for our build periods being longer is the fact that we commence construction without adequate preparations. Due to the system of project-based sanctions and the lengthy administrative efforts involved in obtaining such sanctions, Defence Shipyards tend to get orders only when some of their labour is already idle. When finally the sanction is obtained, both the customer and the shipyards are very keen to start production early. In our current format of shipbuilding, construction can start when just steel and weld consumables are available. Design efforts are nowhere near complete and equipment ordering is still very far away. The problem in shipbuilding is not hull fabrication but the ability to decide and procure all the equipment and systems that are to be fitted as per drawings, which should be generated from a three dimensional model. The latter just does not happen and is, therefore, leading to considerable delay and a stupendous amount of rework. Foreign shipyards, however, spend

much more time on planning right up to the minute details, so that all materials are procured and drawings prepared before the production starts. This considerably shortens the actual production periods but not necessarily the total build period.

- (d) **Complexity of Designs:** While we can surely be proud that our ships are very effective weapon platforms with an assortment of weapon systems, we also must accept that this has resulted in overcrowding of the internal arrangements eventually affecting their finish and appearance. For example, there are no comparable frigates in the world like our P-17 with two ASW helicopters, two anti-missile defence systems, one set of surface-to-surface missiles, two ASW rocket systems, one forward gun, two close-in weapon system guns, hull-mounted sonar, towed array sonar and a host of other sensors and antennae for electronic warfare and communication, navigation etc. If this by itself is not difficult to accomplish, we have chosen complex propulsion systems with different elements being sourced from different manufacturers. We have also introduced different types of data network systems, some of them running parallel. The branch structure of the Navy, which naturally impinge on the equipment operation pattern and design philosophy, contributes to some avoidable complexity. All this adds up not only to the cost but will exponentially increase maintenance requirements in the future. Such a situation arises because each segment of user interest want to include the latest possible equipment or system on-board the ship. A large number of these ends up being developmental as new technology levels are introduced. The designers are constrained to accommodate all these requirements. This is where the foreign builders differ from our system. In their case, the shipbuilders are the motive force in generating new designs or introducing new technologies and come prepared with back-to-back arrangements with OEMs of equipment and systems while quoting for their ships and submarines. Their ships are also designed around major equipment and systems to perform the role rather than first deciding on the hull form and later develop equipment and systems, as the building progresses. Consequently, there is much less clutter on-board.
- (e) **Role of Shipyards in design:** The current system of the Navy acting as the nodal centre for design activities with the shipyards being responsible only for generation of detailed design drawings, which again are vetted by the Navy, is not a pragmatic or satisfactory arrangement. Dependence on naval design has over the years proven to be detrimental to the shipyard. The shipyards do not get direct exposure to any new design concept and have stopped thinking about generating their own designs. The best way to correct the system is to entrust the shipyards with the entire responsibility of design with only conceptual design being handled by the Navy. This will be mutually beneficial, as these officers will gain considerable practical experience.

The shipyards should not have any objection to this system as it would not affect the career pattern and growth of their own officers.

- (f) **Equipment Nomination:** Nomination of equipment by the Navy for various projects has been viewed with some criticism. Considering various aspects of life cycle management, the Navy definitely have a strong case to nominate equipment, so that they can optimise maintenance infrastructure, control inventory holdings and above all ensure familiarity of equipment to sailors, who operate the equipment. A ship, as a war-fighting platform, cannot be seen as a conglomeration of equipment and systems procured to adhere to the governmental procurement system. Therefore, there should be some arrangement for the Navy to specify the type or the make of equipment or systems they want. While this by itself is not questioned, what follows thereafter becomes a problem. Before nominating equipment, the Navy should obtain assurance of the supplier that the production schedule of the shipyard would be met and all specified qualitative requirements also adhered to. Quite often it happens that the nominated manufacturer having been assured of the business is more responsive to the Navy and fails on many commercial and delivery issues with the shipyards. The shipyard feels somewhat aggrieved as they are left with little choice. There are also procedures for issuing PAC etc., which cause administrative delays. To obviate all this, we should perhaps follow what the Royal Navy had introduced in the 70's. They had published a list of equipment and systems manufactured by different manufacturers, which were approved for fitment on-board their ships. Being an approved list, a shipyard could choose products from this and did not have to revert back to the Navy on each occasion for obtaining PAC etc. Since it was a transparent system, manufacturers could interact with the Navy and try and get their equipment listed. Once that was done, shipyards dealt with OEMs directly and there was no further requirement for the Navy to play a role during technical negotiations, price negotiations, etc. In a way, its standardised equipment fits on-board ships, which would be a step in the right direction.
- (g) **Modular Construction:** So far the shipyards have been constructing ships in a traditional manner where the hull is fabricated first with smaller blocks (approx. 30-50 T) with very little outfitting, leading to longer build period. This is largely due to the concurrent and telescopic design where the construction commences immediately on finalisation of the hull structure without adequate progress in the outfit design. On the other hand foreign shipyards have adopted an modular and integrated construction methodology where the blocks are outfitted extensively in the shop floor leading to much lesser outfitting effort and time at a later date. Accordingly, outfitted blocks of higher tonnage based on the infrastructure available are being fabricated in the shop floor leading to much lesser time at the building berth. Indian Shipyards

are fully aware that one of the key factors to reduce the build periods is to adopt the modular construction methodology. Modular construction and quality of any warship is directly related to availability of largely frozen design, modern shipyard infrastructure, and associated build strategy and good shipbuilding practices followed by the yard.

- (h) **Acquisition Management:** For the acquisition management to function effectively and be answerable as a single point agency on the time and cost overruns of a particular project, this needs to be a well-defined structure headed by one of the senior most functionary of the Navy whose primary or only functional interest should be the timely execution of the project. He should act with authority and unambiguous responsibility for the timely execution of the project within target cost. It would be necessary to co-locate all authority and responsibility in the acquisition management team. However, this acquisition management team must work on the concept of integrated project management team so that it has all the wherewithal in terms of technical responsibilities, financial prudence and target control over the ship project being executed in the shipyard. This acquisition management team should also have under its hierarchy technical experts composed of the service element who will advise decisions on technical matters. Inputs of the operational service HQs with regard to the type of equipment and other operational requirements can be taken as a first input. During the course of the project execution however this highly empowered acquisition team should be solely responsible for taking all decisions concerning execution of the project.

### **Some Recommendations for Reforms to the Acquisition Process**

Strategic aim for acquisition should be to improve military capability by managing acquisition better by taking action on several fronts. Some specific areas in the acquisition process that becomes immediately relevant to the Shipyard are highlighted below:

- (a) **Functional Autonomy for Shipyards:** The shipyards should enjoy more functional autonomy in the detailed design, procurement and build that are technically intensive phases of the acquisition process. For that the work culture of the shipyard would require step-ups wherein Yard personnel would begin to take techno-commercial decisions and own-up. Nevertheless, the autonomy should also function under the larger umbrella of the overall Strategy for Defence. Time and cost implications of each and every decisions at the micro and macro levels of a project needs to be embed into Yard's DNA.
- (b) **Internal Process upgrades in the Shipyard:** In order to contribute meaningfully to the acquisition process, with shipyard as the key player, there is a dire need to revamp the skill sets and knowledge base of all personnel in the Yard. Specifically, some areas that require immediate attention is listed below:

- Improving procurement skills and negotiating capabilities.
  - Establishing clearer internal business processes amongst the various work and cost centres within the organisation.
  - Embedding a 'through-life' approach to managing enormous shipbuilding data.
  - Building a more active and transparent relationship with the industry.
  - Ensuring that the Shipyard's activities are synchronized with the MOD's acquisition effort (both for equipment and other areas) fully supports wider defence priorities, including safety and sustainable development.
  - Explore avenues to improve planning, project management and risk management.
  - Continue to improve our engineering abilities.
  - Increase the skill sets of the Yard's financial and commercial staff through higher levels of qualification and better business awareness.
  - Step-up the Management Information System (MIS) for constant feed back to decision makers and policy drivers to ensure that the mistakes of the past do not recur and to see that the learning curve in the design-procurement-build phase is exploited for future decision making.
  - Continual improvement through training.
  - Harnessing the benefits of latest technology especially IT to all spheres of the Yard's processes and procedures. MDL's plan in the pipeline for implementation of PDM/PLM for future projects will reap rich long-term dividends.
- (c) **Costing:** What is required is to improve techniques in costing all large projects to produce more reliable cost and risk estimates by increasing the skills and capacity of our cost estimators. Train them to apply better and more sophisticated techniques for costing and estimation.
- (d) **Vendor Base:** Managing the industrial aspects of defence acquisition requires a broad, flexible and long-term approach, that works in relation to both major contractors and small and medium sized enterprises. Industry needs to play its full part in helping to address the problems this strategy is seeking to tackle.
- (e) **Synergy between ancillary Industry and Shipyard:** Overall aim is to embed a more active and transparent relationship with the industry. That means it needs to be effective, efficient and secure. And we need to provide the industry with greater long-term certainty so that it can make future investment decisions that also support country's interests. Success in acquisition ultimately rests on whether we deliver the equipment our armed forces need, when they need it, and for what cost. This is not always a simple assessment to make.



**Conclusion**

The challenges faced by the acquisition process are constantly evolving. The need of the hour is to deliver a succession of reforms to our acquisition process that will ensure cost optimisation, contain time slippages and at the same time taking a holistic, 'through life' approach to providing the required force capability. There is also a need to strive for constant improvement in the acquisition of new equipment, especially in our larger and more technologically complex projects. We must do better, and deliver more of our projects according to cost and time limits. For that, active synergy and participation from all stake holders viz, MoD, IN, Shipyards and the industry becomes inevitable.

## FDI in Indian Defence Industry

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### **Introduction**

In a reply to a Parliamentary question in July 2010, India's Union Defence Minister AK Antony informed that his Ministry is formulating a policy on foreign direct investment (FDI), in response to a discussion paper circulated by the Ministry of Commerce and Industry (MoC&I), which suggested to raise the foreign investment cap in defence industry from present 26 per cent to 74 per cent<sup>1</sup>. The Defence Minister's response assumes greater importance in view of the buzz generated by the MoC&I's paper among a cross-section of stakeholders. This paper examines the perspectives of the various stakeholders, both at the government and industry levels. It also examines the international practices pertaining to foreign investment in strategic sectors, to draw inference to the Indian context. The paper argues that in view of the international practices pertaining to investment in strategic sectors; the constraints of India's present FDI policy regulating the defence industry; various defence industrial measures having a bearing upon FDI; and the economic benefits of higher FDI, there is a need to increase the FDI cap up to 100 per cent. It also argues that the increase in FDI cap alone is not sufficient to revitalise the domestic defence industry. In this regard, the paper reiterates various reform measures that India's Defence Ministry needs to act upon simultaneously. The paper, however, begins with the existing guidelines pertaining to the FDI in the defence industry and the impact the policy has made so far.

### **The Present Defence FDI Policy: The Impact So Far**

In a major policy change, the government in May 2001 opened up India's defence production to the private sector as well as foreign participation. The decision, which was conveyed via Press Note No. 4 (2001 Series) was subsequently elaborated in Press Note No. 2 (2002 Series), by way of detailed "guidelines for licensing production of Arms & Ammunitions"<sup>2</sup>. As regards FDI, the guidelines specifically mandate, among others, FDI up to 26 per cent in the defence industry,

subject to compulsory industrial licensing. The 26 per cent FDI cap is in consonance with the Indian Companies Act, 1956, which empowers the government "to regulate the formation, financing, functioning and winding up of companies"<sup>3</sup>. As per the Act, a company formed in India is required to operate within the broad parameters of its Memorandum and Articles of Association while always staying within the scheme of law as contained in the Act. The 26 per cent cap on equity share is to protect minority interests in all decisions of the company taken by its Board of Directors (who exercises their power collectively through passing of Board resolutions) and its shareholders. As per the extant provisions of the Companies Act, shareholders with minimum 26 per cent equity share can block a 'special resolution'<sup>4</sup> whose intent is to alter the basic premise on which a company is formed (50 per cent is the minimum to block any decision or resolution pertaining to the company)<sup>5</sup>.

Apart of from the FDI cap, the 2002 guidelines also stipulate a three year lock-in period for all defence equity inflows; no purchase guarantee from the MoD; detailed particulars of the management to be furnished before the government; and strict adherence to export norms as applies to the government-owned enterprises. The guidelines do not, however, mandate a minimum capitalisation for any defence companies involving foreign equity.

The detailed guidelines notwithstanding, the FDI policy has so far not succeeded in attracting any major financial or technological inflows in to the country. It is primarily because the 26 per cent cap is viewed by many foreign companies as dissuasive, as it provides limited scope for meaningful returns to their investment and also little control of their technologies, which they might want to transfer to the Indian joint ventures. From the financial point of view, total inflow of resources to the defence industry between April 2000 and May 2010 amounts to a meagre US\$ 0.15 million, a fraction of inflows into sectors, which attract high-value FDIs, namely services, computer software and hardware, and telecommunications among others<sup>6</sup>. Moreover, of the total 62 indentified sectors in which FDIs have gone in to the defence industry ranks the last, even behind the sectors such as soaps, cosmetics and toilet preparations, and timber products among others (see **Table**).

**Table 1: Select Sector-wise FDI inflow, April 2000 to May 2010**

<i>Rank</i>	<i>Sector</i>	<i>Amount of FDI inflows (US \$ million)</i>	<i>% of total FDI inflows</i>
1	Services Sector	24,227.48	21.10
2	Computer Software and Hardware	10,168.37	8.82
3	Telecommunications	9,821.17	
4	Housing and Real Estate	8,519.25	8.74
5	Constructions activities	8,190.85	
41	Soaps, Cosmetics and Toilet Preparations	173.19	0.15
53	Timber Products	37.07	0.03
62	Defence Industries	0.15	0.00
	Grand Total	120,155.25	100

*Source:* Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Government of India, *Factsheet on Foreign Direct Investment from August 1991 to May 2010*, [http://dipp.nic.in/fdi\\_statistics/india\\_fdi\\_index.htm](http://dipp.nic.in/fdi_statistics/india_fdi_index.htm)

Although, from the technological point of view, the FDI policy has led to a plethora of partnerships between Indian and foreign companies, a closer scrutiny of the partnerships would reveal that most of them are Memoranda of Understandings (MoUs), which in turn are related to the offsets linked to contracts already signed or anticipated in future. Conspicuously absent in these MoUs is any mention about the inflow of defence technology, which is subject to licensing and export control rules of the originating countries' governments. This in turn indicates the lukewarm response of the foreign companies to the FDI policy, which is in vogue since 2001.

### **Differing Perceptions on Raising FDI Cap**

The absence of any meaningful FDI inflows—financial as well as technological—has led to a strong debate in India, starting at the official level with the Ministry of Finance (MoF). In its Economic Survey 2008-09, the MoF had suggested an increase of FDI cap to 49 per cent across the board and “up to 100 per cent on a case by case basis, in high technology, strategic defence goods, services and systems that can help eliminate import dependence”<sup>7</sup>. Although, the recommendations contained in MoF's above survey are only suggestive in nature, they were supported formally by the Ministry of Commerce and Industry (MoC&I), which circulated in May 2010 a comprehensive discussion paper on Foreign Direct Investment (FDI) in the defence sector<sup>8</sup>. The paper made a strong case for increasing the present FDI cap by stating that the “established [global] players in the Defence industry should be encouraged to set up manufacturing facilities and integration of systems in India with FDI up to 74 per cent under the Government route.” While making the above suggestion, the discussion paper suggested that: “For future RFPs [request for proposal] by MoD, a condition may be imposed that the successful bidder would have to set up the system integration facility in India with a certain minimum percentage of value addition in India. The successful bidder should be allowed to bring equity up to the proposed sectoral cap.”

It is worth noting that the discussion paper's main contention of enhancing FDI cap to 74 per cent was premised on the fact that:

“The present cap of 26 per cent in FDI has failed to attract the state of the art technology in the defence sector. Increase of cap from 26 per cent to 49 per cent will not give any additional say to the foreign investor in the affairs of the company as per the provisions of the Company Law. Therefore, increasing FDI cap from 26 per cent to 49 per cent as is being advocated by some industries associations will not really help us in getting the best technology partners to invest in India. By merely increasing the limit from 26 per cent to 49 per cent we may be accused by posterity of doing too little and too late. Therefore, in case we really want to have the state-of-the-art-technology, we have to permit anything above 50 per cent if not 100 per cent. It may be, therefore, desirable to allow either 100 per cent or 74 per cent as in the case of telecom sector. Since there is licensing provision also in the defence sector, we can refuse

to permit FDI in the sector by refusing the license where the background of the company is suspect”.

The above argument for FDI cap of 74 per cent has, however, not found broad support among the industry and most notably the Ministry of Defence, which is one of the key stakeholders in India’s defence industrialisation. Till the release of the MoC&I’s discussion paper, the MoD has clearly stated its intention of not favouring the present FDI cap. This is evident from a question and answer session of the Parliament in which the Minister of State for Defence said ‘No’, to a question of “whether Government is seriously considering FDI hike in defence production”<sup>9</sup>. Keeping in view the above answer and the MoD’s perception with regard to “sensitive nature of the Defence sector”<sup>10</sup> it does not seem the Defence Ministry would favour an outright increase in the FDI (this is not to argue that MoD would not support an increase in FDI limit).

In response to the MoC&I’s paper, a cross section of industrial stakeholders ranging from industrial associations, labour unions, law firms, foreign companies, and consultancy firms have come out with their own views<sup>11</sup>. The views of these stakeholders, which are divided along three major lines are summarised below:

- FDI limit should be retained at 26 per cent.
- FDI could be allowed to a maximum of 49 per cent subject to certain conditions, such as:
  - Minimum financial inflows is US \$100 million
  - Compulsory inflow of technology with approval from originating government with respect to items to be produced in India and their exports to other countries
  - Compulsory industrial licensing and government approval for formation of such JV
  - JV formed in India with more than 26 per cent foreign equity to be barred from participating in “Make”<sup>12</sup> projects
- FDI should be increased to 74 per cent.

The majority of the industry as represented by their major associations, including the Confederation of Indian Industry (CII) and the Federation of Indian Chamber of Commerce and Industry (FICCI), has not favoured an increase of FDI cap beyond 49 per cent. Moreover, the financial condition proposed by the associations—such as minimum \$100 million inflows—for 49 per cent FDI cap is stringent and it is highly discouraging for any foreign company to opt for this route in order to make a presence in the Indian defence industry. Even if some choose this route with a minimum \$100 million investment in an India-owned venture, the JV in question would support only the big Indian companies as the mandatory minimum Indian equity share would be 51 per cent or \$104 million—a hefty amount of investment from the Indian defence industry perspective. In other words, small Indian companies, which are interested to delve into defence production will be debarred effectively on financial ground from taking advantage of even 49 per cent FDI.

The rationale behind some of the stakeholders' opposition to an increase in FDI cap beyond 49 per cent is based on the assumption that higher investment would impinge upon national security, ruin domestic technological development and destroy the nascent indigenous industry. However, these fears do not seem to be based on sound logic. The fear of national security being adversely impacted in view of greater stake of foreign companies in Indian defence industry is a bit overhyped as manufacturing by foreign companies within the Indian national boundary while remaining within the scheme of Indian laws is much better an option than importing complete systems from foreign countries. The Government has much greater option to regulate the foreign companies operating in India compared to companies operating in foreign soil. Similarly, from the technological and industrial point of view, as has been pointed out in this paper in latter part, India is far behind the advanced countries in 'technology standing index'. FDI, if channelled properly, could be a catalyst in stimulating India's overall technological and manufacturing capability. The National Manufacturing Council, a group constituted by the Prime Minister to look into India's manufacturing sector, had in fact recommended FDI as one of the tools to facilitate technology transfer and enhance India's manufacturing capability in key strategic sectors, including aerospace, shipping, IT and hardware, and capital goods<sup>13</sup>.

### **Foreign Investment in Strategic Sector: International Practice**

In the era of globalisation, FDI has been an important source for external finance. According to the United Nations Conference on Trade and Development (UNCTAD), global FDI inflows reached US\$ 1.24 trillion in 2010, and are estimated to rise to US\$1.4–1.6 trillion in 2013<sup>14</sup>. The volume and growth of inflows notwithstanding, FDI inflows are often fraught on political grounds, as inflow of resources are invariably linked to control of assets, which the receiving countries are often reluctant to shed for variety of reasons, national security being the critical one. In recent times there have been plenty of examples in which FDI inflows have been subject to wider and heated political debate. Notable among these is the one that surfaced in early 2006, involving the state-owned Dubai Ports World (DP World) and its planned acquisition of six US ports from the British-owned Peninsular and Oriental Steam Navigation Company (P&O). No sooner had the DP World announced its intention of acquiring the ports, a congressional and greater public outcry erupted in America, leading, finally, to the Middle Eastern company's withdrawal from the acquisition process<sup>15</sup>.

In order to balance the need for foreign investment with national security concerns, many countries in the world, including India, have formulated laws and regulations to prevent/regulate investments in the strategic sector. The US, which is the main source for both inward and outward flow of FDI, has one of the oldest laws, in the form of Exon-Florio Amendment to the Defence Production Act of 1950, which has been recently amended through the Foreign Investment and National Security Act of 2007 (FINSIA). Under the Act, the US

President is authorised to “suspend or prohibit foreign acquisitions of U.S. companies if they are determined to pose a threat to national security”. The presidential power to investigate such acquisitions is however delegated to a huge inter-agency, known as Committee on Foreign Investment in the United States (CFIUS), which is headed by the Treasury Secretary and includes, among others, the Secretaries of Commerce, Defence, State, Homeland Security, Energy, and Labour<sup>16</sup>. Once an application is submitted before CFIUS for review, the agency investigates, within a period of 45 days, the possible impact of the proposed investment on national security with reference to a pre-identified set of factors, ranging from possible impact on the national defence industrial base, to commitment to non-proliferation by the FDI originating country. It is however to be noted that an investigation is waived off if the lead agency and the Chair of CFIUS jointly decide against it.

A crucial component of CFIUS’s investigation process is the ‘mitigation agreement’ under which further conditions are imposed on the “party to the agreement to mitigate any threat to U.S. national security”<sup>17</sup>. There have been cases where transactions have been approved or withdrawn based on additional security measure. The Special Security Agreement (SSA), signed between UK’s BAE Systems and US government is a successful case in which the former was allowed to start wholly owned operation in the American defence market. Under the SSA, BAE System Plc (the US-based segment of BAE Systems Inc) is run by “outside [non-British] directors who, in conjunction with other U.S. based board members, comprise a Government Security Committee. The Government Security Committee has the responsibility for overseeing the company’s compliance with U.S. Government Security and Export regulations, and meets regularly with U.S. Government oversight agencies to provide feedback on that compliance”<sup>18</sup>. According to the former CEO of BAE Systems, Mike Turner, the SSA allows BAE Systems to “operate in the US as an American company, providing the highest levels of assurance and integrity in some of the most sensitive fields of national security provision.” While the parent company in the UK “gets to see the financial results” of the US business, “many areas of technology, product and programme are not visible to us, he adds”<sup>19</sup>.

On the other side of the mitigation agreement lies a failed joint attempt by a private firm and a Chinese company to acquire a US-based network and software firm 3Com. In 2008, Bain Capital (the private investment firm) and Huawei Technologies (China’s largest networking and telecommunications equipment supplier) withdrew their joint US\$ 2.2 billion proposal for acquiring 3Com as the “parties were unable to agree on security-related conditions”<sup>20</sup>.

While the US has established strong institution-based rules and regulations, other countries are not far behind. As a 2008 GAO report notes, of the 10 countries (Canada, China, France, Germany, India, Japan, the Netherlands, Russia, UAE and UK) examined by the supreme auditor, eight have a formal review process, usually overseen by a government economic body with inputs from other government security bodies. Most of the countries studied have set time frame for evaluation and put forth certain condition for prior approval. National

security is at core of the evaluation process, although the concept of security itself varies from one country to another depending on a country's sensitivity towards national defence industrial base, critical infrastructure, including the energy sector; the investment by foreign state-controlled companies and sovereign wealth funds<sup>21</sup>.

Although many countries have devised detailed mechanisms to filter foreign investment into the strategic sector, a very few countries have a blanket ban on inflows after a certain level. Among the 10 countries, India and the UAE have a blanket ban on FDI after a certain threshold. While India does not allow more than 26 per cent FDI in defence industry the UAE restricts all foreign investment to 49 per cent, unless the investment falls in its Free Trade Zones. The approach adopted by other countries is that of approval/disapproval, which is based on certain criteria. For instance, Germany requires prior approval of all investment in its defence industry if a particular transaction amounts to more than 25 per cent voting rights in its domestic company. France has indentified 11 sectors, including defence, in which an inter-ministerial approval is required. Investment in Japan is required to be notified to government if it pertains to sensitive industries, including the ones that deal with dual use technologies. Under a new law, which is in the making, Russia plans to specify 40 strategic sectors for which prior government approval for obtaining a controlling stake.

### **Why does India Need Higher FDI in Defence & How Much?**

Foreign investment in the defence industry is part of India's broader FDI policy, intended to "bring attendant advantages of technology transfer, marketing expertise, introduction of modern managerial techniques and new possibilities for promotion of exports"<sup>22</sup>. However, even after nine years of its being in existence, the defence FDI policy in its present form has not been able to bring the intended advantages in a meaningful way. While perceptions such as "national security" and "strategic nature of defence industry" have prohibited any change in the policy, the fact of the matter is that India's larger goal of self-reliance in defence production continues to be a pipedream. Despite all the efforts, India's defence production has not lived up to the expectations, leading to import of critical systems to maintain defence preparedness. The following section argues why India needs higher FDI in its defence industry.

### **Low Technological Base**

The root cause of India's underdeveloped defence industrial production is its poor technological base in general and military technology in particular. According to Georgia Institute of Technology, Indian ranks far below in the "technological standing" list of 33 countries. The revealing aspect of the list is China's rapid progress in technological strength. In a matter of 11 years to 2007, China's score has vastly improved from 22.5 to 82.8. Beijing now ranks first in the list, above US (76.1), Germany (66.8), Japan (66) and India (just above 20)<sup>23</sup>. China's progress in advanced technology is also evident from its export of Advanced Technological Product (ATP), particular to the US. In 2008, it



accounted for 28 per cent of US's import of ATP, compared with seven per cent in 2000<sup>24</sup>.

One of the reasons for India's underdeveloped technological base is due to poor investment on R&D. For instance for the period 2004-06, India's total R&D expenditure amounts to 0.88 per cent of GDP, compared to 1.42 per cent for China, 2.12 per cent for France, 2.61 per cent for US and 4.53 cent for Israel<sup>25</sup>. India's poor investment on R&D efforts is across sectors including defence. In 2011-12, total defence R&D budget as accounted for by the Defence Research and Development Organisation (DRDO) is Rs. 10, 253 crore, which represents 6.2 per cent of the defence budget<sup>26</sup>. Compared to this, countries such as US,

Russia, France and Spain spend over 10 per cent of their defence budget on R&D<sup>27</sup>. The R&D investment by the Indian private sector is further unimpressive. To put this in perspective, total R&D expenditure by the private sector in 2005-06, the latest year for which comprehensive data is available, is only Rs.15.67 crore<sup>28</sup>.

Given rapid progress in technological advancements in other parts of the world, led by the US and Europe among others, India can least afford to lag behind. This is more so given the high gestation period—25 years as per some studies<sup>29</sup>—for technology investment and its translation into actual proven systems. In other words, even if India increases its R&D efforts in a big way, the benefits, in terms of equipping the armed forces with proven technologies, will not accrue in the near future.

In the short- to medium-term, there is, however, a possibility of raising Indian defence production, based on foreign technology. However, technology transfer is a complicated affair, given the strict export rules followed by many advanced countries. Nonetheless, given the size of the Indian procurement budget (nearly Rs. 43,800 crore in 2010-11), some of the technologies induced to the Indian industry provided a conducive atmosphere, created with a reasonable policy framework.

### **Efficacy of Offset Policy, and “Buy and Make (Indian)” Procurement Provision**

To enervise the domestic defence industry, the MoD has in the last few years taken several measures. Among them is the offset policy, and the recently announced “Buy and Make (Indian)” procurement provision, which have a direct bearing upon the FDI. The offset policy, which mandates a minimum 30 per cent offsets in arms import contracts valued Rs.300 crore or more, allows FDI as a means of discharging offset obligations. The limited FDI cap of 26 per cent, however, means, in a large defence contract, a foreign supplier is forced to resort to non-FDI route—such as outsourcing work packages to the Indian industry—to not only fulfil its offset obligations, but to avoid getting into small and staggered investments in several Indian companies. As outsourcing is more by way of exploiting the existing capabilities, this option unlike direct investments in the new industrial infrastructure, has limited role in enhancing

India's defence industrial capability. Allowing higher FDI is therefore necessary to make the best use of the offset policy.

The Defence Procurement Procedure 2011 (DPP-2011) has articulated a new procurement provision; "Buy and Make (Indian)" which provides the Indian industry a key opportunity to work closely with the global industry. Under this procurement provision, the Indian industry is solely responsible for negotiating with global defence manufactures for technology and other assistance, for the products to be supplied to the Indian defence forces. The only mandatory requirement of the provision is that the indigenous content of the final item has to be minimum 50 per cent on cost basis<sup>30</sup>. However, FDI of 26 per cent means, the Indian partner would have to first put in heavy investments before tying up with its foreign counterpart. The investment requirement, under the present FDI scheme of things, is thus a dissuasive factor, especially to those in the private sector, which are risk-averse due to their lack of exposure to the defence industry. Even if some companies commit investment in setting up intrastate, they will still be dependent on foreign companies for key technologies, which the overseas partners, as mentioned earlier, are reluctant to part with under the existing FDI provisions. Allowing higher FDI would therefore enable the industry to take maximum advantage of the "Buy and Make (Indian)" provision.

### **Economic Benefits**

As mentioned earlier, the FDI policy is a part of MoD's broader reform measures towards the stated objective of achieving greater self-reliance in defence production. The stated objective notwithstanding, there are plenty of economic benefits that could accrue simultaneously to the wider economy, if much of the defence requirement is sourced from the industry within the national boundary. Although the precise estimation of FDI-caused benefits is a task in itself, some broader indication can be inferred from the Kelkar Committee (2005) which submitted its Report to MoD on 'Towards Strengthening Self Reliance in Defence Preparedness'. The Report contained a comprehensive set of reform measures for enhancing India's defence production and based on the suggested measures the Committee had calculated the overall 'economic impact'. Taking 2003-04 as the base year in which the domestic share in total procurement budget was 58 per cent, the Committee was of the firm view that the reform measures proposed by it will lead to progressive increase in domestic share to 90 per cent in a period of five years. The Committee had identified three major economic benefits—higher manufacturing output, additional generation of employment and savings through relatively reduced procurement cost of indigenised products—that would accrue to the wider economy. The details of the economic benefits as identified by the Kelkar Committee are as follows:

- Higher defence production will accelerate the growth of overall manufacturing sector by 8-14 per cent
- Increase of employment by 120,000-200,000
- Savings of 30-50 per cent as result of import substitution and cheaper

cost on account of spares and maintenance. In absolute terms, this translates into saving of more than Rs. 4,000 core per year.

Given the immense benefit of indigenisation, and the key role that FDI could play in achieving that, the current policy therefore needs revision.

### **How much FDI?**

In the light of above desirability the vital question that arises is: what would be the ideal cap of FDI in defence? An attempt is made here to look at various options within the existing framework of India's FDI policy, which allows foreign investments in four maximum limit-based categories: 26 per cent; 49 per cent; 74 per cent and 100 per cent.

Increasing the cap from 26 per cent to 49 per cent will with no doubt provide the foreign investors almost half the returns to their investment. Although this may sound attractive from the financial point of view to the foreign investors, it may not be so attractive to them in terms of control and management. This is because, increasing the FDI cap to 49 per cent from the present level does not provide any additional say in the affairs of the company, as pointed out by the DIPP and as per the provisions of the Indian Company Law. In other words, for a technology investor, who is concerned more about the control and management, the 49 per cent FDI cap provides little incentive in comparison to 26 per cent FDI provision. However, the same investor would certainly be induced if the cap is raised to 74 per cent, thus providing him not only more than majority control but also enhanced scope for returns to investment. The question further arises whether the 74 per cent cap is the maximum that FDI policy could offer to attract the best of the technologies. Probably not! For some of niche technologies, foreign investors would like absolute control of the management for which 100 per cent FDI is a pre-requisite.

It is however to be noted that FDI above 49 per cent, which provides management control to the foreign investor, involves a degree of concern in terms of the impact on national defence industrial base and broader national security. However, as the international practice—especially that of the US—, shows, the concerns could be mitigated by not limiting FDI to a certain percentage of the equity flows but by adopting a flexible path. The path relates to subjecting each of the defence-related FDI to wider review and impact analysis with respect to a set of well-calibrated parameters. Since India has a cap-based FDI approach, the ideal path would be to allow up to 100 per cent FDI, subject to detailed review of each of the incoming investments. Based on the review results, FDI percentages could be assigned, which can vary from zero to 100 per cent. If an investment is found unacceptable because of the certain fears it may be rejected. If an investment is found beneficial only on financial ground, the cap may be fixed either at 26 per cent or maximum 49 per cent; if it involves a meaningful technological inflow, the cap could be raised up to 74 per cent; and the cap may go up to 100 per cent, if the investment brings in high-end technology to the benefit of Indian industry and defence.

In order to follow a flexible path, the existing inter-agency, the Foreign

Investment Promotion Board (FIPB), which is responsible for approving FDI based on the existing cap-based regulations, needs to be empowered to investigate all FDIs in the defence industry. The FIPB may also be empowered to stipulate additional security measures to the foreign investors in order to mitigate any concerns, which may arise in due course of investigation. In case of FDI beyond 49 per cent, conditions can also be imposed on the proposed foreign investor so as to allow him to operate in India like an Indian company, and that except for the financial benefit, no technological or other benefits could be transferred, without permission from the Indian authorities, to the parent or any other country. Thus unlike a rigid and fixed cap approach, which may prevent some desirable inflows involving critical technologies because of inherent rigidity, a complete yet case-by-case liberalisation of FDI policy would enable merit-based selection.

The success of a flexible FDI policy is critically depended on how it is managed to the benefit of the domestic industry. Some inferences in this regard can be drawn from the practices of other countries, primary China which has used FDI as an instrument for developing its strategic industries<sup>31</sup>. The FDI policy of China is geared towards enabling its industries to “integrate into the global value-chain...accelerate its industrial and technological transformation [while avoiding reinvention] of the technological wheel”. The key elements of China’s FDI policy are those of direction, domestic value addition and transfer of technology<sup>32</sup>. China is quite “explicit in the type of foreign investment that is ‘prohibited’, ‘permitted’, or ‘encouraged’, with the latter category focusing on advanced technologies”. To induce foreign investors into the high-tech industries it provides various incentives, such as tax rebates and lower tariff rates<sup>33</sup>. The FIPB, while reviewing the incoming FDI proposal need to follow similar approach followed by China to ensure that the FDI leads to technology transfer to Indian companies and that their value addition is increased over the years. Various incentives such as tax rebates and the like could also be provided to induce higher technology through FDI.

### **Higher FDI alone will not Enhance India’s self-reliance in Defence Production**

Although a higher FDI cap will create an enabling environment for technology transfer, and setting up of joint venture companies, this alone is not sufficient for meeting India’s goal of achieving self-reliance of 70 per cent in defence production. This is because the primary responsibility for meeting the self-reliance target is and will be, for a foreseeable future, with the indigenous industry—especially the public sector undertakings. Despite all the deficiencies, the Indian industries have built a huge production capacity over the years, with the production and sales running into several thousand crores. For instance, in 2008-09 the combined value of production and sales of DPSUs and OFs stood at Rs. 35,626 crore and Rs. 27,237 crore, respectively<sup>34</sup>. It is, therefore, a prerequisite to strengthen the domestic industry, so as to enable them to assume a bigger role, with the foreign contribution providing the fillip in the desired areas.

Although to energise the domestic industry, the Defence Ministry has initiated a set of measures that have not been pursued to their logical conclusion. In the following paras reiterated some of the areas that need consideration for energising the domestic defence industry.

### **Energising State-owned Enterprises**

The state-owned enterprises, comprising nine DPSUs and 39 Ordnance factories despite their large size and long presence in the industry have not been able to meet the growing requirements of the armed forces. This is evident from a large portion of the Indian procurement budget being spent on imports, which runs into billion of dollars. The problems affecting their performance are mostly related to autonomy, technology, professionalism, and their isolation from the developments in the international arms production. To overcome these weaknesses, the Kelkar Committee Report (Part-II, November 2005) on Revitalising Defence Public Sector Undertakings and Ordnance Factories had suggested inter alia (a) corporatisation of Ordnance Factories; and (b) greater autonomy to the DPSUs so as to enable them to invest in and integrate with the global defence industry and in turn benefit from foreign technology and international best practices. Although several years have passed, these vital recommendations have not been implemented. Considering that these state-owned units are still at the core of India's defence industry, the MoD needs to act upon these recommendations.

### **Identification of RURs**

The Kelkar Committee had also recommended designating a select number of private companies as Raksha Udyog Ratnas (RURs), whose primary responsibility would be system integration and manufacturing of big-ticket items for the armed forces. The rationale behind the Committee's recommendation was not only to create big defence companies in the private domain, but also to infuse a degree of competition within the industry – as the RURs would be treated the same on the basis as the existing state-owned enterprise for all practical purposes. Although a Committee was set up for identification of the companies, the names have not been officially announced so far. Keeping in view the interest shown by the private sector, and the potential benefits of having RURs, an early announcement would go a long way in strengthening India's defence industrial base.

### **Streamlining Defense Offset Policy**

Offsets in arms trade is a growing global phenomenon, although the evidence as documented in current literature casts a doubt on their merit<sup>35</sup>. However, as a part of its arms procurement reforms, the Indian MoD announced a detailed defence offset policy in 2006. The policy is intended to leverage MoD's growing acquisition budget towards enhancing domestic industrial capability. Although the policy has so far accrued offsets worth nearly Rs.9,000 crore to various Indian

companies, it does not seem the industrial capability has got any boost. Most of the offsets that have been generated are in the nature of outsourcing, exploiting the existing technological strength<sup>36</sup>. What the MoD needs to do is to channelize offsets in a manner that adds to technological strength of the domestic industry, besides assessing the cost and benefits of offsets so as to facilitate a policy review<sup>37</sup>.

### **Level-Playing Field to the Indian Private Sector**

Although the defence industry is opened 100 per cent to the private sector participation, there have been several limiting factors for its growth. The private companies in the present policy framework are discriminated against the state-owned enterprises (due to the MoD's nomination approach), subjected to an unfavourable taxation regime, and have limited scope to participate in major defence contracts. Unless these hurdles are removed, the intended benefits of defence industry liberalisation would remain limited.

### **Streamlining DRDO and Fostering R&D within Industry**

Formed in 1958, the Defence Research and Development Organisation (DRDO) is India's premier defence R&D organisation with the core objective of providing "scientific and technological support to the armed forces through design and development of new and sophisticated equipment to meet their operational requirements". Although the organisation has achieved success in some key areas of defence technology, many critical technologies and products still remain out of bound. The problems facing DRDO are multifaceted, ranging from organisational structure to human resource constraints, lack of user interaction, poor management of critical assets, and diversion into non-core areas of research. A comprehensive review of the organisation is therefore of paramount importance for a credible defence R&D and production base.

One of the factors responsible for India's underdeveloped defence R&D base is poor funding of research activities at the industry level, partly due to historical culture of license-based production and lack of incentivisation. In 2005-06, total defence R&D expenditure of the industry, both public and private, amounted to Rs. 522 crore, representing 9.5 per cent of DRDO's total expenditure in the same year. Considering that Industry in advanced countries plays a significant role in R&D activities and product development, the Indian industry can not remain complacent, if it wants to make a mark in defence production. Also, given that the R&D involves a great deal of risks, the government needs to encourage the industry, in terms of sharing some of the investment requirement. The MoD can think of creating a technology development fund for incubating R&D within the industry.

### **Conclusion**

Since 2001, India has allowed FDI up to 26 per cent in its defence industry. However, the policy has so far made a very modest impact, in terms of meagre

financial (US \$0.15 million till May 2010), as well as technological inflows into the country. The latter is visible on account of absence of any meaningful partnership between Indian and foreign companies. The major factor responsible for limited impact is the lack of incentivisation of the current policy. To overcome the policy constraints, suggestions have been made in various quarters, to increase FDI cap to a higher limit, although differences exist with respect to the precise level of the FDI cap. The industry's suggestion for increasing the cap to a maximum of 49 per cent with certain conditions—especially the mandatory capitalisation of US\$100 million—is not likely to incentivise the foreign companies, and even if it does, it would at best help a handful of big Indian companies, while the small and medium sector companies would be effectively debarred from taking advantage of the FDI route due to limited equity.

Considering India's underdeveloped defence R&D and production base, immense economic benefits, and the country's desire to enhance domestic defence production, an increase in FDI cap beyond the present limit would be desirable for technology transfer and for meaningful ties between Indian and foreign companies. An increase in FDI cap would also likely facilitate effective functioning of the offset policy and "Buy and Make (Indian)" procurement provision. Keeping the above potential benefits in mind, the FDI could be increased to 100 per cent, in stead of fixing it at a level of up to 74 per cent (as suggested by some) for the reason that a cap-based FDI approach might be a constraint, in some cases, in bringing in high technology-intensive investments. However, given the sensitivity attached to defence industry and national security, all defence-related FDI could be subject to wider review by the empowered Foreign Investment Promotion Board (FIPB). The FIPB may be empowered to recommend the precise level of FDI, which could vary from zero to 100 per cent, based on thorough investigation and detailed impact analysis of each of the investments. The agency may also be empowered to recommend additional security measures to investors to mitigate any concern that may arise in the due course of investigation. To ensure that FDI leads to genuine enhancement of India's technological base, the empowered FIPB may also mandate technology transfer to Indian companies and their value addition as precondition for allowing external investment.

Although a higher FDI cap of 100 per cent would create an enabling environment for technology transfer, and setting up joint venture companies, the indigenous industry, given its size and base, would continue to play a major role in India's defence industry. The emphasis should therefore be placed on energising the indigenous industry, both private and public sector, so as to enable them to play a more pro-active role. This in turn calls for energising the state-owned enterprises to enable them to assume greater role in the defence production; streamlining the defence offset policy; creating a level-playing field for the Indian private companies; and fostering and strengthening the domestic defence R&D.

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## Transparency and Oversight in UK Defence Acquisition

*Tim Banfield*

*Our vision is to help the nation spend wisely.  
We apply the unique perspective of public audit to help Parliament and  
Government drive lasting improvement in public services.*

The National Audit Office scrutinises public spending on behalf of Parliament.

### **The NAO—Who we are and what we do**

#### **Legislative Background**

The NAO has existed in its current form since 1983 although the public audit function in United Kingdom central government has a much longer history with the earliest surviving mention of a public official charged with auditing government expenditure dating back to 1314.

The principal legislation underpinning the authority of the NAO is the National Audit Act 1983. Under the Act, the C&AG:

- formally became an Officer of the House of Commons;
- was given the express power to report to Parliament at his own discretion on the economy, efficiency and effectiveness with which government bodies have used public funds;
- the Act also established the National Audit Office (NAO) to replace the Exchequer and Audit Department in support of the C&AG; and
- the Act established the Public Accounts Commission (TPAC) to oversee the work of the NAO. TPAC is responsible for setting the annual funding of the NAO, appointing the NAO's external auditors and consider their reports.

By the turn of the century, legislative change was again required to reflect further changes to the way that the Government was structured. Reforms addressed the C&AG's role in relation to non-departmental government bodies and the governance arrangements of the NAO.

Under the Government Resources and Accounts Act 2000, resource (accrual) based accounting and budgeting for Department Accounts was introduced. Accounts were previously prepared on a cash basis. The Act also provided for the preparation and audit of consolidated accounts for the whole public sector (Whole of Government Accounts), to be audited by the C&AG.

In 2001 Lord Sharman's review of audit and accountability for central government, "Holding to Account", was published. In response to Lord Sharman's report, the Government accepted the principle that the C&AG should audit all NDPBs and that the audit appointment should be set out in statute. The Government undertook to include this audit provision when new bodies are set up, and to use a provision in the Government Resources and Accounts Act to put the C&AG's audit of existing bodies onto a statutory footing. For public bodies established as companies, the Government agreed to rectify a provision in companies' legislation that prohibited the C&AG being appointed the auditor of companies. This was addressed in the Companies Act 2006, and the C&AG is now able to compete for the audit of public bodies established as companies.

In 2007 the Public Accounts Commission (TPAC) commissioned a review of corporate governance at the NAO. As a result of the review, the Commission made a number of recommendations that have now been incorporated into the Budget Responsibility and National Audit Act (BRANA). The Act established the NAO as a corporate body led by a Board consisting of four executive members (including the C&AG as Chief Executive) and five non-executive members (including a Chairman). The Board is charged with setting the strategic direction for the NAO and supporting the C&AG, who retains his independence in terms of his statutory functions and his audit judgements. The C&AG also remains an independent Officer of the House of Commons but now has a fixed term of ten years instead of an unlimited tenure.

## **The NAO in 2011**

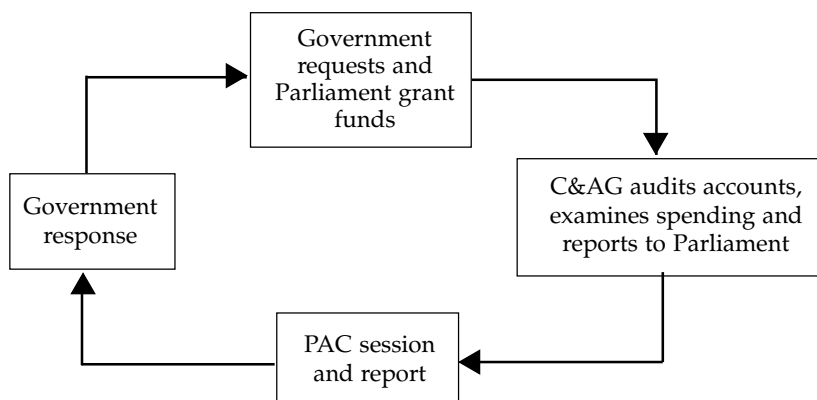
The current Comptroller and Auditor General is Amyas Morse. He and the NAO, which employs some 880 staff, are totally independent of the Government. He certifies the accounts of all government departments and a wide range of other public sector bodies; and he has statutory authority to report to Parliament on the economy, efficiency and effectiveness with which departments and other bodies have used their resources. The work of the NAO led to savings and other efficiency gains worth more than £1 billion in 2010-11.

## **Our Role**

The Comptroller and Auditor General (C&AG), supported by the National Audit Office scrutinises public spending on behalf of Parliament, helping it to hold

government departments to account and helping public service managers to improve performance and service delivery. As a result, the NAO plays a key role in the accountability cycle for public sector finances.

**Figure 1: The Accountability Process**



We are responsible for auditing the financial statements of:

- all central government departments;
- executive agencies; and
- a wide range of other public sector bodies.

We also have a number of international clients including the International Labour Organisation and the World Food Programme.

### **Our Aim**

Our aim is to apply the unique perspective of public audit to help Parliament and the Government to drive lasting improvement in public services. We define improvement as the Government spending wisely in that:

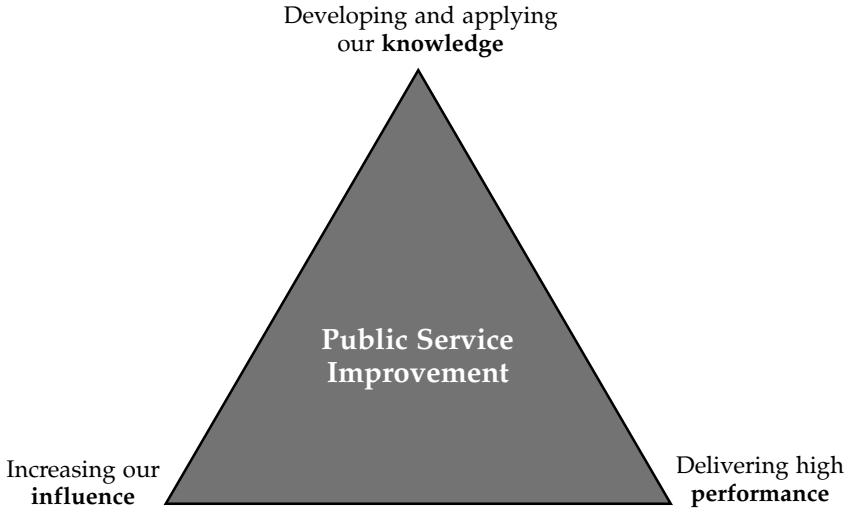
- decisions are made on strong evidence;
- public money is better directed and controlled; and
- financial management is more robust.

### **Our Work**

Our work leads to savings and other efficiency gains worth many millions of pounds—more than £1 billion in 2010—and has two strands:

#### **Financial Audit**

- We audit the financial statements of all central government departments, agencies and other public bodies and report the results to Parliament. (In 2010-11, we audited expenditure and revenue amounting to some £950 billion across 470 accounts.)

**Figure 2: NAO Objectives 2010-11 to 2012-13**

### Value for Money Audit

- The National Audit Office undertakes around 60 value for money studies each year as part of our overall aim to help Parliament and the Government drive lasting improvement in public services. Our value for money studies are evidence based and we draw our conclusions on the basis of rigorous analysis. Our reports are presented to Parliament, and most of these are considered by the House of Commons Committee of Public Accounts (PAC).
- Each study examines a major area of government expenditure, and our objective is to form a judgement on whether value for money has been achieved. We define good value for money as the optimal use of resources to achieve the intended outcomes.

Our programme covers all government departments and many other public bodies. Under the National Audit Act 1983, the NAO can examine and report on the economy, efficiency and effectiveness of public spending and we have powerful rights of access to relevant documents and information. The following reports illustrate the broad reach of our work.

Our work programme is focused on three areas that has impact on all departments' performance in achieving value for money:

- improving financial management and reporting;
- making better use of information; and
- ensuring that services are delivered cost-effectively.

## Strategic Themes

### *Our strategic themes of Financial Management, Informed Government and Cost*

Effective delivery reflects our core expertise and remains the enduring means by which we analyse and integrate evidence to secure maximum impact. As well as giving direction to the client improvements we aim to secure, their strong evidence base enables us to respond flexibly to some of the wider strategic challenges, which the public sector faces in a period of change.

In 2009-10, our work on Financial Management had the high-level goal of improving the allocation and control of public money and encouraging more robust financial management in clients. Now in 2011-12, new developments are impacting on accountability and assurance.

New corporate governance arrangements in departments have implications for the role of the Accounting Officer, while structural changes in health and education, as well as the abolition of the Audit Commission, are changing established relationships between local bodies and departments. As external auditors, we need to be confident that local decision-making maintains the assurance that Parliament receives on how public money delivers value for money and that adequate accountability arrangements are in place throughout the delivery chain.

Since 2009-10, our work on Informed Government has focused on the quality of information used by decision makers to support improved performance and productivity. In 2011-12, we will continue to examine issues of transparency so that high-quality, meaningful data can provide strong incentives for civil servants to use public money cost effectively. Our knowledge and evaluation of data systems will enable us to ensure that transparent information can improve the delivery of public services.

Our work on Cost Effective Delivery has had the goal of helping clients to be better able to deliver policy ambitions and improve outcomes while reducing delivery cost.

In 2011-12, we will also concentrate on improving managerial competence in departments as they implement major cost reductions and systemic reform, often with little relevant previous experience. We will assess and report on the controls in place to manage these changes, including the integration of back office functions, to help improve the long-term management capability of the civil service. We will also carry out a programme of work to evaluate how cost reductions are being implemented.

The NAO is uniquely well placed to help our clients respond to these challenges. Our cross-government focus on these strategic issues is informed by insights gained from our statutory audit responsibilities, and supported by increased economics and statistics capability and dedicated resource to analyse the impact of IT systems in government. This collective knowledge enables the NAO to identify significant problems and to promote and influence positive change.

In 2011-12, our clients will continue to experience major challenges.

Significant budget reductions are being implemented at a time when widespread structural changes are taking place in the way public services are delivered. This inevitably increases risks to value for money with potentially adverse implications for public service delivery. Parliament will expect us to hold departments to account for the successful implementation of these changes.

## **NAO Work on Defence**

### *Defence Context*

This section provides background on the Ministry of Defence, its spending, and the key issues faced in the sector.

### *The Department's Responsibilities*

The Ministry of Defence is both a Department of State and a military headquarters, comprising military personnel from the three Armed Services—the Royal Navy, the Army, and the Royal Air Force—and civilian staff from the Civil Service. It is jointly headed by a military officer and a civil servant, and is responsible for providing the military capability necessary to deliver the Government's objectives and defining future military requirements.

The Department's activities are managed through seven principal bodies, known as Top Level Budget holders, six Agencies and four Trading Funds (see opposite), with a total of 28 sponsored bodies (Appendix 1).

### *Where the Department Spends its Money*

In 2008-09 the Department's operating costs were £38.2 billion. Unlike some departments, the Ministry of Defence only spends a small proportion, less than 5 per cent of its budget, through other bodies (see opposite).

The Department is large, employing around 79,000 civilian staff at an annual cost of £2.8 billion. The three Armed Services comprise another 192,000 personnel, costing £8.9 billion per annum.

Currently, the Department's most significant activity is the support of military operations in Afghanistan. During 2008-09, the Department spent £2.8 billion on the additional costs of operations in Afghanistan and Iraq. The cost of equipment purchased for these operations was £1.3 billion.

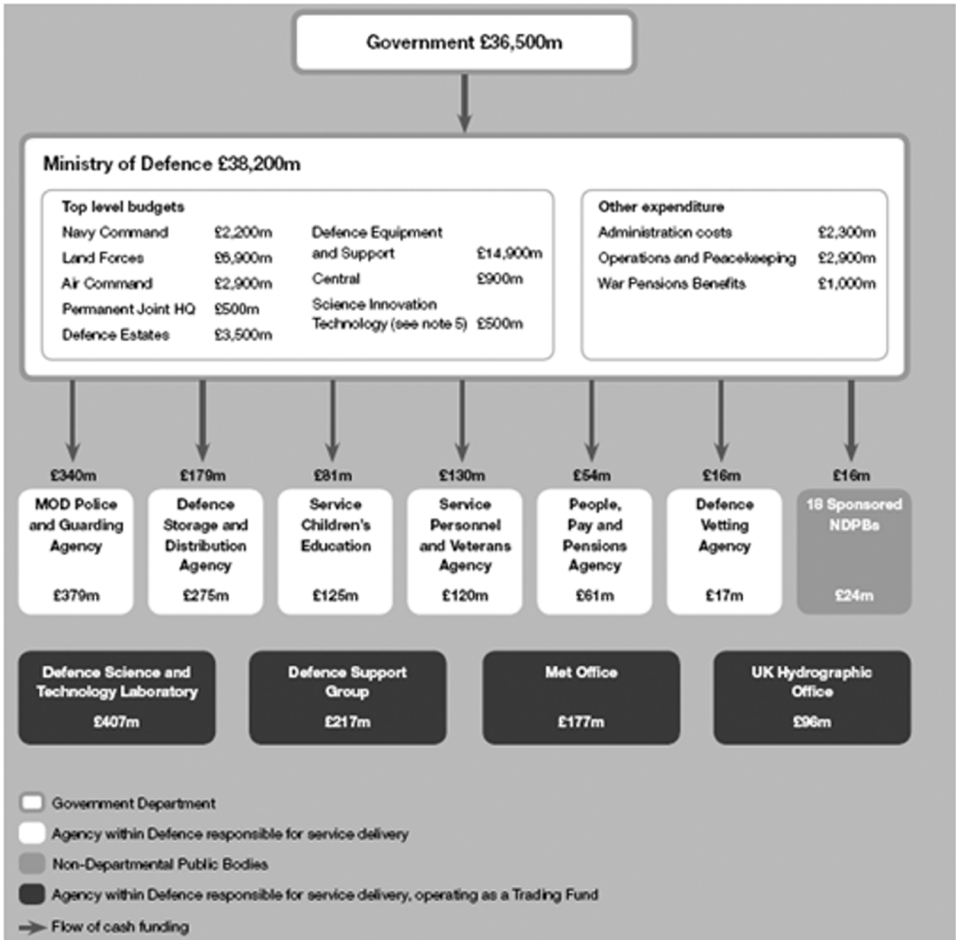
The annual cost of the Department's equipment acquisition activity is approximately £14.9 billion.

The Department also administers and contributes to the Armed Forces Pension Scheme, which paid £3.4 billion, including lump sums on retirement, to around 400,000 retired veterans in 2008-09. In 2008-09 the Department's contribution was £1.5 billion, with HM Treasury funding the remainder. The National Audit Office reported on the cost of public service pension schemes in March 2010.

## **Challenges Faced**

The Ministry of Defence faces a number of challenges, which are particularly significant in this sector:

Figure 3: Where the Money Goes (2008-09 data)



Notes

- Gross operating costs are higher than cash flows because bodies have other income and because cost figures also include non-cash costs.
- Payments made by the Department to sponsored Non-Departmental Public Bodies are grants-in-aid.
- Total of top-level budgets and other expenditure does not equal Ministry of Defence gross operating cost of £38.2bn due to rounding.
- Top-level budgets and other expenditure are derived from Note 2 in the Departmental Resource Accounts 2008-09.
- Science Innovation Technology top-level budget removed with effect 1 April 2010.

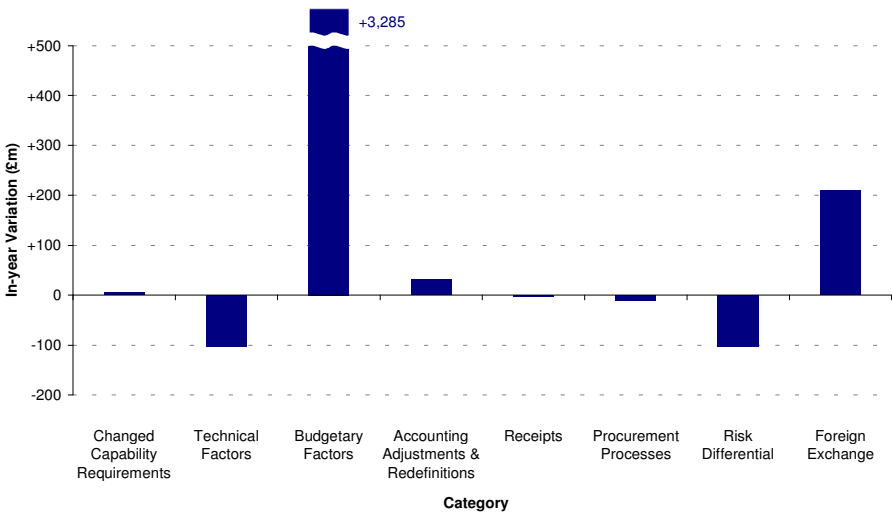


- defence acquisition is about delivering a capability not just procurement;
- acquisition and equipment lives are over long timescales;
- there is always a desire from the military to be at the cutting edge of technology to ensure a comparative advantage over potential adversaries. This introduces risk in the form of technological evolution and/or revolution;
- the structure of defence is both complex and tribal in nature, which makes it difficult to reach a consensus, slows decision making and makes strong management information systems crucial;
- defence equipment acquisition often features mutual dependence either within individual capabilities e.g. the various systems/components within an aircraft or across multiple projects e.g. an aircraft and the weapons it carries. This adds complexity and links risk between them; and
- there is necessarily a strong commercial dynamic with the defence industry, which changes both with the evolution of defence acquisition approaches and prevailing political positions.

### Current Issues

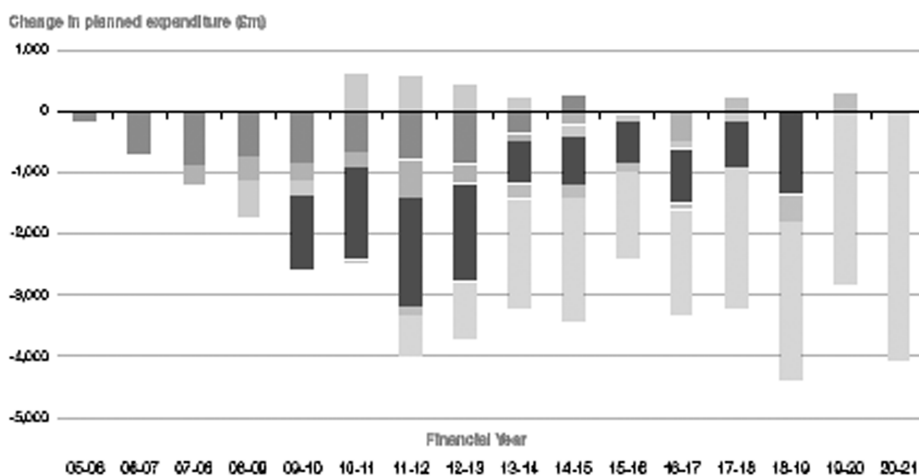
There is a culture of optimism in cost and timescale forecasting on defence projects. Figure 3 shows the cause of cost variation for the Department’s 15 largest projects for a single year (2009-10) in which the in-year cost variation exceeded £3.3 billion.

**Figure 4: In-year Cost Variation for the Department’s 15 Largest Projects by Causal Category**



Source: NAO analysis of departmental data.

**Figure 5: Impact of the 2005-10 Annual Planning Rounds and Strategic Defence and Security Review on Planned Expenditure within the Department's Equipment Programme**



Source: NAO, *The cost effective delivery of an armoured vehicle capability*, HC 1029, Session 2010–2012.

There is uncertainty over operational needs and funding which destabilises programmes leading to delays, increased cost and in some cases project collapse. Figure 5 shows the annual changes to planned equipment expenditure arising from the Department's annual need to identify savings to match its plans to budget and compensate for cost overruns.

The cancellation and delay of key projects is leading to gaps appearing against planned capabilities (Figure 6).

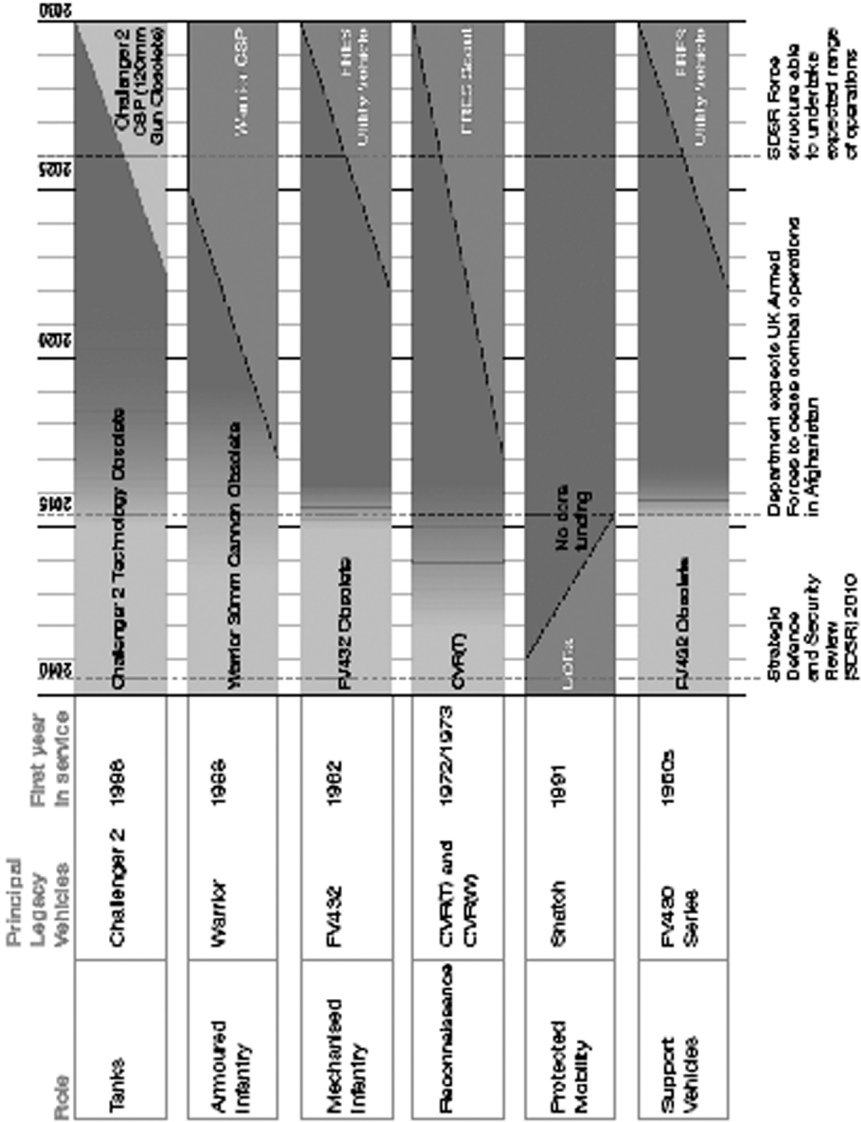
## Our Work on Defence

This section summarises our approach to looking at defence as well as some of the key themes of our recent work on defence with examples of conclusions and recommendations. A full list of our recent defence reports can be found in annex A.

The vision for our defence work is to support parliamentary accountability and transparency and build political and public consensus for reform of the core business processes of the MOD through our work and help to drive change in the Department. We aim to achieve this by:

- exposing issues and creating pressure to improve the systems the Department relies upon for management, planning and decision-making;
- reporting a consistent set of issues to build up the case for change;
- support senior management when they are behaving in a positive way,

Figure 6: Armoured Vehicle Forecast Capability 2010-30



Source: NAO, *The cost effective delivery of an armoured vehicle capability*, HC 1029, Session 2010-2012.

consistent with delivering value for money and reducing the perception of the NAO as a threat rather than a critical friend;

- Examining institutional incentives and behaviours to highlight the need for decision making to be on a realistic, prioritised and corporate basis; and
- highlighting discontinuities and weaknesses across management activities and core business systems to encourage prioritisation and targeting of resources for the Department's efforts to improve and align them.

In order to drive change it is necessary to examine the cause of outcomes not just the symptoms of success and failure. We have focused our work in the following key areas:

### **Financial Governance and Reporting**

We audit the accounts of the Department and all of its sponsored bodies. In total, these organisations spent £40.1 billion in 2008-09, employed over 270,000 people and held assets worth more than £117.4 billion. Our audit work involves understanding the business of each organisation, examining internal controls, agreeing the accounting policies, auditing their transactions, liabilities and assets and confirming that the accounts present a true and fair view. We also consider whether the transactions of the Department are in accordance with Parliament's intentions.

### **Financial Audit: Accounts & Statement on Internal Control**

- We have qualified the Department's accounts for the last three years but provided a clear audit opinion in the two preceding years.
- In 2007-08 we qualified our opinion owing to a limitation in scope due to the inadequacy of evidence available in respect of amounts paid as allowances to military personnel.
- In 2008-09 we qualified our opinion on the accounts for several reasons, including errors in specialist pay, allowances and expenses paid to the Armed Forces via their payroll and human resources system, and the inadequacy of evidence to support certain fixed assets and stock balances.
- In 2008-09 we qualified our opinion on the accounts for several reasons, including qualified opinion due to material error arising from adopting accounting policies which do not fully comply with International Financial Reporting Standards in respect of accounting for lease-type arrangements, a limitation of scope due to inadequacies in the evidence to support around £6.3 billion of assets and a limitation in scope due to



the inadequacy of evidence available in respect of amounts paid as allowances to military personnel.

## Financial Management

The ability of departments to control costs and drive out waste requires professional financial management and reporting. In particular, departments need to be better at linking costs to services and benchmarking performance to determine whether costs are justified and value for money can be improved. To provide assurance that resources are being appropriately managed and controlled, organisations have to publish Statements on Internal Control with their annual financial statements.

The Department presents an extremely complex financial management challenge, with personnel deployed in a considerable number of locations across the globe. It has responsibility for a range of different bodies, including agencies, trading funds, museums and a large and varied estate. It also controls a huge range of different types of assets, including £82.4 billion of land, equipment and buildings and £6.2 billion of stocks.

### *VFM REPORT: Strategic financial management of the defence budget*

We found:

- The Ministry of Defence does not place sufficient emphasis on financial management in its decision-making.
- Annual financial plans at the MOD have been over-committed.
- the Department's could use financial management more effectively to address those factors which are within its control.
- Shortfalls in financial management have significant consequences.
- During 2009-10, the Department had to find additional savings of £800 million to bring its planned expenditure back into line with its budgets. Finding these reductions mid-year is a time-consuming and destabilising exercise. Many areas have to revisit or adjust their plans leading to delays, material changes to project specifications and costly renegotiation of contracts with industry. Delaying projects also leads to significant increases in the project cost.
- The finance function at the MOD does not have as central role in strategic planning as it should have. Financial management does not have a high enough priority to counter the Department's tendency to make over-commitments in its strategic planning.
- The Department has work underway that should make its financial planning more effective, but it also needs to demonstrate that it has the will to use the tools it already possesses.



We recommended:

- a. The Department should use the Strategic Defence and Security Review to a rebalance its programme and take action to keep it in balance for the future. The Department should:
  - underpin the Strategic Defence and Security Review with an explicit financial strategy;
  - set out the relative priorities of expenditure;
  - regularly review performance against financial plans; and
  - reprioritise funds to keep the programme in balance without using delays and de-scoping projects as the default approach to reducing expenditure.
- b. The financial strategy should be reflected in financial plans prepared by the Department. The Department should make sure that the plans:
  - articulate and review spending priorities annually;
  - revisit at least annually the assumptions that underpin the financial plans;
  - contain adequate financial provision for risk and to counter optimism bias; and
  - consider changes to the assets held and not just the HM Treasury control regime.
- c. The Department should use the financial capability it has to best effect and enhance its capability further. The Department should:
  - use professionally skilled finance staff to develop the long term financial strategy and associated risk management strategy;
  - drive out the culture of optimism bias that fails to recognise the full cost of projects; and
  - enhance visibility and understanding of the cost of delivering outputs and cross cutting activities.

### **Cost Effective Delivery of Projects and Programmes**

As well as examining the strategic issues within the Department, we also carry out reviews of a range of the Ministry of Defence's projects and programmes examining their delivery of value for money.

The Annual Major Projects report is one such output, which was introduced at the request of the Committee of Public Accounts in the 1980s and stemmed from their criticism of the absence of any requirement for the Department to inform Parliament about the costs of major defence projects. The Statement was intended to provide improved transparency of the progress and costs of major defence equipment projects.

#### ***VFM REPORT: Major Projects Report 2010***

We found:

- Central departmental decisions by the Ministry of Defence to try to balance the defence budget have reduced its cash-flow requirements in the short-term but at a long-term cost that represents poor value for money for the taxpayer.

- Not making realistic budgetary provision for all likely project outcomes and slowing down projects resulted in a £3.3 billion cost increase in 2009-10 in the total cost of the 15 largest defence equipment projects.
- For the second successive year the cost performance on the majority of projects was broadly stable.
- The rate of timescale slippage had also reduced significantly since 2009
- 98 per cent of Key Performance Indicators were expected to be met.
- This improved performance reflected, in part, a number of initiatives to understand better the key factors bearing on project performance.
- The MOD did not make realistic budgetary provision for all potential costs, for example, on the Typhoon combat aircraft where the Department decided that it needed to spend £2.7 billion on the programme including the purchase of 16 additional aircraft to meet contractual agreements.
- Slowing down projects such as the Queen Elizabeth Class aircraft carriers, led to further project cost growth of £650 million.
- To address cost overruns, the Department also reduced the number of items, and therefore capability, to be procured. For example, Nimrod MRA4 reconnaissance aircraft numbers have progressively reduced from 21 to nine, making the aircraft's unit cost three times the figure originally expected.



The following example gives an indication of the range of projects and programmes we have covered in recent years, the issues the reports have raised and the recommendations we have made to the Department. A full list of our recent work can be found in Appendix A.

***VFM REPORT: The cost effective delivery of an armoured vehicle capability***

We found:

- The failure to deliver key armoured vehicle programmes under the Department's standard acquisition process will delay the implementation of the Department's policy for sufficiently capable, flexible, mobile land forces.
- The Department's reluctance to compromise in setting technologically demanding requirements under its standard acquisition process has put the timely and cost-effective delivery of equipment at risk.



- Faced with rapid changes to equipment requirements driven by operational experience, these unwieldy processes have contributed to a number of armoured vehicle projects being delayed or abandoned.
- The Department has shown that it can make effective compromises to rapidly buy equipment specifically for operations.
- The Urgent Operational Requirements process is not a substitute for the standard acquisition process, but lessons can be applied from the former to accelerate delivery of equipment through the latter process.
- The Department's poor resource management has destabilised the standard acquisition process.
- The Department's requirement to identify significant savings in order to live within its means has led to equipment gaps appearing in some areas, such as armoured vehicles.
- Urgent Operational Requirements have been used to address shortfalls in equipment for current operations.
- In the period since 1998, the Department's standard acquisition approach has failed to deliver armoured vehicle projects on a consistent basis in line with plans.
- The Department spent over £2.8 billion in the same period on upgrading and buying new vehicles through the Urgent Operational Requirements process.
- Based on current resource plans, the Department will have a gap between the armoured vehicles it says it needs now and those it will have at least until 2025, although this gap will start to decrease from 2017 as new vehicles begin to enter service.

We recommended

- a. In future, the Department must exhibit greater pragmatism in its acquisition of armoured vehicles to ensure that some of the lessons learned from buying Urgent Operational Requirements are embedded into core projects. Specifically, it must make realistic compromises between performance, time and cost at an earlier stage.
- b. Repeated cancellations, suspensions and delays of armoured vehicles projects indicate that the current standard acquisition process has been unsuccessful. The Department has told us that it intends to put in place a medium-term strategy for the armoured vehicle sector. If so, this strategy should be consistent with Defence policy goals; consider other acquisition strategies for delivering armoured vehicles; and ensure sustained investment in the sector provides sufficient capability to respond to future military requirements.
- c. The Department has repeatedly destabilised acquisition activity through poor resource management. It should ensure greater coherence between Defence plans and resources over longer periods. Where gaps in the structure and capabilities of the Armed Forces arise as a consequence of resource management decisions, those should be reported to Parliament in its annual performance report.



- d. The requirements the Department has sought from armoured vehicles procured through the standard acquisition process have been demanding, and frequently depended on integrating advanced, but immature, technologies from the design stage. Where there is no clear and compelling requirement for these technologies to be integrated during vehicle design, the Department should have a default position of purchasing off-the-shelf equipment, which can be incrementally upgraded in the future, if necessary.
- e. The Department has learnt lessons from previous armoured vehicle acquisition projects, but more can be done. The Department has learnt lessons from both the Urgent Operational Requirements and standard acquisition processes, and applied these to current armoured vehicle projects. Firm delivery deadlines and budgets could further ensure realism in setting requirements. This could be achieved by engaging more closely with the industry to assess vehicle requirements, based on mature technology, that are initially sufficient—and better than vehicles already in service—but having the potential for future development. The Department should consider buying vehicles in batches, with each subsequent batch offering improved capabilities within a lower initial budget approval, but based on a common vehicle design to minimise any differences in logistic support and training requirements.
- f. The Department has chosen international competition as its preferred route for acquiring armoured vehicles, whilst retaining some specific capabilities on-shore. We support the principle of competition as a means of acquiring armoured vehicles, and this can effectively be achieved by accepting requirements based on minimum modification to existing vehicle designs. By procuring vehicles in successively more capable batches, and modifying them over the vehicles life, the United Kingdom can retain key technologies and the ability to design, manufacture and overhaul vehicles at levels the Department deems critical to hold on-shore.

We have also carried out more examinations of the way the department handles risk within the delivery models the Department uses such as Private Finance Initiatives (PFIs).

***VFM REPORT: Allocation and management of risk in Ministry of Defence PFI projects***

We found:

- The Department has achieved a good service delivery on a broad and diverse portfolio of PFI projects.
- In the case study projects we examined, most of the risks were being well managed by the Department with the projects delivering value for money – but there were exceptions.
- The Department has developed commercial disciplines for scrutinising

the value for money of its PFI procurements and has extended these into other projects.

- The Department is using these disciplines to take tough decisions on some PFI projects although these decisions could have been made on a more timely basis.
- The Department took on average 37 months to procure the projects we surveyed, where data was available, but large projects often took longer.
- The Department's efforts to allocate and manage risk at the outset of the projects that we examined were often hampered by a lack of data on the services required.
- The Department's PFI contracts have flexibility to deal with changes but there are risks to maintaining value for money where changes are required.
- There are instances where contract management could be improved, especially in assessing performance.
- Appropriate skills are required for managing PFI contracts so that value for money is not eroded during the contract's life.



We recommended:

- a. Project teams should ensure that the initial planning stage of each project includes the production of suitable data on any existing use of the required service, forecast usage and the condition of assets being transferred to the private sector. The Department's Private Finance Unit should check that this information is available before bidding competitions commence.
- b. The Department's PFI project teams should assess the likely impact of future changing circumstances on the PFI contracts they propose to enter into.
- c. Where the Department's projects experience service problems because the contract does not set out their requirements clearly they should either renegotiate the contract or seek, through their relationship with the contractor, a mutually agreed working arrangement to overcome the contract deficiencies. Terminating a non-performing contract represents an extreme option. It imposes significant transaction costs on the Department, but these costs may be lower than the ongoing costs of poor performance. The Department should not rule out termination of non-performing contracts on the grounds of transaction costs alone.
- d. The Department's project teams should assess the appropriateness of the systems used to validate contractors' service performance. In particular they should be alert to the risk that the extent of successful service delivery could be overstated without any adverse effect on users

- of the service that would draw their attention to the situation. Project teams should carry out audit work on the performance monitoring systems, consider whether the performance data being provided is adequate and carry out spot checks of the authenticity of the underlying data.
- e. To improve the management of PFI projects the Department's PFI project teams should:
    - keep at least one senior member of the team in post for the first year after the contract has been let, so there is a suitable transfer of knowledge to the team who will manage the contract;
    - have staff with appropriate contract management skills acquired through either previous experience or appropriate training;
    - capture project risks on formal risk registers in both the procurement and in-service phases;
    - undertake user satisfaction assessments on a systematic basis; and
    - carry out post contract evaluations and subsequent annual reviews of overall contract performance. The NAO framework for evaluating PFI projects may assist this process.
  - f. The Department's Private Finance Unit should extend its review of PFI projects by:
    - identifying and disseminating lessons from its project teams' post contract evaluations and subsequent annual reviews;
    - analysing information on the internal and external costs of procuring recent and current PFI deals to identify action points for improving the efficiency of the procurement of future deals; and
    - recording and monitoring the main risks affecting the successful delivery of services across the Department's PFI portfolio taking account of the project evaluations and the issues identified in this report.

### Supporting Operations

The highest priority for Defence in recent years has of course been supporting the Armed forces on operations in Iraq and Afghanistan. This has involved the expenditure of significant resources and we have correspondingly produced ad hoc reports on the way the Department has provided this support:

#### *VFM REPORT: Support to High Intensity Operations*

We found:

- The Department has approved £4.2 billion on Urgent Operational Requirements as at March 2009, including modifications to helicopters and aircraft, better protection for existing vehicles, early attack warning systems for bases and electronic counter-measures.
- The availability and serviceability of the helicopter fleets on operations have exceeded the Department's targets.

- Despite the challenging operational environments, the Department has successfully delivered around 300,000 personnel and 90,000 tonnes of freight to the two theatres combined over the last two years. The Department has not consistently met its supply chain targets for the timeliness of delivery but there are signs that the supply chain is becoming more resilient.
- For Iraq and Afghanistan, pre-deployment training is responsive to lessons identified in theatre and commanders are confident of its quality; but it is constrained by a number of factors.
- The Department's success in delivering life-saving medical treatment is underlined by the number of 'unexpected survivors' following the most severe of injuries.
- Accommodation for personnel at bases meets most needs and personnel are generally satisfied with it, although conditions at forward operating and patrol bases are more austere.
- The Department is delivering the Deployable Welfare Package successfully, although there are some problems with access to facilities during peak demand as a result of the application of specific planning ratios, and with welfare provision at forward bases.
- Both the Army and the Royal Air Force are struggling to meet "harmony guidelines" which set out the frequency with which personnel should be deployed on operations.



We recommended:

- a. Urgent Operational Requirement equipments have performed well but there have been shortages of spares in theatre for some vehicles and insufficient equipments on which to conduct pre-deployment training. The Department has a difficult balance to strike between fielding Urgent Operational Requirements quickly and ensuring that support and training is put in place. The Department should, however, maintain a full capability once equipment is in theatre, through:
  - conducting analysis which takes into account possible scenarios under which new equipment might be used, as operational circumstances change, in order to provide sufficient spares to keep them available until actual usage patterns have become clear;
  - allocating a sufficient proportion of equipment for pre-deployment training so that personnel are up to date and familiar with equipment before arriving in theatre; and

- cataloguing spares in a timely way, wherever possible before equipment is fielded.
- b. Now when the delivery of new equipment fleets, particularly vehicles providing protected mobility, is well underway, the Department should increase the priority it gives to spares purchases and the training fleet, relative to the delivery of vehicles to the operational theatre. For future fleets, it may be appropriate to increase the priority given to spares purchases and the training fleet from the outset.
  - c. Equipments provided to the Operational Training Equipment Pool are not always equipped to the same level as those deployed in theatre, making training less realistic. The Department should provide training equipment that resembles that used in theatre, either through including all modifications, so that equipments are at “theatre entry standard” or by modifying them so that they adequately represent that standard.
  - d. The Department’s performance against supply chain targets has been variable and lower for the highest priority demands, although there are signs that the supply chain is becoming more resilient. The Department should alleviate the pressure on the supply chain by smoothing the trend in demand from theatre, where possible, and enabling greater use of lower priority deliveries. It should also further improve and integrate its logistics information systems, including consignment and asset tracking, so users on operations have visibility over the stock already available at different locations in theatre, can track the progress of deliveries throughout the supply pipeline, and see stock availability back in the United Kingdom.
  - e. In preparing to drawdown forces from Iraq, the Department has compiled a compendium of assets in theatre as a tool to enable detailed planning for redistribution, movement and repair. It should use this information to verify that it can properly account for all assets, reconciling them against its fixed asset registers, whether returned to the United Kingdom, gifted or exchanged. In continuing to develop its logistic information systems, the Department should look to connect this information on its assets in theatre with its asset registers and inventory management systems.
  - f. There is a significant difference in the provision of welfare packages at main operating bases, and at forward operating and patrol bases. The Department should roll out more welfare provision to personnel in forward positions in line with its existing planning ratios and, where this is impracticable, introduce more flexibility about the balance of provision between different items; for example, providing a greater number of satellite phones in lieu of internet access.

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## ANNEX A - RECENT REPORTS ON DEFENCE

The list below sets out our recent work on defence including our value for money reports from the last 10 years. Copies of all of our defence reports can be found at <http://www.nao.org.uk/sectors/defence.aspx>.

### **Financial Audit**

- Report of the Comptroller and Auditor General on the 2009-10 Resource Accounts of the Ministry of Defence
- Comptroller and Auditor General's Report on the 2008-09 Resource Accounts of the Ministry of Defence
- Comptroller and Auditor General's Report on the 2007-08 Resource Accounts of the Ministry of Defence

### **Value for Money**

- Carrier Strike, HC 1092, Parliamentary Session 2010-2012
- The cost-effective delivery of an armoured vehicle capability, HC 1029, Parliamentary Session 2010-12
- MOD: The use of information to manage the logistic supply chain, HC 827, Parliamentary Session 2010-11
- Management of the Typhoon Project, HC 744, Parliamentary Session 2010-11
- Ministry of Defence: The Major Projects Report 2010, HC 489, Parliamentary Session 2010-11
- Strategic financial management of the defence budget, HC 290, Parliamentary Session 2010-11
- A defence estate of the right size to meet operational needs, HC 70, Parliamentary Session 2010-11
- Ministry of Defence: Delivering multi-role tanker aircraft capability, HC 433, Parliamentary Session 2009-10
- Treating injury and illness arising on military operations, HC 294, Parliamentary Session 2009-10
- Ministry of Defence: Major Projects Report 2009, HC 85I & 85II, Parliamentary Session 2009-10
- Support to High Intensity Operations, HC 508, Parliamentary Session 2008-09
- The Red Dragon project, HC 296, Parliamentary Session 2008-2009
- Ministry of Defence Service Families Accommodation, HC 13, Parliamentary Session 2008-09
- Providing Anti Air Warfare Capability: the Type 45 destroyer, HC 295, Parliamentary Session 2008-09
- Ministry of Defence: Major Projects Report 2008, HC 64I & 64II, Parliamentary Session 2008-09
- Ministry of Defence: The United Kingdom's Future Nuclear Deterrent Capability, HC 1115, Parliamentary Session 2007-08

- Allocation and management of risk in Ministry of Defence PFI projects, HC 343, Parliamentary Session 2007-08
- Ministry of Defence: The Defence Information Infrastructure, HC 788, Parliamentary Session 2007-08
- Ministry of Defence: Hercules C-130 Tactical Fixed Wing Airlift Capability, HC 627, Parliamentary Session 2007-08
- Ministry of Defence: Chinook Mk3 Helicopters, HC 512, Parliamentary Session 2007-08
- Major Projects Report 2007, HC 98, Parliamentary Session 2007-08
- The privatisation of QinetiQ, HC 52, Parliamentary Session 2007-08
- Ministry of Defence: Leaving the Services, HC 618, Parliamentary Session 2006-07
- Transforming logistics support for fast jets, HC 825, Parliamentary Session 2006-07
- Ministry of Defence—Managing the Defence Estate: Quality and Sustainability, HC 154, Parliamentary Session 2006-07
- Ministry of Defence Major Projects Report 2006, HC 23-I & II, Parliamentary Session 2005-06
- Recruitment and retention in the armed forces, HC 1633-I & 1633-II, Parliamentary Session 2005-06
- Ministry of Defence: Delivering digital tactical communications through the Bowman CIP programme, HC 1050, Parliamentary Session 2005-06
- Ministry of Defence: Using the contract to maximise the likelihood of successful project outcomes, HC 1047, Parliamentary Session 2005-06
- Ministry of Defence: Reserve Forces, HC 964, Parliamentary Session 2005-06
- Ministry of Defence: Progress in Combat Identification, HC 936, Parliamentary Session 2005-06
- Ministry of Defence: Major Projects Report 2005, HC 595, Parliamentary Session 2005-06
- Assessing and Reporting Military Readiness, HC 72, Parliamentary Session 2005-06
- Managing the Defence Estate, HC 25, Parliamentary Session 2005-06
- Ministry of Defence—Driving the Successful Delivery of Major Defence Projects: Effective Project Control is a Key Factor in Successful Projects, HC 30, Parliamentary Session 2005-06
- Ministry of Defence—Quality of Housing Services to Service Families Overseas, HC 342, Parliamentary Session 2004-05
- Ministry of Defence: The Rapid Procurement of Capability to Support Operations, HC 1161, Parliamentary Session 2003-04
- Ministry of Defence: Major Projects Report 2004, HC 1159-I & 1159-II, Parliamentary Session 2003-04
- Ministry of Defence—Battlefield Helicopters, HC 486, Parliamentary Session 2003-04
- Ministry of Defence: The Management of Defence Research and Technology, HC 360, Parliamentary Session 2003-04

- Ministry of Defence: Major Projects Report 2003, HC 195, Parliamentary Session 2003-04
- Ministry of Defence: Operation TELIC—United Kingdom Military Operations in Iraq, HC 60, Parliamentary Session 2003-04
- Ministry of Defence—Compensation Claims, HC 957, Parliamentary Session 2002-03
- Ministry of Defence—Through-Life Management, HC 698, Parliamentary Session 2002-03
- Ministry of Defence—The Construction of Nuclear Submarine Facilities at Devonport, HC 90, Parliamentary Session 2002-03
- Ministry of Defence—Major Projects Report 2002, HC 91, Parliamentary Session 2002-03
- Ministry of Defence—Building an Air Manoeuvre Capability: The Introduction of the Apache Helicopter, HC 1246, Parliamentary Session 2001-02
- Ministry of Defence—Exercise Saif Sareea II, HC 1097, Parliamentary Session 2001-02
- Ministry of Defence—Progress in Reducing Stocks, HC 898, Parliamentary Session 2001-02
- Ministry of Defence: Helicopter Logistics, HC 840, Parliamentary Session 2001-02
- Ministry of Defence: Major Repair and Overhaul of Land Equipment, HC 757, Parliamentary Session 2001-02
- Ministry of Defence: Redevelopment of MOD Main Building, HC 748, Parliamentary Session 2001-02
- Ministry of Defence: Implementation of Integrated Project Teams, HC 671, Parliamentary Session 2001-02
- Ministry of Defence: Combat Identification, HC 661, Parliamentary Session 2001-02
- Ministry of Defence—The Joint Services Command and Staff College, HC 537, Parliamentary Session 2001-02
- Ministry of Defence: Major Projects Report 2001, HC 330, Parliamentary Session 2001-02
- Ministry of Defence: Non-Competitive Procurement in the Ministry of Defence, HC 290, Parliamentary Session 2001-02
- Ministry of Defence: Maximising the Benefits of Defence Equipment Co-Operation, HC 300, Parliamentary Session 2000-01

### **Signature products**

- A Short Guide—The NAO's work on the Ministry of Defence



# The Indian Defence Acquisition System: Improving Oversight and the System

*K Subramaniam*

## **Introduction**

Defence acquisitions are critical for national security as they determine the operational preparedness of the armed forces. About 50 per cent of the defence budget is spent on procurement, both revenue and capital. This relatively large investment involves a significant opportunity cost, as scarce resources have to be diverted from the much-needed social and developmental sectors. Therefore, the concern for ensuring that this money is well spent becomes heightened not only for all the stakeholders but also for the oversight authorities. The increased oversight concerns in defence acquisitions also arise from the fact that it is highly vulnerable to corruption. Transparency International classifies the defence industry as the third most corrupt sector of business. India being the largest arms importer coupled with the fact that its procurement system is yet to mature, the vulnerabilities are even higher.

## **Oversight Concerns in Defence Acquisitions**

There are two primary oversight concerns in defence acquisition; value for money, and integrity. Other concerns like fair play and transparency gets subsumed under these two concerns. Value for money in defence acquisition means:

- That the acquired product meets the user's requirement or the "capabilities sought for", in the best possible manner.
- That the product is acquired at an optimum cost of ownership.
- That the product is acquired at the shortest possible time.

Putting it simply, it means buying the right product, at the right price and at the right time. Selection of a right product can only be ensured if:

- The Qualitative Requirements are formulated in such a manner that they truly reflect the user 's functional requirement.
- There is an objective system of technical evaluation.

Right price of a product can be ensured only through competitive price discovery.

Value for Money is a key concept in defence acquisition and the interests and expectations of all the stakeholders converge at this point. Objectivity, integrity, fair play and competition are essential ingredients of value for money and not mere ethical requirements. Compromising any of these values not only exposes the acquisition to the risk of corruption but also to the risk of diluted quality, increased cost or delayed deliveries. Therefore, the role of oversight only compliments the efforts of the executive at achieving value for money.

### **The System of Oversight in Indian Defence Acquisition**

There are about five important oversight institutions in India and they have an important role to play in defence acquisition.

- a. The Comptroller and Auditor General of India is mandated by the Constitution to assure the Parliament about the regularity and propriety of all government expenditure. Towards this end, the CAG conducts two types of audits; Compliance Audit aimed at examining issues of irregularity and Performance Audit, which examines activities and outcomes from the prospective of financial prudence. All acquisitions above Rs. 75 crore are subject to mandatory audit by the C&AG while contracts below Rs.75 cores are subject to sample audit. The CAG acts as the pivot in the Parliamentary financial control over the executive. The CAG's reports are laid in the parliament and taken up for deeper scrutiny by the Public Accounts Committee (PAC). The PAC after calling for the explanations of the executive gives its recommendations for corrective action.
- b. The Central Vigilance Commission as the independent anti-corruption agency exercises both preventive as well as a punitive role in ensuring integrity and transparency in the procurement process. As a preventive measure it can study and assess the risk of corruption and suggest systemic or procedural corrections. It also issues guidelines from time to time to ensure integrity in public procurement, which is an area of high concern for it. In its punitive role it inquires into allegations of corruption based on complaints or source information and advises disciplinary action or prosecution against errant public servants. Central Bureau of Investigation (CBI), which is the investigating agency for cases of corruption, functions under the superintendence of CVC. It accords high priority to defence acquisitions to which it owes its own creation. The CBI was formed to address the increasing corruption in defence supplies during the World War-II. The CAG, CVC and the CBI are popularly referred to as the 3Cs, which are much feared by the defence acquisition managers.

- c. After the introduction of the landmark Right to Information Act in 2004, the Central Information Commission has been playing a vital role in ensuring transparency in all aspects of governance. An important reason for the high vulnerability of defence procurements to corruption is that, defence deals are veiled in secrecy. It is commendable that defence is not exempt under the Right to Information Act. The RTI Act has compelled the management to support its decisions with well documented reasoning. On the negative side it has given rise to demand for information, which may be used for vexatious purpose.
- d. Besides the PAC, parliamentary oversight over the Ministry of Defence is also exercised through the Parliamentary Standing Committee on Defence, which conducts detailed study on various issues of concern and gives its recommendations.
- e. In addition to the external oversight bodies, adequate internal oversight is exercised through internal audit and the system of Financial Advisors who perform due diligence and give concurrence to all financial proposals. Ministry of Defence is the only Ministry, which has a dedicated Secretary responsible for the two functions.

From the above analysis it may seem that the Indian defence acquisition system is subjected to excessive oversight. But this perception gets corrected when we find that the more developed a country is the more are the number of

**Table 1: Countries and the Number of Parliamentary Oversight Tools**

0	2	3	4	5	6	7
Lasotho	Azerbaijan	Congo	Angola	Australia	Andorra	Austria
	Russia	Macedonia	Armenia	Bulgaria	Belarus	Belgium
		Tajikistan	China	Cameroon	Benin	Costa Rica
		Zimbabwe	Ivory Coast	Iran	Brazil	Croatia
			Kazakhstan	Jordan	Canada	Czech
			Liechtenstein	Mexico	Cyprus	Estonia
			Rwanda	Mongolia	U.K.	France
			Uruguay	Nicaragua	Germany	Gabon
				Palau	Guatemala	Greece
				Philippines	Guinea Bissau	Hungary
				Samoa	Guinea	Indonesia
				Senegal	Iceland	Japan
				Singapore	Ireland	Lithuania
				South Africa	Korea	Madagas
				Sudan	Jamaica	Mali
				Turkey	Latvia	Romania
				Ukraine	Luxembourg	Spain
				Yemen	Namibia	Sweden
					Netherlands	Switzerland
					Niger	Zambia
					Poland	
					Slovakia	
					Slovenia	
					Chad	
					Thailand	
					Togo	
					Tunisia	
					Uganda	

parliamentary oversight tools as shown in the table above which is based on a study of 82 countries conducted by World Bank Institute (WBI).

## **Problems Related to Oversight in Defence Acquisition**

### *Adverse Impact of a Compliance Focussed Oversight*

Officers involved in public procurement in India and more so those engaged in defence procurements operate under the constant fear of the three C's—CAG, CVC and the CBI, which prevents them from taking quick, bold or innovative decisions. Officers are afraid to take or approve decisions and try to play safe by deflecting and dispersing accountability, which is a major cause for all delays. The oversight agencies are blamed for inculcating this work culture of risk avoidance. A major cause for this situation is the highly “procedural violation focussed” oversight prevalent in India. The Indian oversight system places undue and improper emphasis on adherence to procedures in a narrow sense even at the cost of outcomes. This is why the Indian bureaucracy over the years has become highly process oriented rather than outcome focussed. Officers are ready to sacrifice results in order to ensure blind compliance to process and regulations in the limited way that they understand them. I would like to illustrate the case of the high priority Married Accommodation Project for defence personnel wherein, the work of construction of 300 residential accommodations at a particular location was retendered 12 times by the Central Public Works Department (CPWD)! This was done in order to comply with the rule, which stated that if the bid value (of the lowest bidder) was higher than the estimated cost by more than 10 per cent then the bid should not be accepted. The department needs to be lauded for achieving such compliance and thus successfully avoiding objections from the oversight agencies. But what about the achievement of results? The work was delayed by 3 years and there was a 300 per cent cost overrun. But in India nobody gets punished for this. On the other hand if the Director General, CPWD had taken the prudent decision of accepting the bid after two unsuccessful retendering attempts he would have probably risked a vigilance case against him. Contrast this with the case of Delhi Metro Rail Corporation (DMRC) a success story in project management, against which several counts of procedural deviations have been pointed out by the oversight agencies. These so-called procedural deviations can be more precisely termed as “adoption of abnormal procedures” and it needs to be appreciated that it is because of these abnormal procedures and methods adopted by DMRC that the project was successful.

One would question the utility of the regulations, procedures and guidelines if their violation was acceptable. How does one enforce them if non-compliance is not penalised? The answer lies in the fact that the regulations and procedures governing public procurement in India have serious shortcomings. Therefore, a procedural compliance focussed oversight would be incorrect due to the following reasons:

- a. It needs to be appreciated that sometimes established rules and procedures may not be able to address the peculiarities of a certain

situation and alternative solutions may have to be adopted in the organisational interest, to achieve better or more timely results. Rules or procedures are narrowly framed and therefore cannot address the complex situations with several variables and uncertainties, which the procurement managers face in day-to-day decision-making. The executive is often faced with a dilemma. If they strictly play by the rule book the desired result may not be obtained in time. On the other hand if they circumvent the procedures, they risk adverse observations from oversight and may even be held liable for misconduct. Officials have to choose between committing irregularity and committing impropriety. The play-it-safers choose the later because the Indian system punishes irregularity and not imprudence while the achievers do not mind “bending rules” to achieve goals. Joseph Badaracco, Professor of Business Ethics at Harvard Business School writes - “Bend the rules, don’t break them”. Instead of acting like moral book-keepers, successful managers bend the rules and own up to their deeper responsibilities towards the objectives mainly because sometimes situations give them no choice. In fact bending the rules—as opposed to breaking them—is harder as it requires imagination and commitment.

- b. Rules and procedures prescribe actions which aim at maintaining certain essential principle—like integrity, value for money, objectivity, fair play, competition etc. Therefore in the ultimate analysis the principles are more important than the rules and if the principles are upheld even at the cost of rules there should be no issues. However in the Indian system the procurement procedures and rules stipulate only the operative part and do not highlight the underlying principles. Rules and procedures are understood, applied and enforced in letter ignoring the spirit behind them. Rules are formulated in the form of dos and don’ts and leave very little operational freedoms to the managers. Going by best practices, acquisition guidelines like Federal Acquisition Regulations, Common Wealth Procurement Guidelines etc. are broad based and only set the boundaries within which responsible managers find ways to manoeuvre with operational freedom. If organisations were to be run merely on the basis of checklist of rules and procedures then qualified and experienced managers would not be required to steer organisations.
- c. There is no benchmark or standard against which a procedural violation is discerned. Much of the so-called violations are judged using popular perception or limited knowledge about public procurement norms. In India, while raising an observation of procedural violation, the oversight agencies seldom quote the specific rule which is violated and the judgement is based on the subjective opinion of the vigilance officer or the auditor. Most of the observations about procedural violations are a result of hindsight wisdom based on detailed analysis of information—most of which would not have been available to the decision makers at the time of taking the decision.

- d. Oversight agencies place undue focus on procedural violation without appreciating the context in which the so-called violation occurred. Much of the so-called procedural violations could be better termed as “adoption of abnormal procedures”.
- e. A plethora of rules and procedures issued by several agencies which are often conflicting with each other cause confusion among procurement officials. There is no public procurement standard in India on the lines of, say the Federal Acquisition Regulations in the U.S. which is the mother of all guidelines from which procurement procedures specific to different sectors are derived.
- f. Many of the prevalent public procurement concepts or guidelines in India are out of tune with the ground realities and the modern day concept of supply chain management. There is a popular perception against limited tendering which is considered a taboo, despite the fact that almost all procurement procedures classify it as a competitive tendering process. The CVC guidelines abhor limited tendering which is made an offence in many vigilance cases. Today it is becoming clear that limited tendering by soliciting offers from select vendors based on quality and capability, gives better value for money than inviting all and sundry through open solicitation. In many cases good quality vendors do not participate in government contracts. For instance, if we take the panel of media agencies maintained by the Directorate of Audio Visual Publicity, the top eight agencies in the country are not included. The other issue is; how do we reconcile the concept of open solicitation with the requirements of vendor development and supplier consolidation, especially when modern supply chain management advocates forward and backward integration to reduce costs and enhance quality. The new Indian defence acquisition policy focuses on developing indigenous defence industry and unless this conflict is resolved, it would turn out to be a major roadblock.

#### CASE STUDY

Turbine blades and its parts have to be periodically hard coated as the impact of silt in the river water damages their surface. Hard coating using a Robotic Arm gives better quality coating than manual coating. When tenders were floated by a project for hard coating, the RFP stated that vendors having Robotic Arm Technology would be preferred. Only one vendor had invested in developing Robotic Arm Technology who obviously needed to be supported with adequate orders and was awarded the contract. However, the senior officials of the project were penalised by vigilance for including a restrictive clause in the RFP favouring a particular vendor. The fact that the speed and quality of the Robotic Arm Technology resulted in significant cost savings especially during the peak load period, was ignored. The present procedures of defence procurement with a few exceptions

have only dissuaded quality vendors and encouraged small time poor quality vendors who are able to manage the cumbersome defence procurement system. I met an NRI industrialist who has demonstrated the capability and feasibility of producing indigenous engines for tanks but his main worry is from the oversight bodies. Further, how do we reconcile the emphasis on open tendering with the need for minimising proliferation of inventory or better dedicated after sales support, as the two requirements are conflicting. If open tendering throws up a new vendor every time, the cost of inventory and after sales support would be higher.

- g. The public procurement guidelines in India are not based on a proper risk assessment or cost benefit analysis. Any stipulation or procurement guideline issued to ensure integrity, transparency or value for money imposes certain costs (in terms of money or time) along with the benefits, which may accrue from its implementation. Increased oversight engagement drive costs and timelines especially in a situation of increased uncertainties and complexities as seen in defence acquisition. Similarly, imposing additional procedural requirements and conditions to ensure transparency or integrity pushes up cost as the vendor would try to factor in the costs of complying with them. It may also cause delay because the vendor would seek clarifications or try to negotiate on these conditions. A procurement procedure or guideline should be based on a certain cost benefit analysis. The cost should not exceed the degree of risk that is addressed by these measures. Many of the procedures and guidelines governing public procurement in India are not based on such a cost benefit analysis and as a result they are more imposing when compared to the risk they try to cover. For example, the provisions for integrity pact in the DPP requires the bidders to provide a Bank Guarantee (Rs. 1 crore for contracts valuing Rs. 100 crores to Rs. 300 crores and Rs. 3 crores for contracts of Rs. 300 crores and above) besides various penal provisions like forfeiture of Bid Security, Performance Bond, debarring etc. The bidders will certainly factor these risks and costs in their price. The Integrity Pact provides that complaints if any made by the bidders would have to be examined in detail by the Independent External Monitor, which is only a duplication of the work done by the Chief Vigilance Officer. This process is bound to cause delay. After incurring all these costs what is the assurance of success of the Integrity Pact. The concept of Integrity Pact itself has had limited global acceptance and its impact is yet to be assessed. Further, how violations of the pact would be established or what evidence would prove violations is not laid down. If the Independent External Monitors were to adopt the narrow "procedure violation focussed" approach, it would have disastrous consequences. Therefore, in the final analysis it would seem that the costs of implementing the Integrity Pact may be higher than the benefits, which remain more of theoretical assumptions.

Therefore, a “procedural violative focussed” approach by oversight especially vigilance wherein probability of corruption is assumed from the mere observation of procedural deviations has disastrous consequences resulting in harassment to the honest, proactive and goal oriented officers.

### ***Oversight Remains Ineffective as no Action is taken on its Outcomes***

The observations and recommendations made by oversight bodies are not converted into insight by the Defence Ministry in order to improve the acquisition process. Unless action is taken on its findings, the oversight activity does not reach its logical conclusion and remains a mere ritual. The ultimate objective of oversight is to improve governance, which remains unachieved due to the executive’s failure to act upon the outcomes of oversight engagements. This is why despite regular audit by the C&AG and vigilance by the CVC, problems in defence acquisition continue unabated. It needs to be remembered that the C&AG and the CVC are only advisory bodies, which make recommendations to the executives. It is for the organisations to utilise oversight as an aid to management and as a feedback control mechanism.

### ***Inadequacy of Parliamentary Oversight***

To establish best practices or to tear down inappropriate practices is not only a matter of knowledge and expertise, but also of resolve and conviction. In this respect, political will could act as a driving force to compel the defence bureaucracy to carry out the necessary reforms. Therefore, parliamentary oversight plays a crucial role. Effective parliamentary oversight can actually contribute to improving the quality of the policies and programs initiated by the government, accord them greater legitimacy and thus boost the confidence of the acquisition managers. Political and military leaders have shared responsibilities in reforming the security sector, given that the reform has to fulfil both functional and societal demands. C&AG, audit is the key instrument of Parliamentary Financial Control wherein based on the CAG’s report, the Parliament, through the Parliamentary Accounts Committee recommends suitable action to the government. But this system has its limitation because the PAC is able to select only few cases from the CAGs report for detailed examination and action. The others are dealt in a routine manner wherein the government gives an Action Taken Report to the PAC and the matter ends. Some of the problems with the Indian parliamentary oversight system are that:

- It is more of ex post than ex ante and therefore defeats its very purpose.
- Parliamentary Committees are not able to function strictly above party lines in promoting effective oversight.
- Due to differing parliamentary priorities, defence issues are not allocated sufficient time.
- Lack of adequate defence expertise or knowledge of security issues among parliamentarians.



## **Analysis of Major Problems in Indian Defence Acquisition**

### *Flawed Approach of Correcting Procedures Instead of Improving Systems*

A major flaw in the approach to improving the defence acquisition process is that systemic problems are addressed by merely introducing amendments to the Defence Procurement Procedure. Many of these amendments are a reaction to the observations raised by oversight agencies and aimed at preventing the reoccurrence of the problems. This approach of tinkering the procedures instead of improving the systems and solving the root cause of the problem, further complicates matters. Therefore, though the Ministry comes up with a new Defence Procurement Procedure (DPP) almost every two years, the systems remain the same and the problems remain unsolved. Analysis of some of the major problems of defence acquisition would highlight this point.

### *Formulation of QRs*

Formulation of the Qualitative Requirements (QRs) is the most crucial stage in the defence acquisition process and impacts all the other important decisions in an acquisition process. The deficiencies in the system of QR formulation is highlighted below:

- i. Instead of defining the capabilities sought for in terms of functional and performance parameters, QRs are stated in terms of technical specifications, often in terms of specific values which either do not match with the products available in the market or in some cases match uniquely with a product resulting in bias to a single vendor. Best practices advocate formulation of requirements in terms of functional and performance parameters; and prohibit the use of technical or physical specifications. When the weapon system is to be indigenously designed or produced, the development or production agencies convert these user needs into detailed military and technical specifications for R&D and production purpose. Stipulating narrow QRs restrict competition and choice; and therefore do not enable selection of the most optimal product.
- ii. There was no grading or assigning of weights to the QR parameters. Selection of a product involves optimisation between various competing parameters so that the best possible equipment is selected to match the capability sought for. This is not possible unless there is proper grading or weighting of the required parameters in the absence of which an objective technical evaluation becomes difficult.
- iii. The specifications stipulated in the QRs are often found to be inconsistent with the technology available in the world market, inconsistent with each other or inconsistent with ground realities.
- iv. Often the parameters specified in the QRs could not be tested during trial evaluation due to lack of testing facilities.

These deficiencies in the QRs create serious bottlenecks in the technical selection of the weapon systems, which is then overcome by altering or waiving the QR

parameters. To mitigate this problem an amendment was introduced in the procurement procedure stipulating that any alteration or waiver of the QRs after the issue of RFP would require the approval of the Defence Minister. This instead of preventing the reoccurrence of the problem, further complicated it because the waiver of QR parameters had to be obtained in almost 50 per cent of the cases as there was no other way out. As a result, the procurement process was delayed by at least 4 to 6 months. The root cause of the problem – faulty formulation of QRs – was never addressed.

### CASE STUDY

The QRs for Combat Diving Equipment stipulated minimum endurance of 2 hours i.e. the equipment should be able to keep the diver underwater for at least 2 hours. It also specified that “it should be able to operate upto a depth of 75m”. It also went ahead to specify the dimension and the volume of the air bag. During technical evaluation only one of the vendors could meet the important functional requirement of endurance of 2 hours. But the equipment of this vendor could not meet the dimensions of the air bag specified in the QR. Further, the equipment could not be tested upto a depth of 75m because the army divers are trained to dive only upto 10 m while the navy divers use the equipment only upto 55m. These two parameters, which were inconsistent with the prescribed QRs, required a deviation for which approval of the Defence Minister was required.

While the above amendment in the Defence Procurement Procedures only discouraged modifications of QRs after issue of RFP, frequent changes in the QRs prior to issue of RFP especially in the case of indigenous development continues unabated. Many of the changes carried out in the QRs were arbitrary and situational. It was pointed out in CAG’s Audit Report No. 7 of 2001 that frequent changes in the requirement by the services was one of the reasons for failure of development projects. The QR for an Air Defence Gun was revised 7 times in 17 years as shown in Table 2.

The Army was unable to decide as to whether the Air Defence Gun is to be single barrel, twin barrel or multi-barrel, to be with or without fire control radar, to be towed or mounted. The Army frequently wavered between a fair weather and all weather guns. This resulted in frequent amendments to the QRs and due to this indecisiveness the development of an indigenous Air Defence Gun could never fructify.

Until 2003, the QR parameters used to be graded as critical, essential and desirable. To avoid the use of discretion and manipulation in evaluation of these parameters the Ministry amended the DPP to do away with the grading of parameters. Again based on the recommendation of the CAG’s Audit Report of 2007, the DPP 2008 stipulated that QRs should be formulated in terms of functional parameters, without explaining how this is to be done.

**Table 2: Showing Revisions to GSQR for Air Defence Gun**

Date QR parameter	Oct 85	Feb 97	Feb 98	July 98	Jan 2000	May 2001	April 2002
System	All Weather	Fair Weather	Fair Weather	Fair Weather	Fair Weather	All Weather	Fair Weather
Calibre (mm)	30 to 35	30	30	30	30	To achieve CKP of 6	30 mm
No. of Barrel	Multi Barrel	One	Two	Two	Two	Both	Two
Rate of Fire (rds/min) minimum	1000	1000	2000	2000	2000	800/1600	2000
Muzzle Velocity (m/s) minimum	1000	1000	1000	1000	1000	1200	Min 1100
Max. Effective Range (m) minimum	4000	3000	4000	4000	4000	4500	Minimum 4000 m
Mass of Equipment (kg) Maximum	6000	1500	2500	3800	3800	2500/ 4500	4500 kg.

Besides issuing amendments to the DPP, no efforts have been made to reform the very system of formulation of QRs by adopting a more scientific method with the use of Value Engineering concepts. Neither has there been any attempt to train acquisition officials on best practices of QR formulation.

The present method of formulation of QRs does not facilitate the selection of the optimum product through a competitive and objective process. QRs are formulated based on the information available on the internet, in literature of products, obtained from the military attaches, located in various countries or directly from the vendors by issuing Requests for Information. This approach to formulation of QRs has the risk of pre-selection or inherent bias to a particular product. The use of manufacturer's brochure to determine specifications may not only restrict the size of the potential market but also reduce the scope for bidders to offer alternate innovative solutions.

### **Technical Evaluation**

The second major bottleneck in the defence acquisition process is the way technical evaluation is carried out. Not only are there severe delays in field trials but also the process of evaluation is more of a subjective assessment and discretion creeps in. The discrepancies in the QR formulation as discussed previously, further vitiates the process of trial evaluation and technical selections.

In the trial evaluation report the advantages, disadvantages and deviations from QRs of the various products are listed. However, there is no method of determining the relative merits of these advantages or demerits of the disadvantages in arriving at the final selection. In the absence of an objective and quantitative method of evaluation the selection of the optimum product could not be ensured. The process does not ensure fair play to all vendors and

the objectivity and equity of the selection could not be demonstrated or proved. As a result, many critical procurements are hampered due to representations, complaints and investigations. The fact that in at least 60 per cent of the cases a single vendor is prequalified vindicates the anomaly of the system. But instead of addressing the real issue, the DPP was amended in 2006 stipulating that if technical evaluation resulted in a single vendor being qualified then the whole process would be redone again by broadening the QRs.

Similarly, the procurement of Special Clothing and Mountaineering Equipment encountered problems during receipt inspection because of the absence of well-defined QRs. But instead of developing QRs for the clothing, the procurement procedure was amended wherein Director General Quality Assurance (DGQA) was made to develop specifications from the sample of the selected product through reverse engineering. These specifications were then compared with the specifications of the supplies during receipt inspection. This resulted in a unique and absurd system where specifications are made not for selection of a product but after its selection for the purpose of inspection.

Technical prequalification involves comparative assessment of the products offered by optimising the various parameters to arrive at the technically best product. This would necessitate the use of quantitative means of evaluating the various parameters against the set criteria. Weights for different parameters would have to be determined as trade-off between parameters is also involved. Scoring of offers would facilitate an objective comparison. Best practices of technical evaluation involve a scientific decision making process by using some form of a decision matrix based on weights and scores for the various evaluation criteria. The technical evaluation methodology used in Indian defence procurement was highly simplistic. However, the Ministry and the services are opposed to using a scoring matrix system, as they fear subjectivity in assigning weights to QR parameters or deciding the scores. This fear is unfounded because assigning weights or scores is based on logic and not discretion. For example, the relative weight to be assigned to the range, accuracy or date of fire is to be decided on the basis of criticality of the requirement and not a matter of subjective choice.

### *The Menace of Complaints*

The Indian defence acquisition system is often held to ransom by complaints made by competing bidders or vested interests as these complaints create panic among officials involved in acquisition. Many critical procurements have been sabotaged by spate of complaints. Solutions have to be found to deal with this menace. It is to be seen whether the introduction of Integrity Pact has led to a decline of complaints. Following the judgement of the European Court of Justice in the case of Alcatel, several countries have recently introduced a mandatory standstill period between the finalisation of the contract and the award of contract to provide the bidders with a reasonable opportunity for the review of the award, which can also be set aside if found incorrect.

### ***Need for an Integrated Defence Acquisition Organisation***

Multiple agencies with different centres of accountability are involved in Indian defence acquisition resulting in lack of coordination, diffused accountability and delay. For instance, in the case of capital acquisitions for the Army, thirteen different agencies each reporting to different functional heads are involved in the whole process.

There are eight stages in the acquisition process and during each stage the case shuttles between the Service Headquarters and the MOD; and given the divide between the MOD and the Service Headquarters the whole process lacks coherence and synergy.

The recommendations of the Group of Ministers in April 2000 to create a separate and dedicated organisational structure for acquisition integrating all the procurement function remains unimplemented till date. Only additional structures like Defence Acquisition Council, Defence Procurement Board, Defence Production Board, Defence R&D Board have been created. The wing of the Ministry, which was handling capital acquisitions was renamed as the acquisition wing with the secretariat officials re-designated as managers.

Study of the acquisition system of various countries showed that most of the countries had a separate integrated defence acquisition organisation, which brought various specialised functions like finance, quality assurance, QR formulations, market research, costing and administration under one umbrella with single point accountability. The services only give the user requirement, the quantity of the product required and the time by which the product is required. It is then the responsibility of the acquisition organisation to make available the best possible product at optimum cost within the given time. The DGA of France, the Defence Procurement Agency (DPA) of UK, the Armament Corporation of South Africa and DGA of Germany are cross-functional, integrated acquisition organisation.

### ***Re-engineering of the Acquisition Process***

A major cause of delay is essentially the way a procurement proposal is processed. From the initiation of the case to the signing of the contract the procurement case had to sequentially go through eight stages of processing. Each stage consists of about 9 to 10 approval points with each approval point having at least 3 submission points.

A management audit conducted by the CAG in 2006 revealed that each acquisition case has to go through at least 50 to 60 submission points and at least 25 per cent of his workflow was redundant. For example why should the finance be involved in deciding the quantities to be procured or in the technical evaluation. The time taken for processing cannot be reduced unless this method of processing is completely reengineered.

### ***Capacity Building of Acquisition Managers***

Defence Acquisition is a cross-disciplinary activity requiring expertise in technology, military, finance, quality assurance, market research, contract

management, project management and supply chain management. The Indian defence acquisition system does not provide for such specialisation, much needed in view of the increasing complexities, high lead-time and costs of acquisition. The personnel involved in procurement do not have any training or exposure to project management, procurement management or contract management. Technical processing in the Service Headquarters is done by service officers on tenure posting lasting for not more than a maximum of 3 years. This denies the scope for any specialisation.

### **Conclusion**

As oversight plays an important role in helping the management attain value for money in defence acquisitions, there is a need for the oversight regime to act more as a positive reinforcement in improving the organisation, systems, procedures and policies. This would require the adoption of a balanced and risk based approach by the oversight authorities—balancing the cost and benefits of oversight with the risks involved. Oversight engagements should be sensitive to management needs and based on an appreciation of the overall context in which managerial decisions are made. There is a need for shifting from a mere “procedural irregularity focussed” approach to a “value for money” oriented approach.

If oversight is to make value addition to the governance process, its outcomes should be taken to logical conclusions by ensuring that appropriate corrective action is taken by the executive.

The defence acquisition system in India is fraught with sever delays and inefficiency. The system is not geared to assure value for money or to ensure that the right quality of weapon systems and capabilities are inducted. These problems can only be overcome by reconfiguring the acquisition organisation, the systems and the processes, so as to make them more professional, scientific and objective—based on modern principles of project and supply chain management. Besides putting in place an integrated acquisition organisation the key functional areas, namely formulation of QRs, technical evaluation, vendor development and costing needs to be overhauled. The officers manning the acquisition should be trained in project and procurement management to make them acquisition managers in the real sense. Drastic changes in the defence acquisition regime are further necessitated by the increased emphasis on indigenous development and production of defence systems, for which the Indian defence industry in the private sector needs to be promoted in a big way to realise its potential. Mere tinkering with procedures, which has been happening for a decade will not solve the problem.

## Defence Acquisition Systems: A Look at Selected Nations

*Mrinal Suman*

Procurement of new weaponry and equipment is a long, complex, arduous and time-consuming process in all countries. Multiple agencies have to perform vital functions, both concurrently and sequentially and a large number of inter-dependent variables have to be factored in to provide required equipment to the armed forces in an expeditious and cost effective manner. There are three imperatives that dictate the evolution of all acquisition procedures—equipment should meet performance criteria as specified by the armed forces, it should be delivered within the required timelines and it should cost the country the least. Development and sustenance of an indigenous defence industry is a natural fall-out of the above process.

India is no exception. Since 2002, the Government has been making a concerted effort to streamline the entire acquisition process. A study of four selected nations will provide useful inputs to India in this endeavour. The United States is the most technologically advanced super power with a huge defence budget. Germany is a key military player of Europe and has spelt out its latest equipment vision in May 2011. France has a unique model wherein all acquisition related functions have been assigned to a single centralised agency. Finally, the United Kingdom has an admirable record of continuous reforms to optimise its system.

### **The United States**

In the US, the Department of Defence (DoD) is responsible for providing effective, affordable and timely systems to the armed forces. Within the system, every acquisition programme is a directed and funded effort that provides a new, improved or continuing war-fighting capability in response to an approved need. Most importantly, the US investment strategy is designed to ‘support not only today’s force, but also the next force and future forces’.

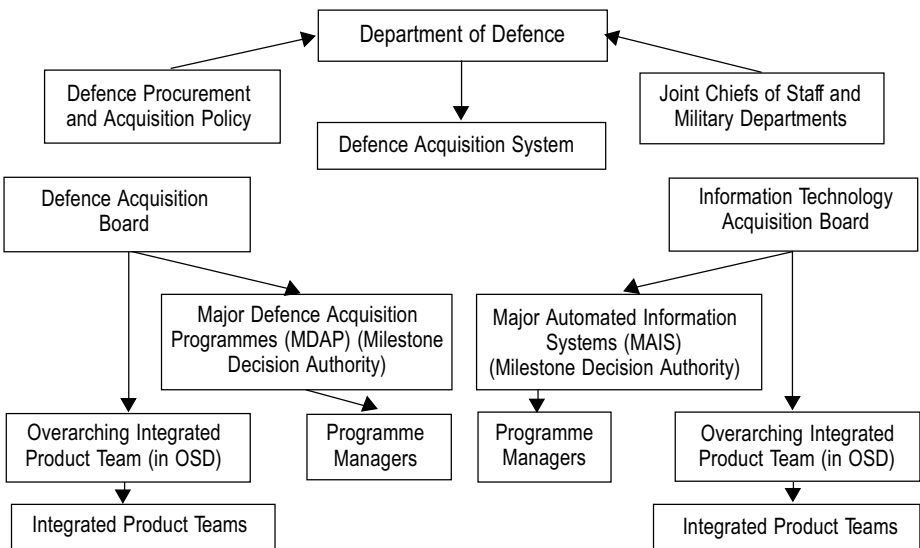
The US acquisition system follows an evolutionary approach wherein capabilities are imparted to the armed forces in increments with inbuilt provisions for future enhancements. The evolutionary strategy relies on a spiral development process. Spiral development is defined as: “an iterative process for developing a defined set of capabilities within one increment. This process provides the opportunity for interaction between the user, tester and developer. In this process, the requirements are refined through experimentation and risk management, there is continuous feedback and the user is provided the best possible capability within the increment. Each increment may include a number of spirals”. Such an approach facilitates rapid induction and exploitation of mature technologies. The key to success in this approach is regular and close cooperation between various stake holders—industry, acquisition officials and the armed forces.

The US defence acquisition system is governed by the DoD Directive Number 5000.01 that describes management principles and the overarching policy in detail. Salient policy guidelines include flexibility, responsiveness, innovation, discipline and streamlined management. The Directive mandates constitution of Integrated Product Teams (IPTs) for ensuring continuous and effective communication amongst different agencies involved in acquisitions.

**Structures**

The operation of the Defence Acquisition System has been described in DoD Instruction 5000.02. The Office of the Under Secretary of Defence for Acquisition, Technology and Logistics, USD (AT&L)}, is the nodal agency and the overarching authority tasked to oversee the complete defence acquisition process. It is assisted by Joint Requirements Oversight Council (JROC) in reviewing programmes and

**Figure 1: Schematic View of Defence Acquisition Structures**





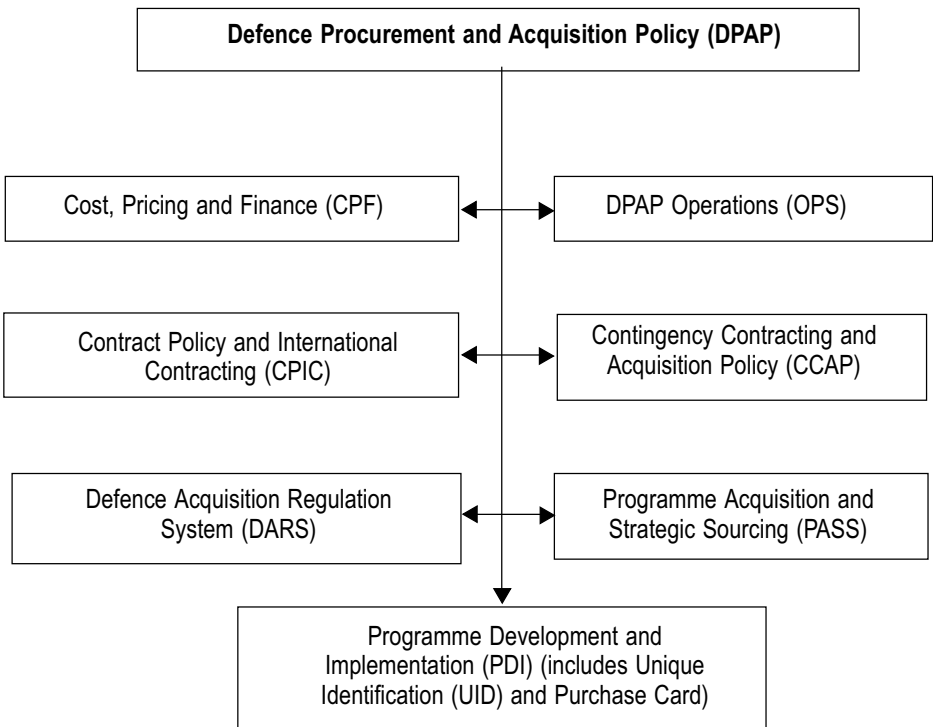
Functional Capabilities Board (FCB) in assessing capability gaps and proposals. Contract support is provided by the Defence Contract Management Agency (DCMA) and logistic support by Defence Logistics Agency (DLA).

Defence Procurement and Acquisition Policy (DPAP) is responsible for all acquisition and procurement policy matters. The Defence Acquisition Board and Information Technology Acquisition Board are senior advisory boards for defence acquisitions for Major Defence Acquisition Programmes (MDAP) and Major Automated Information Systems (MAIS) respectively.

### Defence Procurement and Acquisition Policy (DPAP)

The DPAP office serves as the principal advisor to USD (AT&L), the Defence Acquisition Board and Information Technology Acquisition Board on acquisition and procurement strategies for all major weapon systems programmes, major automated information systems programmes and services acquisitions. DPAP is composed of seven Directorates—DPAP Operations; Cost, Pricing and Finance; Contract Policy and International Contracting; Defence Acquisition Regulation System; Contingency Contracting and Acquisition Policy; Programme Acquisition and Strategic Sourcing, and Programme Development and Implementation.

Figure 2: Organisation of Defence Procurement and Acquisition Policy



## The Defence Acquisition Board and Information Technology Acquisition Board

The Defence Acquisition Board (DAB) and the Information Technology Acquisition Board (ITAB) are manned by senior officials from the Joint Staff, the Military Departments, and staff offices within the Office of the Secretary of Defence (OSD). The Boards include Vice Chairman of the Joint Chiefs, the Service Secretaries and a number of Under Secretaries of Defence. DAB is responsible for approving Major Defence Acquisition Programmes (MDAP) and ITAB approves Major Automated Information Systems (MAIS).

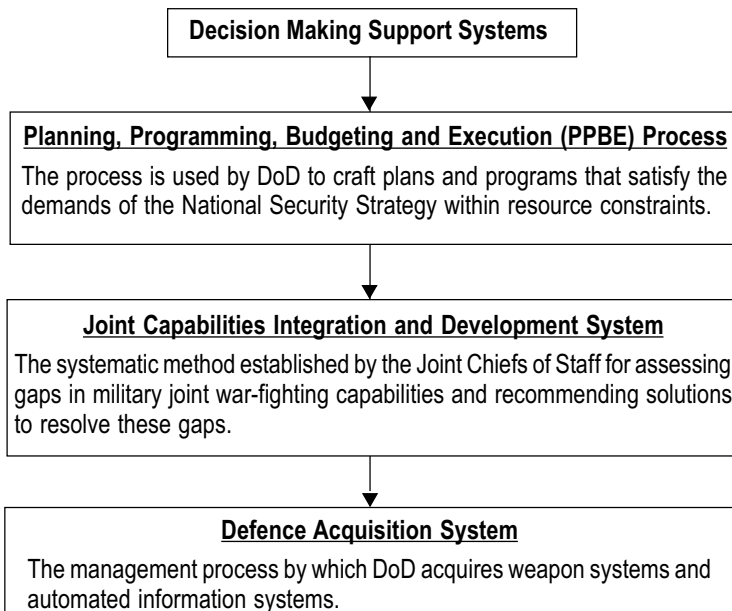
Both the Boards are further supported by subordinate groups in OSD known as Overarching Integrated Product Team (OIPT). Each OIPT facilitates communication and vets issues before the Boards' respective meetings. In this facilitator's role OIPT charters working-level Integrated Product Teams (IPT) for each review and manages their activities. At the Milestone Decision Point, the OIPT leader provides DAB or ITAB members with an integrated assessment of programme issues gathered through the IPT process as well as various independent assessments.

### Procedure

DoD has three principal decision-making support systems, all of which were significantly revised in 2003. These systems are as follows:

- a) **Planning, Programming, Budgeting and Execution (PPBE) Process.** It is really the starting point wherein the Secretary of Defence establishes policies, strategy and prioritised goals for DoD. The PPBE process consists of planning, budgeting and execution phases.

**Figure 3: Flow Chart of Decision Making Support Systems**



- b) Joint Capabilities Integration and Development System. It is a systematic method established by the Joint Chiefs of Staff for assessing gaps in military joint war-fighting capabilities and recommending solutions to resolve these gaps.
- c) Defence Acquisition System. It is the management process by which DoD acquires weapon systems and automated information systems.

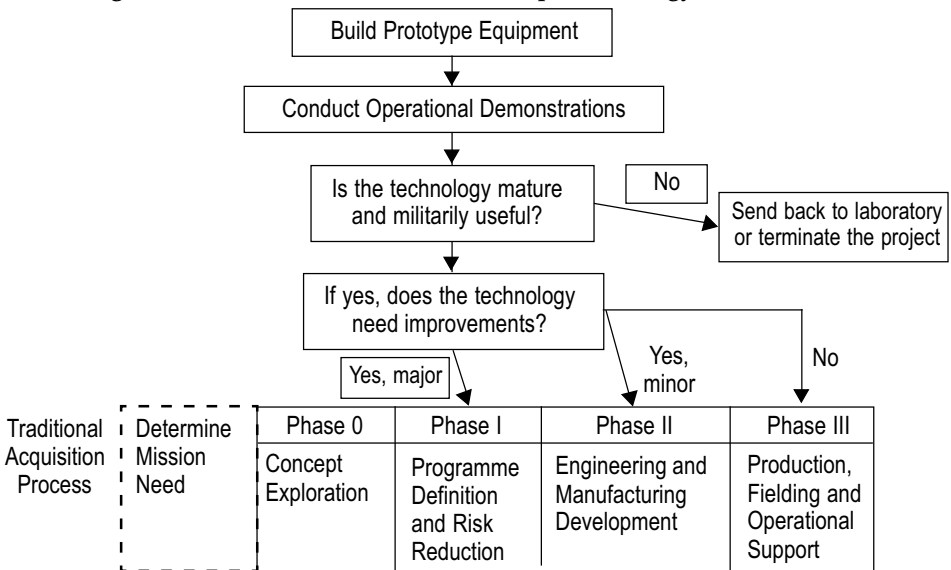
**Advanced Concept Technology Demonstration**

With a view to expedite acquisition process, Advanced Concept Technology Demonstration (ACTD) was introduced in 1994. The concept aims at offering comparatively stabilised technologies to the defence forces and let the commanders ascertain their suitability in operational environment. Thus, it is left to the commanders to determine whether the equipment offered meets their requirement in its current form or further developmental work is required. In this methodology, advantage is taken of the nation’s technological prowess to tell the military as to what equipment can be made available with the technologies mastered. Thus, time taken to develop new technologies as per the military’s requirements is eliminated.

**Salient Features**

Being the largest purchaser of defence equipment and the most advanced nation in military technology, US has an elaborate acquisition regime in place. Through the system of nominating Programme Managers, it follows a system of single point of accountability for accomplishing programme objectives for total life-cycle systems management, including sustainment. It is characterised by

**Figure 4: Flow Chart of Advanced Concept Technology Demonstration**



centralised policies and principles and decentralised and streamlined execution of acquisition activities.

## Germany

Germany is a key military player of Europe. As emergence of new tasks needs matching capabilities and identification of key capability gaps, it has been striving to fine-tune its defence acquisitions procedure to meet urgent demand for the acquisition and introduction of newer equipment.

'New Procedural Provisions for Identifying and Meeting Bundeswehr Needs' was issued in May 2004. It aimed to clarify misconceptions, resolve contradictions and reformulate individual stipulations. Recently, the German Ministry of Defence issued Defence Policy Guidelines on 27 May 2011. It spells out its equipment vision as follows:

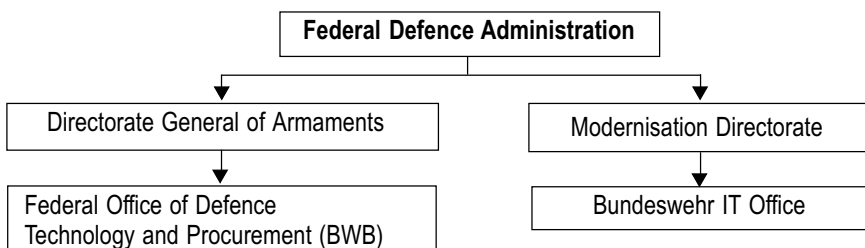
- Capabilities for probable operations in the future would require regular modifications and upgrades of equipment in terms of quality and quantity.
- The role of the defence industry is to serve the Bundeswehr. The German defence industry will continue to make a significant contribution to providing modern and powerful equipment as well as to in-service support. Bundeswehr and the defence industry alike will have to react flexibly to changing levels of ambition.
- Germany will procure what is required and affordable; it will not procure what people would like to have or what is offered. Priority is to be given to commercial off-the-shelf solutions. Short-term responses to urgent operational requirements must be guaranteed.

The Policy Guidelines finally conclude that it is necessary to restructure the procurement system against the backdrop of changed security challenges and with regard to increased efficiency.

### Structures

There are four organisations involved in defence acquisitions under Federal Defence Administration. They are Directorate General of Armaments; Federal Office of Defence Technology and Procurement; Modernisation Directorate; and Bundeswehr IT Office.

Figure 5: Structure of Federal Defence Administration



### Directorate General of Armaments

It is responsible for defence research and the planning of equipment and weapon systems (excluding IT) including their induction into the armed forces. Directorate General of Armament has seven divisions. Three divisions (1 to 3) are engaged in policy tasks and four divisions (4 to 7) are oriented along technical and technological lines. Division I handles armament planning and central affairs. It is responsible for organisation and supervision of the armament sector (less IT); operational tasks of the Directorate; armaments planning and situations, and development-planning proposals for development and procurements annual programmes.

Division II deals with economic, logistic and legal armaments affairs and disposal. The charter of duties of Division III relates to international armaments cooperation including multilateral bodies and equipment aid.

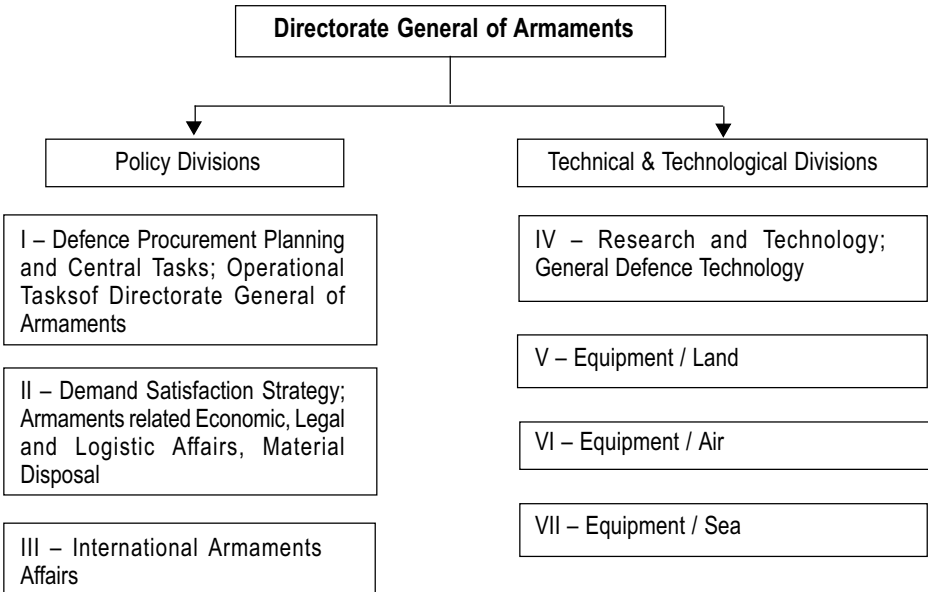
Division IV deals with research and technology and general defence technology. Divisions V to VII are organised to handle land equipment, air equipment and sea equipment respectively.

### Federal Office of Defence Technology and Procurement (BWB)

BWB is the largest technical authority in Germany. Its task is to ensure that Bundeswehr 's demands are met by supplying state-of-the-art technology and modern equipment at economic conditions. It has the central responsibility for the management of all armament projects (excl IT).

It has four project Divisions—Land Combat, Land Support, Air and Sea—and is responsible for:

Figure 6: Structure of Directorate General of Armaments



- Management of complex projects.
- Systems engineering and integration.
- Research and technology.
- Technical/economic aspects of in-service support management.
- Contract and price negotiations.

BWB is also the supervisory body for seven technical centres and two research centres, which are mainly responsible for:

- Technical consultation and support of the project management for components and equipment,
- Performance of studies, research and technology tasks,
- Performance of experiments and analyses.

In addition to the above, BWB has three service divisions—two deal with central administrative tasks and general technical and economic matters, the third service division is responsible for innovative, holistic procurement processes in the fields of operational procurement (case by case basis), strategic purchasing by means of interdepartmental contracts and complex service contracts.

**Modernisation Directorate**

The Directorate acts as a service provider oriented towards overall Bundeswehr interests—providing support services in a most cost effective way. It manages modernisation activities in terms of strategic corporate management. The Directorate provides active support for all modernisation projects, extensive provision of innovative, effective and secure information technology, direct management of private-public partnerships as well as the advancement of cooperation with trade and industry to improve economic efficiency and effectiveness of the Bundeswehr.

**Figure 7: Structure of Federal Office of Defence Technology and Procurement**

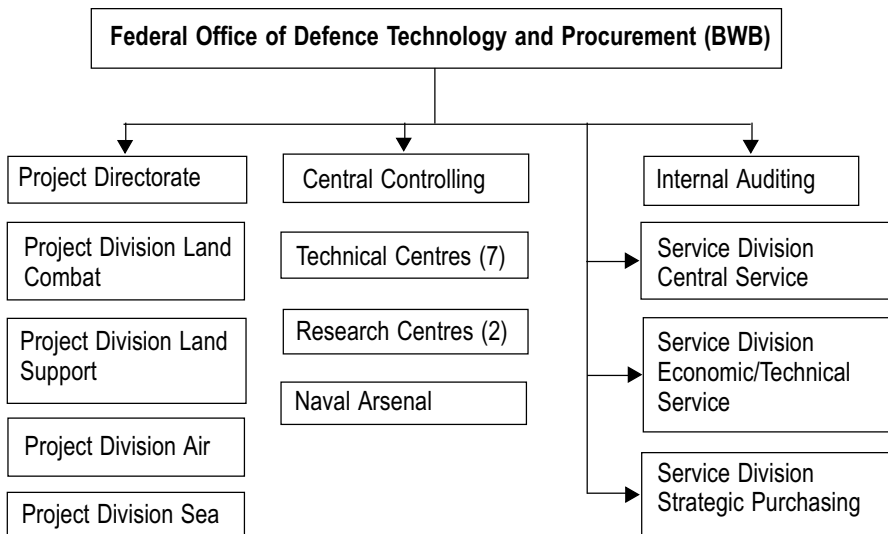
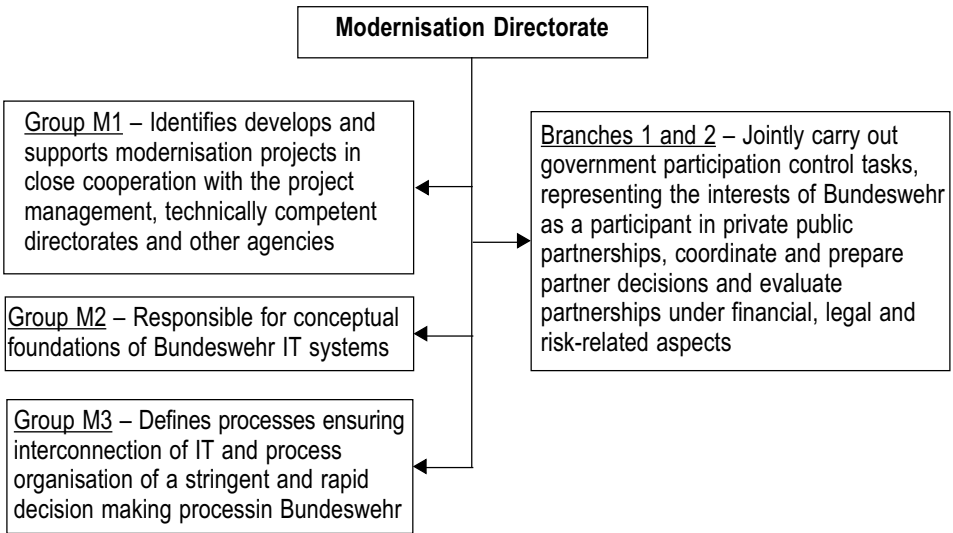


Figure 8: Structure of Modernisation Directorate



### Procedure

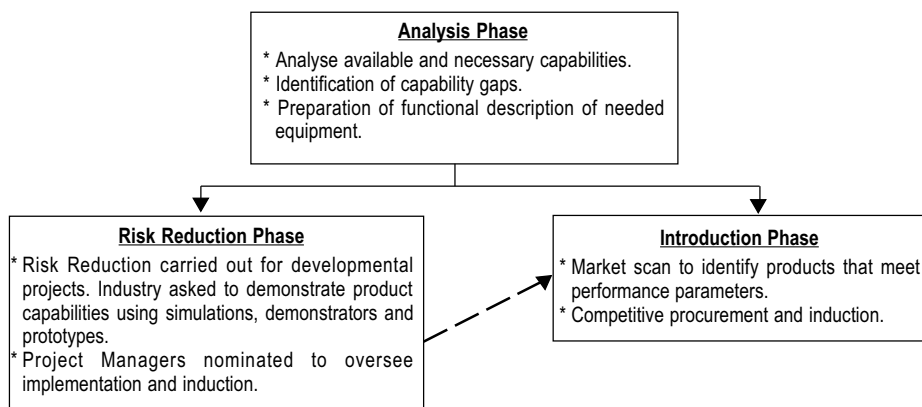
A major initiative was taken in 2001 when Customer Product Management (CPM-2001) procedure was issued for the identification and fulfilment of military requirements. It was a top down approach wherein system capability and functional requirements are derived from the military capability needed. Thereafter, contract is awarded to a prime contractor who translates performance requirement into equipment profile. It is for the prime contractor to identify and develop sub-vendors for sub-systems.

The defence acquisition procedure has been under regular review. Its latest version “Organisation, Procedures and Contracting” was issued in Sep 2010. The complete planning-cum-acquisition process has been divided into three broad but somewhat overlapping phases, as follows:

- Phase 1—Analysis Phase. This is really a part of the planning process. Four ‘Integrated Capability Analysis Working Boards’ are constituted under the Chief of Staff of Bundeswehr to analyse available and necessary capabilities for the entire German armed forces. Based on this comprehensive capability analysis, capability gaps are identified and solutions are investigated in five planning categories—personnel, operations, organisation, infrastructure and armaments. For armaments, a functional description is prepared for those requirements, which are essential for eliminating the deficit.
- Phase 2—Introduction Phase. A market scan is carried out and products that meet required performance parameters are identified and procured in a competitive manner for introduction into the service.
- Phase 3—Risk Reduction Phase. In case it is decided to have a new product developed, a risk reduction is carried out after the Analysis

Phase. In Risk Reduction Phase, industry is asked to provide a demonstration of product capabilities using simulations, demonstrators and prototypes. Before committing resources, it is ensured that the envisaged product would meet all performance requirements. Once a go-ahead is given, Project Managers are appointed. They are assigned responsibility to oversee complete implementation during the Risk Reduction and Introduction Phases.

**Figure 9: Planning and Acquisition Process**



### **Salient Features**

Germany considers strategic partnership between Bundeswehr and trade and industry indispensable for maintaining modern and efficient armed forces. The industry is respected for its high speed of innovation. Contracts may be awarded to the industry for the following:

- Study and research contracts in the Analysis Phase.
- Development Contracts or contracts covering co-use of products/facilities in Risk Reduction Phases.
- Development contracts, purchase contracts and contracts for work and services in the Introduction Phase.
- Contracts in the in-service phase.

Finally, the underlying philosophy of the German defence acquisition regime, as aptly summarised by the German Defence Minister in March 2010, is based on three questions: 'What is being required?'; 'Which are the alternatives?'; 'Which of the alternatives is economically priced while still providing the required performance?'

### **France**

With the objective of making itself self-reliant in defence production, France adopted a centralised system of defence acquisitions in 1961. The French model is unique and is considered highly successful.

Like India, France follows five-year defence plans (the "Loi de

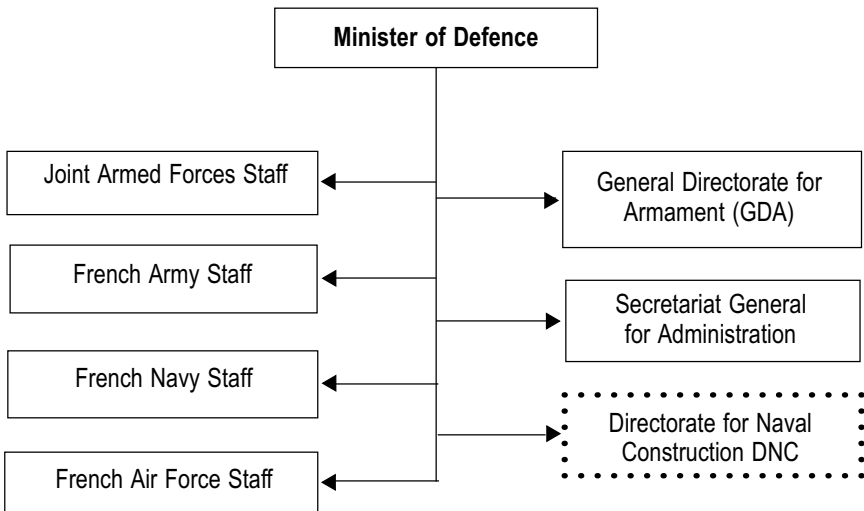


programmation”). The plans are quite exhaustive in detail and include equipment procurement schedules with required resource allocation. Within the overall budgetary estimates of the plan period, the Government allocates a yearly budget.

For conducting all facets of armament programmes, an empowered overarching authority has been put in place under the Ministry of Defence. A corps of highly competent and technically qualified individuals has been created to oversee the requirement of modern war systems by the French armed forces, analyse various options, identify the most appropriate route, facilitate development and ensure induction.

Special attention is being paid to ensure adherence to timelines and cost estimates. It was analysed that failure to stick to them was primarily due to the lack of necessary expertise with the acquisition functionalities, involvement of multiple agencies in oversight functions and the cost-plus contracting system that provided loopholes to contractors to inflate costs. Necessary reforms were initiated. Acquisition functionalities were trained and equipped to perform their assignments. Innovative techniques have since been developed for estimating realistic cost and risk potentials, thereby ensuring cost containment. Additionally, an element of accountability has been introduced. Persons responsible for cost overruns are held answerable.

Figure 10: Higher Defence Organisation



**Structures**

General Directorate for Armament (Direction générale de l’armement), or DGA in short, is the government agency responsible for programme management, development and procurement of weapon systems for the French armed forces. It manages about 80 percent of defense equipment budgets with the balance being utilised by the military services.

DGA has a three-pronged mission. One, it is responsible for the design,

acquisition and evaluation systems that equip the armed forces. Its work covers the entire life of these programmes. Two, it prepares for the future, anticipating threats and risks, preparing the technological and industrial capabilities. Finally, it actively contributes to promoting exports. Additionally, DGA provides overview of the weapon systems to ensure their global coherence; possesses an ability to manage risks to drive complex projects; and has mastered unique ways to survey and test systems.

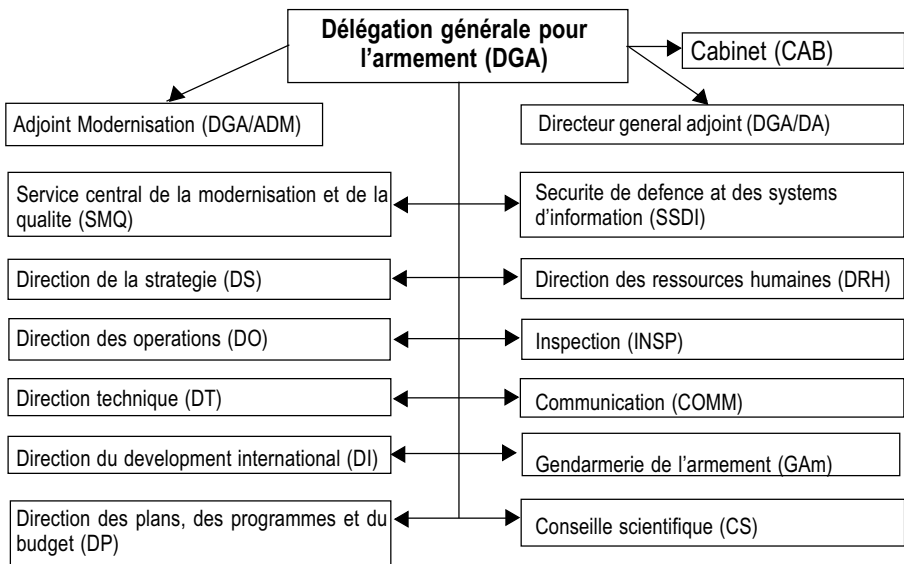
DGA is a large organisation consisting of 12,000 employees at 20 locations in France. DGA is a major catalyst in the economic development and exports of French defence companies. Whereas it placed 9.114 billion euros worth of orders on the French industry, French defence exports exceeded 4.2 billion euros in

2010. It invested 635 million euros in research contracts notified to the industry in 2010 and currently has 80 weapons programmes in progress. It has developed highly fruitful public/private partnerships and evolved innovative financing methodology.

DGA has a central corps of armament engineers providing leadership for the organisation. An array of military and civilian personnel provides the necessary technical and operational expertise. Integrated Programme Teams consisting of DGA and the military officers manage programmes. DGA functions through its directorates. They carry out the following responsibilities:

- Monitor research activities, conduct common technology development and prepare programmes for development, ensuring technical consistency within the forces' systems.
- Oversee design and development of land, naval, aeronautical and tactical missiles programmes.

Figure 11: Structure of General Directorate for Armament (DGA)



- Management of funds including budget preparation with responsibility for procurement, quality and logistics support.
- International armaments cooperation with European and NATO countries.
- Support development of French defence industry.
- Coordination of development and implementation of export strategy and promotion and control of French armament equipment exports to foreign markets.
- Provision of technical expertise and skills needed by programme managers and other agencies.

In addition to managing research, development, production and testing of weapon systems, DGA oversees the functioning of government's industrial entities like shipyards and repair depots.

DGA also undertakes testing and assessment of equipment and military technologies through a vast network of test centres that function under it. In addition, DGA supervises engineering schools like École Polytechnique that function under the aegis of the Ministry of Defence.

### ***Procedure***

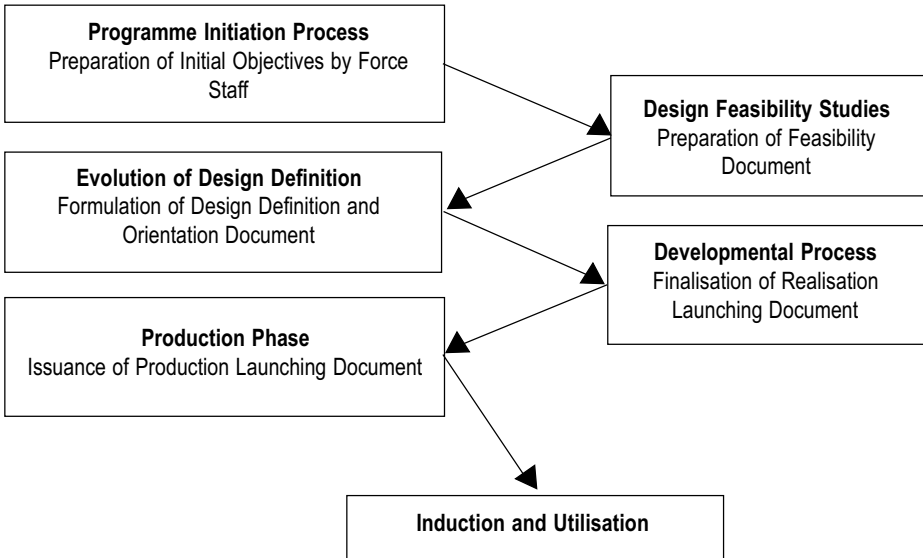
The acquisition process is divided into the following broad phases, characterised by the types of work involved:

- (a) Preparation Phase. Operational requirements are outlined, with possible solutions evaluated with a look at their risk, cost effectiveness and life cycle cost implications.
- (b) Feasibility Phase. To move into the feasibility phase, a feasibility file is prepared and gets approved by the Minister of Defence after it has gone through the Permanent Executive Committee. It searches for possible answers and their assessment, in terms of the degree of satisfaction they can bring to the military requirements—still expressed in general terms.
- (c) Definition Phase. In this phase the responsibility passes to the Programme Manager. This phase is entered when one or more approaches appear to meet the military need and can be selected for a more thorough examination. During this phase the military requirements (including the need for support, environment and training, technical specifications, schedules, costs and industrial conditions) are refined.
- (d) Realisation and Development Phase. Once the system has been sufficiently identified, it enters this phase. At this point the DGA may also commit to production or partial production. This phase terminates with delivery of the complete product, along with the necessary training and support system.

### **Salient Features of the System**

French defence acquisition system has certainly been an unrivalled success. Creation of a unified and centralised monolith DGA in 1961 to oversee all facets

Figure 12: Acquisition Process



of weapon development, procurement and induction was a bold and inventive step. The model has become a subject of frequent studies by other countries.

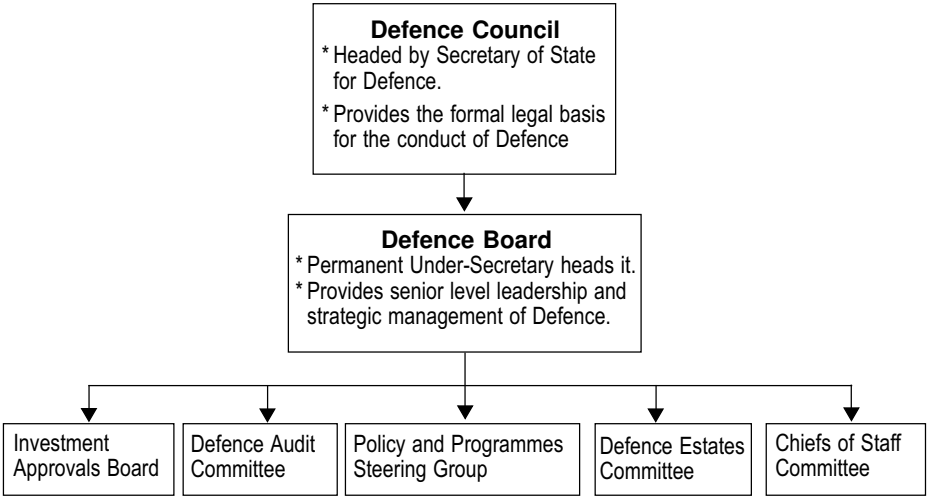
The French system is characterised by the extraordinary technical competence of the acquisition staff of DGA. DGA recruits the best talent and grooms it through prolonged exposure and extended tenures. It is often said that DGA staff know more about emerging technologies than the scientists and producers of equipment. Such technical skills help DGA in close monitoring of developmental timelines and cost overruns. The industry is fully aware of the fact that DGA functionaries cannot be bluffed. Resultantly, French system has been able to keep a good check on cost escalations.

### The United Kingdom

The stated purpose of the British defence acquisition regime is to provide needed capability for defence, ensure value for money for the taxpayer and sustain a responsive defence industrial base. Its defence acquisition translates industrial capacity into effective military capability and provides the British Armed Forces with the battle-winning equipment, support and infrastructure they need to defeat the enemies—current and potential.

The Defence Council is the senior departmental committee. It provides the formal legal basis for the conduct of defence in UK. The Defence Council is chaired by the Secretary of State for Defence. The Permanent Under-Secretary chairs the Defence Board (DB). The DB is the main corporate board of the Ministry, which provides senior level leadership and strategic management of defence. Its role is to deliver the Defence Aim set out in the Public Service Agreement. There are three main strands to the Defence Programme:

Figure 13: Higher Defence Organisation



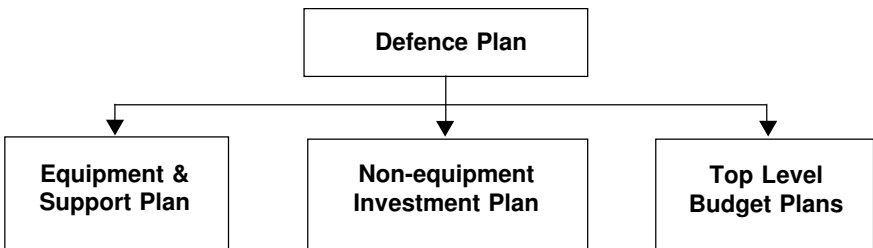
- (a) The procurement of new capability (whether new equipment or major upgrades) is managed through the Equipment Procurement Plan, which is 30 years long.
- (b) Provision of equipment support, which is planned 10 years in advance through the Equipment Support Plan.
- (c) Planning for investment in equipment which are not for military use (predominantly IT projects and infrastructure) are made by the Central Defence Resources Team and are included in the Non-Equipment Investment Plan, which is also 10 years long.

A planning process, known as the Planning Round, is used to support construction of the Defence Plan which comprises three key sets of forward plans—the Equipment and Support Plan; the Non-Equipment Investment Plan; and Top Level Budget Plans.

The acquisition community is large and diverse, and is supported by other Government Departments. Within the Ministry of Defence (MOD), the acquisition community includes:

- The Capability Sponsor (Deputy Chief of Defence Staff (Capability) (DCDS(Cap)))

Figure 14: Planning Round

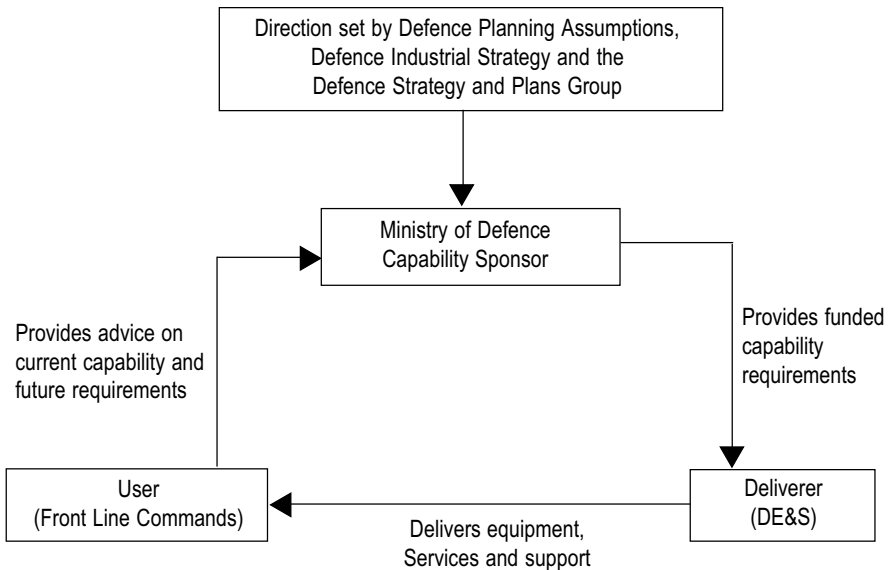


- The User who generates the Force elements
- Delivery teams who contract for equipment, infrastructure and services
- Finance and Planning teams
- Research and Development teams
- Commercial teams
- Technical Support teams
- People Services teams.

### Structures

Two structures play dominant roles in the British acquisition process—the Joint Capabilities Board (JCB) and Defence Equipment and Support (DE&S). JCB performs the role of key Capability Sponsor and DE&S is the implementing authority.

**Figure 15: Tripartite Structure of Equipment Procurement Planning**



### Joint Capabilities Board (JCB)—the Capability Sponsor

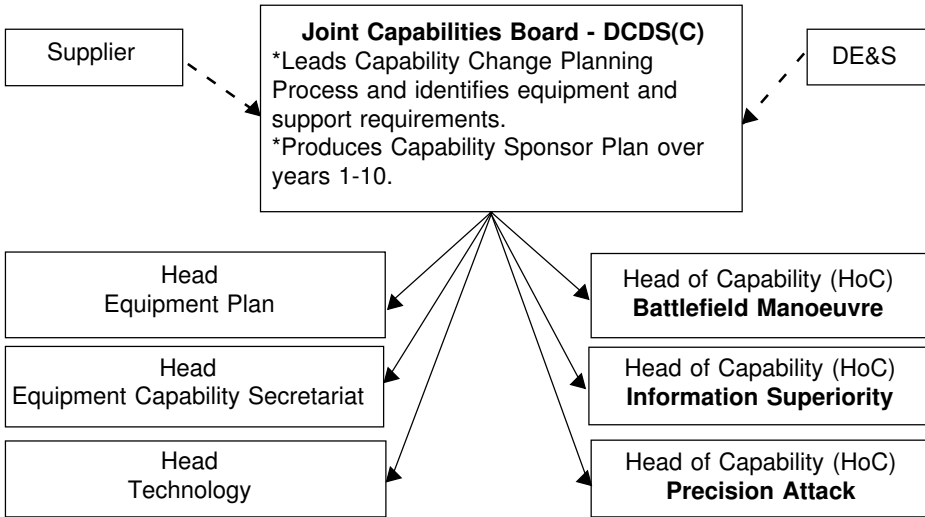
JCB provides strategic leadership and direction, in order to deliver a balanced, coherent and affordable Capability Sponsor Plan to meet MOD policy requirements. It makes high-level investment decisions within and across the organisation's three capability areas:

- Battlefield Manoeuvre
- Information Superiority
- Precision Attack

JCB is headed by the Deputy Chief of Defence Staff (Capabilities), or DCDS(C)

for short. Its role is to decide what capabilities the forces need and work alongside the supplier and DE&S to deliver the required equipment or systems. Heads of Capability (HoC) act as Programme Sponsors of new and enhanced equipment programmes.

Figure 16: Capability Sponsor



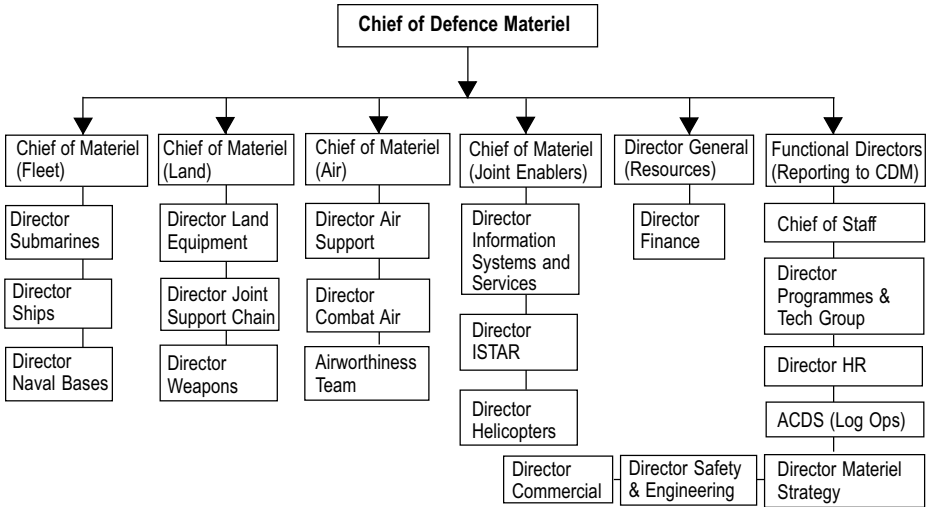
There are three other key areas within the Capability Sponsor—Head of Equipment Plan, Head of Equipment Capability Secretariat and Head of Technology.

### Defence Equipment and Support (DE&S)

The Defence Procurement Agency and the Defence Logistics Organisation were merged in April 2007 to create a single Defence Equipment and Support organisation (DE&S). It is responsible for delivering the 10 year equipment-and-support plan, managing resources in-year to meet the needs of the sponsor and the military front line users who have delegated responsibility for years 1-4 of the support element of the plan.

DE&S meets the needs of the sponsor by analysing the stated performance requirements, availability of matching market capability and degree of maturity of related technology. Solutions are presented with a clear understanding of financial and commercial risks. DE&S manages delivery of these solutions by planning and managing projects, services and assets to ensure that equipment and support is delivered and sustained through life. This includes working with front line users and sponsors to shape the concept of use, forward plans and deployment options for equipment and support.

Figure 17: Defence Equipment and Support Organisation Chart



**Procedure**

The services are asked to provide basic Cardinal Points Specifications (CPS) only. These are operational parameters specifying performance requirements in very broad terms. It helps in studying the projections in detail and decide on ‘make’ or ‘buy’ decision in consultation with the research and development agencies and the defence industry. Even the procurements are carried out on the basis of CPS, which are made known to all the producers.

It is a very ingenious method, in which the producers while conforming to CPS can introduce innovative techniques and ideas. All products, which comply with CPS, are trial evaluated by the services to identify the most suitable one for introduction into service. This also provides a common platform to judge different technologies for futuristic adaptation and further research.

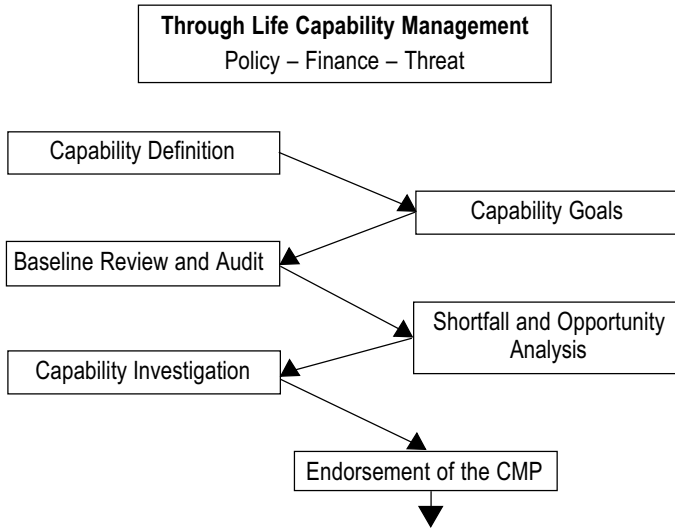
Capability planning translates the requirements of defence policy (and the strategic challenges) into an approved programme which defines the capabilities UK requires through life. There are four basic variants on the acquisition lifecycle—Sequential, Incremental, Evolutionary and Combination. The key factors in determining the long-term success of a military capability is the selection of the appropriate lifecycle and the development of the most appropriate Acquisition Strategy.

These options might include the procurement of new military equipment or services, upgrades to existing equipments or services, or changes to the support arrangements. Performance, cost and time are traded to optimise capability. This process produces a Capability Management Plan (CMP) for each capability area which adopts a through life view, seizing opportunities to reduce whole life cost, and with flexibility to respond to changing threats and opportunities.

Following Ministerial decisions on resources and priorities, CMPs are



Figure 18: Capability Planning Process



incorporated into a single integrated 10-year equipment and support plan. This brings together the plans for capital investment in new equipment, with the support consequences for both current and future equipments. Defence Science and Technology is responsible for the Defence research programmes to provide the scientific understanding and the new technologies to meet this key need.

### Special Features

The British defence procurement regime is characterised by continuous reforms. Defence Acquisition Change Programme (DACP) was a major initiative to 'bring about a step change improvement in acquisition performance—in the delivery of capability to the Front Line and value for money for the taxpayer—through creating a more agile acquisition organisation system and managing capability through life'. Although DACP formally closed on 31 March 2009, reforms are underway to implement the programme.

Another aspect is early engagement of the industry for greater realism. National Defence Industries Council (NDIC) is the forum in which MOD and the industry meet to discuss important issues and develop policy and practice through a range of joint activities.

### Conclusion

As seen above, all defence acquisition systems have to contend with two recurring problems—over-specified demands of the armed forces and time-cost overruns. That is the challenge they have to overcome. Even though the above-discussed systems are still evolving, they are considered effective enough to deliver. Their study reveals the following key commonalities:

- (a) Incorporation of the defence industry in the defence acquisition process at the outset.

- (b) Exploitation of mastered technologies.
- (c) Unambiguous delegation of authority (with corresponding accountability for performance) to the nominated entity.
- (d) Independent trial and evaluation agency.
- (e) Highly qualified and trained acquisition staff with prolonged tenures.
- (f) Innovative pricing methodology.

It will be inadvisable for India to attempt replication of any foreign model. However, cognizance must be taken of the above mentioned key commonalities to improve its defence acquisition system.

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# Organisational Structure and Procedural Framework for Defence Acquisition in Brazil: The Challenge of Technology Transfer

*William de Sousa Moreira*

## **Introduction**

The national defence requires attention, focus and expertise in the management of resources, both human and material, needed for the preparation and use of force, notably the armed forces. Geostrategic and socio-political conditions particular to Brazil, have caused Brazilian governments to turn their attentions to prevailing high social demands. In doing so, any defence spending must be consistent and justified to be viewed as acceptable.

The preparation of the material base for the armed forces is therefore a constant challenge. The responsible leadership in this sector of the government must optimize the share of social effort for the defence budget, as the magnitude of resources involved make the decisions vital to national security. Therefore, government procurement of defence materials requires technical knowledge, careful planning, organisation and clear methodology to be effective, as they take place in an environment of uncertainty.

Uncertainties are inherent in the process of choosing suppliers and technological options, in economic crises and the possible consequences on the defence budget. It is also vital to have established the capability to absorb and maintain the technological knowledge acquired and to meet operational requirements and interoperability both between services and internationally. Finally, there are many uncertainties that derive from the dynamics of the global defence market. In order to effectively deal with these dynamics one requires a specialized acquisition service, trained and qualified to lead acquisitions across all branches of the military.

According to Mr. David S. Sorenson, in a system that involves so many institutions, actors and billions of dollars, there will always be problems. He

points out some obstacles that may crop up in defence acquisition processes, like the difficulty to reach specifications and performances; the need for additional research and development effort; spiralling costs and delays, among others<sup>2</sup>. In developing countries, we even have to cater for barriers in the transfer of technology, the technological gap and dependence on the developed countries. To cope with this complex dynamic process, Brazil needs specialisation.

The last two decades have brought substantial changes to the international system. The continued advancement of science and its technological applications in the arms industry is one of its most sophisticated expressions. This sector is responsible for a significant part of the advanced military power's economies and employs large numbers of highly skilled workers.

In historical perspective, the global arms market has suffered many oscillations due to presence or absence of conflicts, sometimes contracting (post-cold-war) or sometimes expanding (post-11/9). It is, therefore, difficult to formulate long-term predictions for this type of market<sup>3</sup>. But factually, new products are offered each year, often foreshadowing revolutions in the military capabilities, which makes the decision-making processes even more complex.

In a multifaceted and complex international environment, Brazil has emerged, politically and economically, reaching the status of the world's seventh largest economy with even more auspicious prospects for the coming decades. The process of democratisation, economic growth and social inclusion has stimulated a higher participation of the society in defence related topics and demanded a higher participation of the political institutions in the formulation of strategic thinking and in the preparation and deployment of the armed forces (AF).

This new reality has initiated discussions about defence issues and demanded the publication of political thinking about defence at the highest level. Two recent examples include the National Defence Politics<sup>4</sup> and, more recently, the publication of the National Defence Strategy (NDS) in December of 2008<sup>5</sup>. Through these documents, the Brazilian government clarified its' understanding of the main issues related to national defence, as well as issued guidelines to regulate the preparation and employment of its' defence forces, giving it more integrated and holistic treatment. The search for better articulation and equipment for the armed forces was the central theme of the latter document.

The NDS is a result of a year-long discussion in which the Defence Ministry sought to listen to other sectors of society and to include the issue on the national agenda. The process of the NDS formulation has become a marker in recent Brazilian history and, along that period, the issue of defence equipment was raised, highlighting the importance to minimize external dependence in terms of defence equipment acquisition.

In this sense, an important aspect of the NDS is the obvious desire of the country to no longer be a mere purchaser of arms, but to become a partner for production and development of the technologies involved. This is an explicit stance that aims to allow the technological leap needed to redeem such liability that we understand is incompatible with the new Brazilian international

insertion. This desired transition from buyers to partners remains a huge challenge. To overcome such barriers it will be necessary to involve both the public and private actors with responsibility for national development.

Obviously, reducing the technological gap, particularly pronounced in the critical areas of defence products, requires concentrated actions in multiple sectors of the state and society. Academia, public and private industry, among others, must participate in this process. In this regard, the concept of technology transfer has achieved remarkable importance. It has become a mandatory requirement for the varieties of weapons and combat systems acquisitions, particularly those which embodied high technology programs.

To further establish this point, the defence acquisition processes are now powerful tools. This paper aims to explore structural issues related to these processes, the changes that have been implemented and their objectives, as well as the challenges in the desired absorption of technology.

### **Obtaining Products of Defence (Defence Acquisition)**

In terms of obtaining defence products, Brazil has a tradition marked by decentralisation in the former ministries of the Navy, Army and Air Force, with coordination efforts carried out by the fourth military ministry, the General Staff of the Armed Forces (GSAF), considering their peculiarities and interdependence. These former ministers enjoyed extensive autonomy in the force planning, including the use of specific funds made available for system purchases. They advised the government and Congress individually with regard to necessary equipment and platform programs, as well as their possible sources of acquisition.

Whenever possible, they opted to buy or develop domestically. In the first half of the twentieth century and into the 1960's, the country had formed a limited military industrial base, integrated into the organisational structure of its own armed forces<sup>6</sup>. In the 1970s, a vigorous defence industrial base developed and reached its peak in the 1980's<sup>7</sup>, but was not able to remain competitive in the 1990's.

Nevertheless, the purchase of high-tech equipment, such as combat systems for sea, air or land based platforms, was often resorted to foreign companies. Furthermore, many requirements were only fulfilled through opportune acquisitions<sup>8</sup>, where the range of choices was limited and many times reduced to a single option.

The creation of the Ministry of Defence (MoD), in June of 1999, transformed the military ministries to individual force commanders and the former GSAF was eliminated. This created better conditions for the integrated treatment of military matters. Since then, the Brazilian Government, mainly through the MoD, has been engaged in improving the system of procurement of defence products through a more holistic approach. This process matured over the first decade of the MoD, recently achieved legislative expression and is deserving of special mention:

- Decree N<sup>o</sup> 6.703, of December 18 of 2008. Approved the National Defence

Strategy (NDS), through which the formulation and implementation of procurement policy of defence products will be centralized in the Ministry of Defence, under the responsibility of the Secretary of Defence Products.

- Complementary Law (CL) N° 136, of August 25 of 2010. CL Amendment N° 97, of June 9 of 1999, that “Provides for the General Standards for the Organisation, the Preparation and Employment of the Armed Forces”. Empowers the Ministry of Defence to formulate policy and guidelines related to defence products used in operating activities, including arms, ammunition, transportation and communications, uniforms and materials for individual and collective use, being admitted to the Forces Delegations<sup>9</sup>.

The CL 136/2010 introduced mechanisms that politically strengthen the Ministry of Defence. In the area of military acquisition, the law gives it the powers to formulate policies, to issue guidelines and develop the budget plan as well as to exercise the central role in the consolidation of individual services proposals, while staying in line with the priorities established in the END and the Budget Guidelines Law.

The policy of obtaining high-tech defence material includes the provision, if appropriate, to establish external partnerships guided or conditioned to the transfer of technology, aiming to increase the capacity of the national defence industry and to reduce external dependence.

As mentioned previously, Brazil will no longer be a mere buyer of foreign defence firms, but intends to develop strategic cooperation that leverage indigenous capabilities, enabling the transfer of a substantial part of the R&D efforts and production of platforms, systems, equipment and required components to Brazil.

It is important to note that this new regulatory framework indicates a substantive change in arms procurement, as Brazilians move from a tradition of decentralisation and autonomy in weapons acquisition, to a more integrated centrally managed process. This new process is headed by Ministry of Defence, under a specialized department, allowing for the possibility of selective delegation of executions to the individual Forces. It comes as a natural consequence of a process of “integrative transformation” undertaken by the Ministry of Defence that, without neglecting the specific requirements of each of the services, seeks to provide integrated treatment to factors that by acting together can generate synergistic effect.

Moreover, the possibility of delegation of authority improves the management flexibility, since in each case, it allows exploring the advantages of centralisation or decentralisation and avoiding the corresponding disadvantages. Studies show that, in general terms, centralisation of the acquisition process bring benefits but also disadvantages. The benefits are derived primarily from the economy of information efforts, scale and processes that enable greater efficiency in the overall implementation, reducing process costs, lower purchase prices, the availability of skilled human resources,

standardisation of products and services purchased and viability of global purchasing (“global sourcing”)<sup>10</sup>.

However, exacerbated centralisation may cause difficulties in the consistency of specifications, especially when the needs vary according to different operating environments<sup>11</sup>. It may generate higher transportation costs, particularly in a country with vast territory and centres of redistribution located far apart. Centralisation may also increase costs of coordination with the need for investment in technological infrastructure of information and communication technology. The study draws attention to the fact that the “most important decision is not to centralize, but to identify some appropriate cases of centralisation” (GARCIA, *Loc. cit.*).

It is arguable that the experience accumulated in the twelve years of the MoD enabled understanding that the benefits of centralisation can overcome their disadvantages, especially when it reserves the right to perform authority delegations. In other words, it reserves the right to permit selective decentralisation in some appropriate occasions.

Actually, the centralisation seems to meet the wishes of important sectors, particularly the defence industrial base. This sector often highlights the difficulties that it faces, as the monopolistic nature of the market in which it operates, and where the government is the single buyer; the technological gap relative to foreign companies, and the uncertainties of the defence budget, ranging from fluctuations to the discontinuity of allocations and the limitations of defence planning. Aggravating this perception is the low priority given to the sector in the last decades; the taxation; the difficulty in attracting funding according to the required securities and the uncertainties relating to the regularity of future demand. All which reduces the willingness to invest, as well as creates a reluctance to enter the external market<sup>12</sup>.

The long-term integrated planning can be more foreseeable to the business sector, to the extent that the development of technological solutions is a time consuming task for defence industries, whether they seek self-development or the establishment of partnerships to acquire skills. Also, such predictability tends to facilitate the vertical integration of the production chain. The relevant companies can participate in the process from the initial conception, design and prototype development to subsequent courses. In this model, the national industrial sector can manifest its full potential.

On the other hand, when decentralisation is predominant and the purchasing processes are getting thrown into isolation, indigenous companies tend to be at a competitive disadvantage when compared to large foreign suppliers of defence products, mostly due to the complexity of the items and the short delivery time. Furthermore, the planning capacity is reduced and the defence industrial base experiences more difficulties, increasing the tensions between the supplier and the buyer – usually the government<sup>13</sup>.

The potential advantages of the centralized model are only realized completely if the MoD achieves the ability to implement effective plans of equipment requirements and long-term relationships. The appropriate



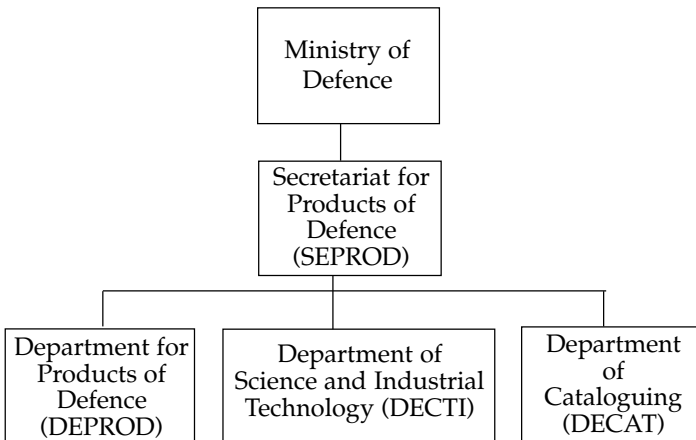
management of the purchasing power of the Government plays a fundamental role in the viability of projects. This requires predictability and stability of budgetary allocations, without which no model will result successfully.

Another advantage of centralizing is the ease of inserting interoperability requirements in the projects of defence products. Such requirements are fundamental to allow the joint operation of the armed forces (AF) and, when necessary, the operation with other forces of the State. This advantage is more difficult to obtain when the demands are generated within the walls of individual forces. It is also easier to put together and to maintain highly specialized development teams. In this case, skills can be more easily improved and accumulated, allowing progress on the practices and methodologies, particularly in projects and contracts development.

The experience seems to show that, given the circumstances, the advantages of centralized system tend to overcome the inherent disadvantages. Thus, to better conduct policies and guidelines relating to defence acquisition, the natural step was the creation of the Secretariat of Defence Products (SEPROD), reporting directly to the Minister of Defence. This was an important and challenging structural innovation, which deserved from the Minister of State for Defence an emblematic comment:

The French General Directorate for Armaments (GDA), responsible for the whole process of acquisition of ordinance used by the armed forces of that State, has 13.000 employees and has completed, this year, 50 years of existence. Our newly created Secretariat of Products for Defence (SEPROD), which would be the functional equivalent of the GDA, has no more than a few dozen of employees. This comparison should not serve to discourage us. On the contrary, is a prime example of work that is left to do and the huge opportunities for advancement that will be open in the near future. (Nelson Jobim. Speech at the opening ceremony of the "Latin American Aero & Defence"—LAAD-2011 exhibition of armaments).<sup>14</sup>

#### **Organisational Structure of SEPROD**



The SEPROD was established with three departments, one of defence products, another for science and industrial technology and a third focused on cataloguing. These three major organisational elements have responsibilities in the pursuit of goals that gave rise to the Secretariat.

They will create staff and accumulate knowledge and expertise related to the processes of purchasing defence products, getting to know the conceptual underpinnings and legal norms, the actors and responsibilities involved and the people in every bureaucratic instance to be reached. They will study the global trends of defence markets, the opportunities for partnerships at the domestic or regional level, the socioeconomic and security background, the management of government purchasing power, combined with the branches of government, Congress, industry, commerce and society in general, and finally develop the whole array of knowledge necessary for efficiency and effectiveness of procurement of defence products. It is also noteworthy that both the developed and developing countries have established high education institutions with courses dedicated to “defence acquisitions”. It shows the concern and the importance attributed to this activity<sup>15</sup>.

A fundamental issue that has been advocated by the Minister of Defence is the need to adopt a military program law that ensures the regularity of budgetary allocations, providing stability and sustainability to the strategic projects for defence. Being a long term and both technological and scientific knowledge intensive, these strategic projects demand long-term planning and development. The mentioned law is considered a key measure in a democratic system, due to the alternation of power every four years that tends to channel resources and attention to high profile projects with short-term results. It is an old aspiration of the AF, who has already suffered with projects heavily impacted in terms of cost and schedules due to budgetary oscillations (cuts and contingencies) and uncertainties.

In this vein, the law for Amendment of Defence Industry, presently in process of being formally approved, establishes special rules for the acquisitions and hiring of defence products and systems. It provides that the strategic defence enterprises have access to special tax and financing rules. Additionally, it establishes the Special Tax Rule for the Industry of Defence. It is also worth mentioning the issue of ORDINANCE N<sup>o</sup> 1.213—MD, of 16 May 2011, which constituted the Standing Committee of Products and Services for the Defence—CP-Prode, in order to “coordinate the actions for purchase of defence products and services that, by their usage by AF, must be acquired under the guidance of MoD”.

Currently, the normative efforts are clearly trying to increase the autonomy and technological self-reliance of the national defence industry. It is a comprehensive approach, with the government prioritizing the Brazilian contribution in the global economic system, by expanding the national capacity for innovation.

As an example, the NDS highlights the need for the legal and regulatory framework and special tax provisions, aimed at “protection of private national

defence companies from the risks of immediate market", using as required the power of government for purchases<sup>16</sup>. For areas of critical technology, which require extensive research and development (R&D) effort and large medium to long term investment with considerable risks, which would typically inhibit the private interest, the intention is to work through the state sector.

To be competitive in foreign markets, the strategy encourages partnerships at regional levels within the Union of South American Nations (UNASUR), in order to achieve a synergic effect of complementarity of existing capabilities and to mitigate the problem of high cost of research and development and large scale production by carving out a regional market for defence products.

Regarding the scientific-technological gap, the partnerships seek to mitigate and to eliminate gradually the need for external procurement of defence products and services. The initiatives will be more in line with Brazil's foreign policy, in order to reflect wider strategic partnerships in the international arena, focusing on cooperation in defence and development. Brazil seeks an international order based on multilateralism and an appreciation of plural and distributive planning, with more qualitative participation of the developing countries in the decision-making forums of the international system. This will demand the reform of international institutions that do not reflect this view.

It is worth emphasizing the importance of the National Defence Industry Policy (NDIP), edited on July of 2005<sup>17</sup>. The paper proposes the strengthening of the industrial base of defence (IBD), defined as the set of state and private enterprises, civil organisations and military personnel engaged in research, development, production, distribution and maintenance of "strategic products for defence". These, in turn, are understood as goods and services, which, by the peculiarities of procurement, production, distribution, storage, maintenance or use, may affect national security or other defence purposes.

The NDIP is also an effort to raise the awareness of Brazilian society of the value of IBD as a tool for development and defence as well as a tool to decrease the dependence on foreign strategic defence products. It aims to reduce the tax burden on the IBD, with special attention to the distortions related to imported products; to expand the armed force's ability to acquire strategic products for defence in the national market; to improve the technological quality of products for strategic defence; to increase the competitiveness of the IBD to expand exports; and finally to improve the industrial mobilisation capacity of the IBD<sup>18</sup>.

The approval of the bill for defence products enables the aforementioned review of the NDIP.

The greatest strategy is to associate defence to development and vice versa. These two aspects complement and support each other, forming a binomial inducer of inclusive social progress.

### **Actors in Defence Acquisition**

As already mentioned, the Brazilian defence system is experiencing many transitional aspects. Previously, the process for equipment acquisitions was carried out by each of the AF with great autonomy, through procedures

essentially intramural, although they depended on the formal approval of higher bodies of the executive and legislative branches. Today, a more integrated and centralized model is in the implementation phase by the MoD.

In terms of force planning (determination of needs), the individual services conduct their sub-sector planning following policy orientations included in documents of strategic level which bind them within political constraints. In this aspect, the National Defence Policy and the National Defence Strategy are worth mentioning. Other guidelines for the sectorial level (Ministry of Defence) are added, such as the Policy and the Military Strategy of Defence, among others. The Federal Constitution, the country laws and the International Acts are continuously taken into consideration.

In this process, strategic evaluations give rise to threat perceptions or employment prospects of the AF and, on that basis, material needs are identified, quantified and consolidated in a plan. Then, the boards of each Force start identifying options and suppliers and act in accordance with the acquisition process steps. Concerns about regulatory framework are ever-present throughout the process and at times it may be necessary to have a special ratification of the bidding exemption, by a special committee. When the various alternatives are established and thoroughly checked, a proposal is sent to the Minister of Defence.

For the final decision, the Minister of Defence advises the President, who may rely on other special government structures for advice. One of them, in particular, is the National Defence Council (NDC), specifically engaged when purchases may have political and strategic implications of a major character. The NDC is composed by the Vice-President, the president of the Senate, the House of Representatives, the Ministers of Justice, Defence, Foreign Affairs and Planning, and the Commanders of the Navy, Army and Air Force. The task of the NDC secretariat is exerted by the Office of Institutional Security. As an example of such kind of acquisition, we could cite the case of aircraft carrier São Paulo (ex-Foch), which was submitted to and supported by NDC.

In the governmental sphere, the Ministry of Planning and Budget Management (MPBM) evaluates the negotiation process for obtaining external funding for the projects by the private or public sector entities with multilateral agencies and bilateral credit. The Foreign Financing Commission (COFIEX), a collective body, which is part of the structure of MPBM, makes the evaluation of the processes that intend to attract external resources for the project of financing bodies and public sector entities. On this aspect, it takes into consideration the national and sectorial priorities, the availability of counterpart funding and the capacity and indebtedness of the borrowers. It has representatives from the Ministry of Finance, the Ministry of Foreign Affairs and the Central Bank of Brazil. Another important actor is the National Congress, through its Committee on Foreign Relations and National Defence. Particularly, it is the Federal Senate that approves the external credit operations.

The organs of internal control and supervision of accounts of state are present throughout the process. The Attorney General's Office endorses the processes of acquisition and the Court of Audit (TCU) is equipped to monitor and audit,

as necessary, to defend programs or projects. This is a democratic practice and necessary for transparency and proper use of the public resources.

As is evident, since the determination of the requirements to the execution of a contract to obtain defence products, multiple processes must be followed—which could be time consuming. The participation of specialized sectors, in various levels of government, is needed and, as one could expect, different teams do not always work in a harmonious and synchronized way. The recent creation of a specialized structure within the Ministry of Defence points to the possibility of increased efficiency throughout the process. It will yield, for instance, the establishment of a qualified staff who accumulate knowledge and experience in this field.

Large acquisitions of defence products are complex processes, with their own dynamics, technical, administrative, financial, and special policies that can take a long time to mature. An emblematic case is the process of obtaining new jet fighters for the Brazilian Air Force. The named FX-2 program is marked by an intricate competition between countries and suppliers, with domestic political ramifications that go beyond any bureaucratic-administrative revenue. Another example that can be cited, less intricate, but also complex, is the project of obtaining HX-BR helicopters for the Navy, Army and Air Force, now under way with preliminary results already achieved. The project of obtaining French submarines, perhaps the most complex, is also in progress.

In all cases, the requirement of “technology transfer” has occupied a central place in the discussions and may be the determinant for the choices yet to be made. This transfer has been subject to specific contracts or included as a clause in trade compensation (offset). In Brazil, it is considered of great importance in the process of purchasing. There are always hardships in establishing which technologies will be transferred; how will it be handled; when the transfer starts, and on what terms it will be completed.

### **Challenges of Acquisition and Transfer of Technology**

We are heirs to a modern scientific tradition that associates knowledge to power. Francis Bacon’s maxim—“sapientia est potentia”—reveals a new look to science, which breaks with the way scholastic and medieval people used to think. This is a utilitarian approach that was developed along the modernity and embedded in the economic production system that prevailed<sup>19</sup>.

The natural consequence was a strong stimulus to holders of knowledge that could represent advantages in economic and military sciences to protect such knowledge from others regarded as competitors. It is obvious that advantages attained in economic and military fields result in political leverage. So, the greater the power represented by a set of knowledge, the greater the degree of protection. It is clear that the arms industry is at the heart of these concerns, because the range and the destructive potential of certain weapons have global reach, particularly when it comes to weapons of mass destruction.

Today, the economy is highly competitive and largely based on innovation. The issue of knowledge protection has gained a new dimension, central to the

survival of businesses—and the states. Now it is time to bring forward the first question: To what extent governments or companies are willing to effectively transfer technology, that represents a leverage on the technological level, to developing countries only to create potential competitors in the future?

To continue the analysis of the topic, I should anchor the meaning of some key concepts, in order to avoid possible semantic confusion that can blur the discussion. We believe in technology as a “body of knowledge directed toward the problems of production of goods and services”<sup>20</sup>. It is important to differentiate the technology from the technique, the latter understood by a “set of information and instructions that enable one to use or operate any system or equipment”. A second question arises for every purchase of defence products: Are we actually buying technology or technique?

Today, we know that technology behaves as a factor of production or as a consumer good. In this last sense, it is an intangible asset that can be sold, transferred or even copied, stolen or smuggled. It is thus subject to property rights and, therefore, the discussions associated with trade cannot be dissociated from the system of intellectual property rights. In Brazil, the National Institute of Industrial Property (INPI) plays a central role in the implementation of public policies in this area.

The Brazilian legal framework considers technology transfer a process by which “a body of knowledge, skills and procedures applicable to problems of production are transferred in an economic transaction, from one organisation to another, increasing the innovative capacity of the recipient organisation”. Of vital importance is the receiver’s capability to absorb this knowledge as much as possible for innovative activity in a given technological area. This has many implications; particularly considering that the ambience we talked about is not stimulating the transfer. If two entities are willing to deal, then this compromise between the parties involved can be formalized in a document that specifies the economic conditions of the transaction and the aspects of a technical nature.

There are three basic contract models: a) Contract assignment—Ownership transfer of intellectual property rights; b) Licensing Agreement—Allows the Use of Intellectual Property Rights (operation), exclusive or not—it can be: exploiting patent, exploration of industrial design or trademark use; c) Technology Transfer Agreement. In the latter case, it provides information not protected by industrial property rights. This can be achieved in two ways: supply (transfer) of technology or provision of technical and scientific assistance services<sup>21</sup>.

It is noteworthy that political, financial and marketing issues will always be present in the various processes and contracts involving technology transfer. This happens because business strategies involving intangible assets (like patents, designs...), often of dual nature and usually of high value, are subject to restrictions by international regimes designed to control and avert the proliferation of weapons of mass destruction. These assets can be protected by a system of intellectual property rights or preserved in the form of industrial secrets.

In the market for defence products and dual technology, there are practices to restrict or deny access to sensitive goods or services directly linked to them. These practices erect additional barriers for developing countries to overcome the gap that separates them from the more developed ones. Even countries which adhere to the principal acts of the nuclear non-proliferation regime may not have access to materials and knowledge needed to develop nuclear technology for peaceful purposes, which is a form of technological restriction. Although the purpose of preventing the proliferation of weapons of mass destruction provide the moral basis for export control regimes, restrictions imposed by leading countries in nuclear energy could also have other interests, whether political, economic or simply market related. This increases the importance to develop a genuine national industrial base devoted to defence, which can provide a minimum qualification and independence in terms of defence products.

In the fierce competition inherent in the current economic model and the production system in place in the world, technology and knowledge-intensive applications, institutions and companies are seeking to maximize their earnings. In this environment, it should be appropriate to establish some sort of "technology management", focused on the administration of matters related to technology, innovation and diffusion, technology business involving patents, technology packages, licensing, technology transfer agreements, and other activities related to technical-scientific services. The "technology management" could implement new forms of organizing and management of research projects, development and engineering<sup>22</sup>. A management strategy may initially indicate partnerships as a prerequisite in leveraging the technological imbalances, so that at a later stage, the parties may reach autonomy to compete.

Regarding the effectiveness of the proposed transfer of technology, one should always bear in mind the question previously posed: are we buying technologies or techniques? Moreover, we point out that it should complement the effort itself, since those who put together technology packages are most able to dismantle them. The actual transfer will thus depend on the availability of trained technical staff with expertise compatible with the technology to be absorbed because a human being will be the only recipient for technological knowledge. So, it is imperative for the receiving teams to be able to ask the key questions and to understand the answers.

Finally, effective technology transfer actually occurs only if the recipient is able to absorb vast knowledge that enables the innovation and, consequently, the dissemination to other enterprises, making the sector-specific production system the owner of the technology in question<sup>23</sup>.

### **Final Considerations**

The new Brazilian reality prompted a rethinking of its national defence system, with greater participation of society and all the political institutions with responsibility over the matter.

Since the creation of the MoD, Brazil started to pursue more proficient

management of the armed forces. In this course, the process of obtaining defence products is being gradually migrated from a decentralized system in which the Navy, Army and Air Force exerted a central role and maintained relative autonomy, to a system that is more integrated and yet flexible enough to meet the peculiarities inherent in each Force.

In this new model, the Secretariat of Defence Products (SEPROD), established in 2010, emerges as a new institutional actor that will play a key role in the systematisation and development of methods for product purchases. This new organisation will drive the formation and accumulation of expertise in the defence acquisition area, with a qualified staff, by nurturing better retention over time in order to develop this area of specialisation in the MoD.

The decision to use this model is based on experience gained over the past decades and banking on the possibility of exploiting the benefits of centralisation, while avoiding its disadvantages.

Regarding the challenge of technology transfer, the appropriate responses require a deeper understanding of its real possibilities, limitations and barriers inherent in the competitive nature of the international system. It must be noted that the actual transfer will truly occur only if the absorption of extensive knowledge enables the receptors to promote innovations in the corresponding sector and provides the conditions for the dissemination of such knowledge to other enterprises.

Finally, the search for the integrative transformation of Brazil's national defence system is a key priority in building the "new defence". As eloquently stated by Ex-Defence Minister Nelson Jobim, "the success of the new model of production of defence products depends on the ability to successfully carry out the task involved and the willingness to seize the enormous opportunities that are ahead of us".

## NOTES

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# Capacity Building for Defence Technology Acquisition and Oversight

*Ravinder Pal Singh*

## **Background**

Arms acquisition for defence forces is a continuum of military security challenges from a country's primary threat. In the case of India, its disputed border with China locks it into military technological competition, which, in its basic form, is a technological competition at national levels. China is itself locked into a technological competition in its North with Russia, Japan and South Korea, which drives its quest for security. As China continues to modernize its military technology capabilities, which are primarily focused on a potential Taiwan Strait conflict, it could have applications in other contingencies, such as in South Asia.

India's military technological capacities, therefore, have to be driven by international arms and technology competitiveness. In order to remain in step with such fierce levels of international competition, Indian armed forces will have to relegate its South Asian security capacity building paradigm, which had arrested its military's technological potential for more than half a century.

The limitations in Indian arms and technology acquisition policies are early satisfaction levels reached by its security vision and perception, which continues its primary focus on Pakistan-centric technological capability building.

## **Introduction**

The paper is based on the assumption that advances in military effectiveness are chiefly due to exploitation of developments in science and technology. Innovations and advancements in science and technology have contributed to an exponential increase in the military effectiveness by a factor of many thousand times<sup>1</sup>.

The nation's S&T enterprise, advanced engineering outputs and R&D competitiveness in advanced high technologies<sup>2</sup> are also the indicators of its military industrial potential. It is therefore critical that capacity building in

advanced science and technology is made an intrinsic part of military systems to sustain effectiveness of its weapons and support systems.

India arms acquisition plans may give due attention to security threat emanating from its western neighbour, but its military technology capacity building has to note advanced technology competition that China is engaged in with its northern neighbours and with the US.

Chinese PLA is moving its military potential from its sheer size to building capacity for waging high-technology and high intensity war fighting capability<sup>3</sup>.

China's high technology competitiveness is to a large extent contributed by this and continues to outstrip India's in terms of technological infrastructure, international export standing and technology productive capacities<sup>4</sup>. A prominent feature of global capacities for Technological Infrastructure (TI) is the ascendancy of China's standing at #4 ahead of UK, but it follows US, Japan and Germany in the order of global TI capacities. India is at #20 between Singapore and the Czech Republic. In terms of Technological Standing (TS) in the current world market share in high technology products, China is at #1 position; India is at #21 between Australia and New Zealand. In terms of technological Productive Capacity (PC) that is the physical and human resources devoted to technological productive capacity during the period 1996-2007, China leapt to second position behind Japan, whereas India is at #10 between Switzerland and the Netherlands.

At the minimum, India's leadership has to come up with an advanced technology development strategy, a long-term key technologies development plans and a dedicated agency to implement these.

As far as Indian military planners are concerned this paradigm shift and re-focus will help India to leap beyond its present military technology gird-lock. With that assumption in mind, what are India's major handicaps in advanced technology capacity building for arms acquisition and its implementation processes?

This question will be addressed in terms of limitations and opportunities in military technology capacity building in terms of following aspects:

- Advanced technology policy-making and decision-making processes;
- Human and leadership resource building, which has to precede institutional resource building; and
- Governance and oversight reforms for sustaining and integrating S&T advances in the security sector.
- Military sector's capacities for technology innovation.

### **Policy-making and Decision-making Processes: Limitations**

Arms procurement processes are characterized by large, infrequent and technically complex contracts and their implementation. It is hard to understand complexities of arms and technology acquisition by an untrained generalist bureaucracy, and indeed many military insiders also do not fully comprehend these questions unless they are formally trained and gain experience by building up this specialisation. Consequently, India's arms and technology acquisition

processes are handicapped in terms of skill sets required for assessment and implementation of contracts. Lack of skills also contributes to confidentiality that surrounds the technology and systems assessment process, particularly when it comes to technology-cost evaluation of options, implementing offsets, or maintenance contracts over an extended period of time.

The current model of executive and legislative oversight of the security sector and in particular the arms acquisitions has the following limitations:

- Limitations in management of competitive technologies. A generalist bureaucracy serves a useful purpose in harmonisation of broader dimensions of security policy-making in the Ministry of Defence in terms of balancing defence sector demands with broader public priorities; balancing inter-service priorities and administration of finance. However, in building up of capabilities for management of complex technology systems, which are increasingly being used in modern defence systems, both executive and legislative oversight will have to be technology-enabled to ensure that the military sector remains technologically competitive. This requires independent validation and verification of military technology acquisition processes, monitoring and scrutinizing knowledge thresholds, financial and technical inputs, and reviewing of outputs. All these demand a higher level of technology skills and organisational capacities than currently available in the defence sector or in its oversight systems.
- Shaping of Long-term Advanced Technology Competitiveness Strategy. These plans have to focus on technology competitiveness that can flow into national arms acquisition plans being made in China, Russia, Japan, Taiwan and South Korea. Instead of merely procuring weapon systems, the focus has to be on advanced technology capability building in these countries. It should lead to identification, assessment and focused acquisition of key advanced technologies and identification of capability gaps.

### **Initiatives Required at National Level**

- India's membership of Wassenaar Arrangement should be actively pursued.
- Identify key advanced technologies for acquisition and development at national levels. With increasing scale of cross fertilisation of technologies and components with common applications in military and industrial sectors, nations identify technologies that are deemed critical to their competitiveness. In recent years, such technology priority lists have been drawn by Germany, France, United States and Japan<sup>5</sup>.
- Design and implement key advanced technology (KAT) strategy through a specialised independent agency to be monitored by an empowered group of ministers. This should be an independent agency on the models of agencies for space and atomic energy, which should take the following steps:

- State long term goals for development and acquisition of key advanced technologies both in industrial and defence sectors and the desired future capabilities in each of the sub-fields;
- Convene expert groups for evaluation of key advanced technologies to support the stated future capabilities, identify resource needs and allocations in terms of finance and human skills development; and
- These technology evaluation groups should include experts from the military, technologists, and development planners from key fields to design a focused and implementable plan. Listing of key enabling technologies should also point at early breakthrough technologies that need to be explored. The expert groups should be able to identify priorities of an implementable plan, which must be monitored and reviewed by the executive and legislative branches with the help of experts in each field.
- Agency for Development of KAT should aim to promote key advanced technologies for India's export competitiveness, particularly in advanced countries. Additional aims should include the following:
  - Development of KAT enterprises in special technology zones to facilitate private sector joint ventures and Venture Capital enterprise;
  - Develop KAT R&D Corporation to promote applied and contract research in various fields of KAT, industrial patents and incubators for commercialisation of KAT.
  - The KAT Foundation should be established to increase R&D workforce in key advanced technologies through funding of research projects at IIT centres for basic and fundamental research;
  - The KAT Foundation should develop and maintain linkages with universities, corporations, and research institutes in the US, European projects such as Eureka, Japan, Israel and Russia.
  - Develop and maintain linkages with universities, corporations, and research institutes and academic centres within the country.

Liberalisation of advanced R&D in development and defence sector: A developing country like India can leverage advanced technologies used for satellites, space launch vehicles or propulsion systems for national security as well as diverse commercial applications. Systems and technologies relating to global position systems, space telecommunication and earth observation systems would have development applications in fields such as environment and natural resource management, water resources; feedstock and cadastral management; forestry, agriculture, fisheries, weather forecasting, and disaster management could use remote sensing and satellite telemetry.

These developments can have a role in national security such as for global navigation systems and global information systems. Communication satellites have a crucial role in defence communications as well as social applications in distance education, health monitoring and tele-health services<sup>6</sup>. Military

applications would be in the fields of space sensors, surveillance technologies and satellite systems for synthetic aperture reconnaissance, electronic reconnaissance, early warning, ocean surveillance etc. These would provide field commanders with real-time battle space awareness and possibilities of seamless integration of air, land sea resources in common tactical environment.

Due to sheer scale of commercial applications and pace of generational change, military is losing technological leadership to commercially developed advanced technology systems. Digital revolution, ubiquitous computing with cloud computing technology and increasing speed and computing power, sophisticated sensors, precise navigation are among a few examples with increasing application in both military and commercial sectors<sup>7</sup>.

### **Initiatives Required at Defence Sector Level**

- In absence of a documented national security policy, a comprehensive definition of arms and advanced technology acquisition policy does not materialize. National advanced technology capacity building cannot be episodic with priorities changing with political parties in power. If such capacities have to be developed, it requires a coherent policy, plans and budgetary support.
- DRDO reforms need to include: separation of triple-hatting in the DRDO and increase the ratio of its research potential versus administrative cost; DRDO is hampered by funding turbulence; insufficient margins and insufficient availability of adequately qualified personnel; weak accountability processes and bureaucratic adversarialism. Liberalisation of defence sector R&D must include building up other competitive R&D agencies. DRDOs monopoly over military R&D has to face competition within and from outside the country. It has to use best commercial practices, materials and components through cooperative R&D agreements with industry to integrate defence and commercial technologies.
- Develop a research institute for assessment and acquisition management of advanced technology systems, which have high degree of technical, financial and legal complexities. It should have both research and degree granting roles with the aim to build expert skills in disciplines such as operational research, systems analysis, decision sciences, systems engineering, financial risk analysis and contract management, etc. This kind of institutionalized training capacity for technology procurement planning and management can also be used for decision-making in other complex technology intensive sectors such as telecommunications, space, atomic energy, aviation and maritime projects etc.
- For governance of advanced technology systems, political decision-making needs to progress through several layers of complexities involving operational, financial and technological variables. Capacities need to be developed for executive and legislative oversight, scrutiny, monitoring and review of defence technology decision-making

processes. This should also include capacity building in independent statutory authorities such as the Comptroller and Auditor General. For conducting technology assessment, assurance and audit to facilitate oversight of different stages of R&D, this capacity should be independent of the government R&D agency to provide the following levels of oversight:

- User Agency(s) scrutiny at the approval stage and post-approval up- gradation stages;
- Executive approval and technology assurance for project monitoring;
- Executive review and technology verification;
- Legislative validation at approval and subsequent stages of project funding;
- Post-induction technology performance audit by an independent and technologically proficient statutory authority.

Technological oversight requires verification and scrutiny of three critical points of knowledge to decide on starting the R&D, and continue it through the product development and production stages<sup>8</sup>. These points identify relative zones of “Unknown and Known”, to verify the status of the following three knowledge competencies:

1. Knowledge is available that a match exists between technology that can be developed and can meet technical or operational requirements. Knowledge that this match will provide the envisaged advantages during the foreseeable period;
2. Knowledge is available that the proposed design and systems will work to the expected levels of performance; and
3. Knowledge is available that the desired product can be produced within the targets of cost, quality, and production schedule.

The current system of appointing project administrators who have generalist academic backgrounds with frequent job rotations required by their careers, their required technology management capabilities are not built up in relation to aspects such as: project requirement definition; costing for complex systems with unreliable or incomplete data; contract evaluation and tendering processes; comparative assessment of diverse layers of component suppliers with different technologies, offsets implementation, different life cycle costs etc.

Considering there is a lack of data and little expertise is available with the executive and legislative branches, it is understandable that decision-making gets delayed and enveloped in excessive confidentiality. Consequently, technical interrogation of decision options is weak in India’s governance system. The department of defence acquisition should set a data base for global acquisition experiences, lessons learnt and mechanism for costing and offsets. The current data bank is developed in fits and starts and is of indifferent quality.

## **Initiatives Required at Level of Defence Services**

Technological resources of defence sector leadership; military effectiveness is a product of organisational capacities for weapons technology innovation. It is a process of interaction between military's needs and missions, R&D laboratories (which may or may not be connected with defence R&D sector), the defence industry and the executive oversight in the MoD. Weapons technology and innovation processes should enable creative interface between weapons engineers and the users. This interface become efficient if military leadership evolves from levels of being mere user of weapon systems to become technology innovators. The perquisite to this change is of course the understanding of the competency gap between the weapons developers and users for maintaining technological superiority of weapons systems, innovation for joint war fighting capabilities and investing in human resources in military technology sector to minimize ownership costs.

Military sector's capacities for technology innovation need to be enhanced Technology innovation capacities of a military organisation can take three broad forms, which will enhance its operational effectiveness:

- Technologically new products or systems: are those systems whose technological characteristics or operational uses differ significantly from those of previously employed systems. Such innovations can involve radically new technologies, can be based on combining existing technologies in new applications, or can be derived from the use of new knowledge.
- Technologically improved products or systems: these are existing products or systems whose performance has been significantly enhanced or upgraded. A simple product may be improved (in terms of better performance or lower cost) through use of higher-performance components or materials, or a complex product, which consists of a number of integrated technical sub-systems may be improved by partial changes to one of the sub-systems.
- Technological process innovation is the adoption of technologically new or significantly improved methods, which may involve changes in equipment, or organisation, or a combination of these changes. This may be derived from the use of new knowledge to deliver technologically new or improved products, which cannot be produced or delivered using conventional methods.

Basic academic training of military leaders has to be grounded in engineering disciplines from institutions of world class standards. The engineering knowledge will enable military leaders to understand and exploit new technological opportunities and create new innovations for battlefield needs.

Additionally, it will provide arms acquisition organisations with management skills with both operational experience and engineering knowledge of weapon systems design, manufacture and maintenance. The armed forces have to create a cadre of technology savvy and knowledgeable combat leaders as



emerging S&T is now inextricably linked with innovating sophisticated military weapons. A seamless development of operational concept into a useful weapon system requires higher S&T competencies in the armed services to visualize new technical opportunities for incorporating in weapon systems development.

The prevailing minimal user concept in Indian military leader's education has remained unchanged for the past six decades. Armed forces in countries, which do not have advanced engineering capacities, such as in India, are unable to leverage opportunities in cutting edge technologies for creating new operational capacities. Such military forces remain mere followers of developments of new weapon systems as they lack technological knowledge and innovation. Studies on the Gulf war reveal advantages of high technology and innovative engineering skills over organisations with lower levels of technology skills<sup>9</sup>.

If the military leadership's educational foundation is based on engineering knowledge and skills, it will be able to exploit emerging technologies to create operational and logistical advantages through innovative battle space management. Consequently, the education programmes of military leaders in China, Israel, Japan, South Korea and Taiwan are being designed to become technology intensive.

Indian military R&D conundrum reveals that DRDO scientists engaged in military R&D do not have experience of operational military environment for which they are developing weapons. While the military system, does not have science and engineering background to leverage emerging technologies.

Should the maximal education concept be introduced in Indian armed forces, its leadership echelons will be staffed by highly trained engineers to bridge threat assessment and exploitation of emerging technological opportunities.

Participation of military S&T engineers in military R&D work in Japan and in Israel gives evidence of linkages between the R&D sector and the military's operational requirements<sup>10</sup>. The military background experience of Israeli R&D engineers has been particularly useful in technology assessment for force multipliers not only for use in Israel's defence sector but the international defence market. This is evident from the Israeli venture capital investments in military R&D on force multipliers for domestic as well as international defence markets.

Other examples illustrative of this proposition are participation of highly qualified engineers that are serving in Asian armed forces are also conducting advanced military R&D in Japan (Technology Development Research Institute), in South Korea (Agency for Defence Development) and in Taiwan (Chung Shan Institute of S&T).

The armed service leadership can become technology intensive if the MoD sets up at least three IIT level engineering institutes for academic training of commissioned officers and for subsequent post-graduate training and building research capabilities in the security sector<sup>11</sup>. Not only it will help in evolving a technology intensive professional culture in the military sector, but incentive of short service tenure after an IT training will also help in overcoming severe shortage of officers currently experienced in the defence services. If released

after short service tenure, these engineers with operational experience can make useful contribution in the defence R&D system and industries, which is extremely short of competent R&D project managers<sup>12</sup>. As and when such engineers with military experience join private sector industries, they would also contribute in leveraging a country's commercial base (non-defence sector engineering resources), and transfer experience of best commercial practices to defence sector. On the other hand, the defence sector can use available commercial manufacturing capacities in the country in case of emergencies.

It is important that at these defence sector IITs should emphasis post-graduate training and doctoral research in key advanced technology fields at centres set up in such institutes. This kind of human resource is found extremely short in India's defence R&D system<sup>13</sup>. If a research foundation is set up to subsidize research in key advanced technologies with both commercial and military applications supported by technology incubator programmes, patenting process and marketing organisation, such university research could help in developing self-sustaining revenue models<sup>14</sup>.

The three armed services must develop their in-service technical laboratories to identify and conduct exploratory research in technologies, which promise early major breakthrough in weapons systems development. These laboratories should define the staff qualitative requirements for R&D for the DRDO or other technology providers and provide a closer understanding between the operational needs and the technology developers. These labs would enable cross fertilisation of operational concepts with new technology developments. The service R&D laboratories should be separate from the DRDO to conduct feasibility studies independently; test and verify different stages of engineering models offered by domestic and foreign technology developers; conduct technical and maintenance evaluation trials of prototypes developed, and carry out R&D quality assurance trials.

These service laboratories should be staffed with scientists and engineers who have military field experience, thereby creating a cadre of scientific personnel in the armed services to staff and lead major arms acquisition or R&D programmes. By developing independent capabilities for technology assessment and for feasibility studies would enable armed services laboratories to pursue breakthrough technologies, without being unduly controlled by DRDO or the ministry of defence bureaucracy. This would also enable competition for the seeking of new systems and technology upgrades to prolong the operational life of platforms.

Defence R&D projects must have independent verification and evaluation capacities. This would require building up of expertise in different fields of research so that experienced personnel from the military's S&T cadre and other civil experts could independently test and evaluate each phase of technology project development.

The country's governance system is handicapped by an absent process for harmonizing technological opportunities and operational feasibility, measuring effectiveness, constraints and costs. The ambiguities present in each of these

indicators may be addressed by a cadre of the military's S&T experts who should staff executive and legislative oversight processes as well as audit schemes. They would facilitate compliance with R&D quality control standards and technological performance measurements. Project monitoring in the Ministries have to understand each stage of knowledge thresholds before releasing funds, and steps being taken for improving performance while reducing costs.

In absence of an alternative R&D organisation, which can compete with DRDO's monopoly and absence of independent evaluation capacity, services are compelled by the executive branch to accept DRDO's data and what it is able to produce. Even communist China has an organisation State Test and Evaluation Committee (STEC), which is independent of technology developers like COSTIND as it reports directly to China's Central Military Commission<sup>15</sup>.

### **Implementing Change to New Technology Paradigm**

The new paradigm of rapid pace technology change has identified limitations and barriers in meeting challenges of time, cost and technology innovation in arms procurement decision-making processes. Some of these aspects include the following:

- Absence of a defence strategic review process and long-term technology capacity building plans, lack of coordination between defence plans and outlays, weak capacities for comparative technology assessment and limitations in realistic technological capability definition. This often leads to time and cost overruns; besides the post-acquisition verification of technology standards of weapon system remain un-validated;
- Absence of independent technology verification and validation agency that can competently adjudicate technology-related decisions between the developers or suppliers, the users and executive oversight of financial allocations;
- Absence of culture of technology-innovation and weak capacities in the military sector to create new operational opportunities through new technologies.

How to implement change demanding by challenges of new technologies in a large security sector where tradition and resistance to change is reinforced by career and competence vulnerabilities? It may require a three-stage process:

1. Political and military leadership's acknowledgment that need for change is based on new realities of international technological competitiveness. Either the Indian security sector changes its existing leadership skills or it may fail to deliver its primary purpose. The paradigm of minimal user concept has been overtaken by rapid pace of technological changes internationally. New technologies flow into security sectors, which have developed their knowledge capacities to absorb the change.
2. Acknowledge realities of building institutional and organisational capacities in the defence sector for creating and enhancing technological knowledge and engineering skills of its leadership resource. This would

require pursuing maximal education concept for the military's leadership academic training. A technology management service needs to be created for conducting executive oversight functions.

3. Building up of technological culture in the nation's security sector would require changing rules of career advancement that recognise new realities in decision-making and appreciate technological innovation. Building up of technology innovation infrastructure in the country and also in the defence sector. This would need setting up R&D and commercialisation centres in key advanced technologies for defence-advanced technologies.

## **Conclusion**

While inquisitive impulses for technological change are possible in any group, some organisations have been able to embrace this essential scientific attribute more than others. Instead of feeling threatened by this idea of technological challenge, organisations that strive for scientific excellence are at a fundamental advantage.

In order to build competitive oversight capacity for weapons technology acquisition, the military related R&D could be divided into three formats:

- (a) Basic research at MoD supported engineering institutes, modelled on the IITs;
- (b) Applied research by the DRDO or other competitive organisations, and
- (c) Feasibility or exploratory research, proof of concept, technology evaluation studies and user quality assurance testing to be conducted at the in-service laboratories of the armed forces.

Instead of an arms acquisition approach, the MoD's department of arms procurement has to develop a military technology capability building approach. Armed forces, which build their technological capacity as part of their organisational philosophy will be more effective than those organisations that have not. For an overview of key enabling technologies in Europe see the Commission Staff Working Document 2009.<sup>16</sup> In the US, different organisations such as the DoD, DoC and Aerospace Industry Association have their own identified technologies and for priority technology lists of France see note<sup>17</sup>.

## **Some examples of key military technologies with commercial applications**

- Air breathing Propulsion  
Aerospace industry, ship propulsion and stationary power generating systems.
- Semi-conductor materials and micro electronic circuits  
Very high speed integrated circuits based on gallium arsenide or silicon chips with applications in automotive, telecom and computer industries, manufacture of industrial robotics.

- **Passive Sensors**  
Specialized fire-fighting, medicine, controlling pollutants, diagnostic tools and engines, monitoring industrial hazards, satellites for remote sensing, communications and weather applications.
- **Composite Materials**  
Commercial aircraft (by the year 2005, composites were making up more than 65 per cent of structural weight of transport aircraft) and in automotive and construction industry.
- **Signal Processing**  
Applications in basic research in neural networks and related applications.
- **Simulation and Modelling**  
Military applications: designing, testing and validating weapon systems development and theatre-wide decision making in operations. Commercial applications: Undersea geophysics, petroleum exploration, virtual prototyping, expert systems training, integration of design, management of industrial manufacturing processes, and transportation modelling.
- **Advanced Software Production Capabilities**  
All segments of advanced industries, complex project management, air-traffic control, including medical applications.
- **Sensitive Radars**  
Robotics, automated manufacturing processes, speed determination, safety radars and remote detection of chemical effluents.
- **Parallel Computer Architecture**  
Computer aided design, manufacturing and engineering simulation for the aerospace, petroleum electronics research and weather forecasting.
- **Photonics**  
High speed computing, lasers detectors, local area networks and trans-oceanic cabling. Optical communications for transmitting information as photons over fiber rather than as electrons over copper, making it immune to electromagnetic interference.
- **Computational Fluid Dynamics**  
Aerospace industry, production of silicon wafers, gas-deposited coatings on materials, welding of high temperature metals, production of circuit boards, machine tools and gas turbine parts.
- **Machine Intelligence and Robotics**  
Robotics, handling hazardous materials and automated manufacturing. Recent studies indicate that expert systems diagnostics can reduce maintenance man-hours significantly.
- **Data Fusion**  
Urban planning, resource management, pollution controls monitoring, and climate, crop and geological analysis. Information engineering tools to support planning, analysis in industry, control of computer and telecommunications networks, traffic control, financial markets, etc.
- **Weapon system Environment**  
Pollution control, however research is being conducted for applications in

- weather forecasting, as well as oceanographic, space and geological research.
- Pulsed Power
  - Electrical utility industry for power factor corrections and the medical industry.
- Hypervelocity Projectiles
  - Commercial space launch vehicles.
- Superconductivity
  - For improved distribution and utilisation of electrical energy, medical monitoring, non-invasive diagnostic surgery, magnetic resonance imaging (MRI) and high performance computing.
  - Identifying commercial and military applications of the selected generic technology fields is work in progress.

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# Defense Acquisition Workforce Management in the United States

*Greg Beckham*

## **Introduction**

The Defense Acquisition Workforce (DAW) in the United States is managed in strict accordance with U.S. law. The Defense Acquisition Workforce Improvement Act (DAWIA), enacted in 1990, created the legal foundation for central management, planning, and development of the DAW. The DAWIA also stated that the goal of the legislation was to improve the quality and effectiveness of personnel who manage and implement defense acquisition programs. Finally, the DAWIA formally established the Defense Acquisition University (DAU) and charged it with creating and delivering approved training to workforce members. This paper will discuss some of the details of DAW management as they have evolved over the twenty-plus years of the DAWIA being in effect.

## **DAU**

The DAU mission is to provide a global learning environment to support a mission-ready DAW that develops, delivers, and sustains effective and affordable war fighting capabilities. DAU impacts acquisition excellence through:

- Acquisition certification and leadership training,
- Mission assistance to acquisition organisations and teams,
- Online knowledge sharing resources,
- Continuous learning assets, and
- Strategic workforce planning.

## **DAWIA and Career Fields**

The DAWIA established Career Fields as well as certification requirements for individuals to meet in order to become actual members of those Career Fields.



To meet the intent of the law, the Department of Defense (DoD) formed 13 functional Career Fields. Certification within these fields is based on three factors:

- Education,
- Experience, and
- Training

Each Career Field has written guidance for all three of these factors. The guidance covers individuals at Level I, Level II, and Level III and can be found on the DAU website as follows:



• **Established Career Field certification requirements**

- 13 Functional Career Fields
- Three Certification Levels Based on:

- Education,
- Experience, and
- Training



Program Management	
<p><small>Approved for public release; distribution is unlimited. Form Approved for Public Release; Distribution is Unlimited. Form Approved for Public Release; Distribution is Unlimited.</small></p> <p>Acquisition professionals in the Program Management career field are concerned with all of the dimensions of a Program Management Office (PMO) or a Program Executive Office (PEO). Program management professionals serve in a wide range of PMO and PEO positions, including Program Integration and Analysis, Program Manager, Program Executive Officer, and their deputies. They may also serve in a number of support and management positions throughout the workforce. The fundamental responsibilities of the Program Manager are to balance the</p>	
<p>many factors that influence cost, schedule, and performance to integrate and tailor application of the DoD PMO roles, responsibilities, and effective defense systems are delivered to the warfighter as quickly as possible.</p> <p>Program Managers and Deputy Program Managers of major programs (ICAT 25A/26) must also complete PMT 401 and PMT 402 to meet additional statutory or regulatory requirements.</p>	
<p><b>LEVEL I</b></p> <p><input type="checkbox"/> <b>EDUCATION</b> (Award) baccalaureate degree, preferably with a major in engineering, systems management, or business administration</p> <p><input type="checkbox"/> <b>EXPERIENCE</b> 1 year of acquisition experience</p> <p><input type="checkbox"/> <b>TRAINING</b> <input type="checkbox"/> ACQ 101 Fundamentals of Systems Acquisition Management (SIS) <input type="checkbox"/> (Award) ACQ 201 (Parts A &amp; B) Intermediate Systems Acquisition (IS &amp; IS) <input type="checkbox"/> (Award) One CMU Level 100 course in another functional area</p> <p><b>LEVEL II</b></p> <p><input type="checkbox"/> <b>EDUCATION</b> (Award) master's degree, preferably with a major in engineering, systems management, business administration, or a related field</p> <p><input type="checkbox"/> <b>EXPERIENCE</b> <input type="checkbox"/> 2 years of acquisition experience; at least 1 year of this experience must be in program management <input type="checkbox"/> (Award) An additional 2 years of acquisition experience, preferably in a systems program office or similar organization</p> <p><input type="checkbox"/> <b>TRAINING</b> <input type="checkbox"/> ACQ 202 (Parts A &amp; B) Intermediate Systems Acquisition (IS &amp; IS) <input type="checkbox"/> PMT 250 Program Management Tools (PMT) <input type="checkbox"/> (Award) One CMU Level 200 course in another functional area <input type="checkbox"/> (Award) Intermediate-level management and leadership training <small>(Award) priority (PM) in professional societies</small></p>	<p><b>LEVEL III</b></p> <p><input type="checkbox"/> <b>EDUCATION</b> (Award) Most one of the following criteria: <input type="checkbox"/> At least 24 semester hours from writing, accounting, business finance, law, contracts, purchasing, economic, industrial management, marketing, operations methods, and organization and management (EANTES or IEP equivalent) courses may be substituted. <input type="checkbox"/> At least 24 semester hours in the individual's career field and 12 semester credit hours in the disciplines listed above</p> <p><input type="checkbox"/> (Award) master's degree in engineering, systems acquisition management, business administration, or a related field</p> <p><input type="checkbox"/> <b>EXPERIENCE</b> <input type="checkbox"/> 4 years of acquisition experience <input type="checkbox"/> At least 2 years of this experience must be in a program office or similar organization. (Award) must be in a PM or PEO, DCMA Program Integrator, or Supervisor of Shopping.</p> <p><input type="checkbox"/> At least 1 year of this experience must be in a program management position with cost, schedule, and performance responsibilities <input type="checkbox"/> (Award) 2 additional years of acquisition experience</p> <p><input type="checkbox"/> <b>TRAINING</b> PMT 401 (Parts A &amp; B) Program Management Office Course (PM 251 &amp; 52)</p>

Source: <http://icatalog.dau.mil/onlinecatalog/CareerLvl.aspx>.

The U.S. DAW consisted of approximately 147,700 people as of October 1, 2010 (the beginning of the U.S. Government Fiscal Year (FY) 11). These individuals are assigned to each of the 3 Military Departments (Air Force, Army, and Navy) as well as to a number of defence agencies such as the Defense Logistics Agency (DLA) and the Defense Contract Management Agency (DCMA). The following are the current Career Fields, some of which are broken down further into appropriate subsets: Auditing; Business; Contracting; Facilities Engineering; Industrial/Contract Property Management; Information Technology; Life Cycle Logistics; Production, Quality and Manufacturing; Program Management; Purchasing; Systems Planning, Research, Development and Engineering, and Test and Evaluation.

# Defense Acquisition Workforce

Career Fields	Army	Navy	Air Force	4th Estate	FY10 TOTAL
Auditing	0	1	0	4,142	4,143
Business	2,860	2,584	2,118	562	8,124
Contracting	8,839	6,001	7,865	7,087	29,792
Facilities Engineering	1,564	5,319	20	8	6,911
Industrial/Contract Property Management	84	78	28	311	501
Information Technology	2,168	1,634	1,008	355	5,165
Life Cycle Logistics	9,045	5,219	2,427	170	16,861
Production, Quality & Manufacturing	2,081	2,181	404	5,061	9,727
Program Management	3,438	5,258	5,026	1,193	14,915
Purchasing	351	562	145	229	1,287
SPRDE	10,882	19,581	9,498	1,801	41,762
Test & Evaluation	2,304	3,000	2,838	304	8,446
Unknown	18	0	5	48	71
<b>Total</b>	<b>43,634</b>	<b>51,418</b>	<b>31,382</b>	<b>21,271</b>	<b>147,705</b>

## Certification

It is very important to understand that each DoD Component certifies its own individual DAW personnel. All of the components (Air Force, Army, Navy, and the defense agencies) use the same criteria discussed above, but they all have their own process for deciding when a person is certified fully. “Certification” is defined as:

“The process through which the DoD Components determine that an individual meets the mandatory standards (experience, education, and training) established for a career level in an acquisition career field”.

The career levels referred to in the above definition are Level I (Entry), Level II (Intermediate), and Level III (Senior). As mentioned above, the DAW website contains extensive information regarding all levels of certification for all Career Fields. This information is continually updated as a result of Career Field officials meeting and making decisions for improving the performance of those in their Career Field. This paper will discuss these meetings and decisions in more detail later.

One important point to remember is that the 13 Career Fields are very interrelated. Because of this, the certification requirements for a specific Career Field often contain training and experience in a different Career Field. For example, an individual striving to become a Program Manager certified to Level

III is required to take several training courses in disciplines such as software acquisition management, basic contracting, and logistics.

### **Single Acquisition Corps**

The DAWIA consolidated the training that was available at the time of its passage to support the concept of a single Acquisition Corps in the U.S. Defense Department. Before then, several defence establishments taught different types of training courses that were all helpful to the acquisition workforce, but the DoD Components all approached the issue a bit differently. The DAWIA brought everything together with DAU providing the training and the competency management framework for ensuring that training was uniform, consistent, and updated systematically to respond to policy and procedural changes that affected each Career Field.

The DAWIA also led to a focused career development. This development has two facets: the first focuses on the people in the DAW, and the second on the positions that need to be filled with qualified personnel within the DoD acquisition infrastructure.

As for the first, individuals are able to plan their careers to become senior members of the DAW in their chosen Career Field moving from the entry level to Level III. They also have the option to broaden their careers by performing internships; taking training courses in other, but related, disciplines, or by participating in exchange or rotational assignment programs.

With respect to the second facet, each of the DoD Components has an acquisition infrastructure that defines the positions necessary to acquire equipment and services necessary to supply the operational forces with the best, most affordable capabilities available. There is a defined grade structure (for both military and civilian positions) allocated to each program office based on the size and complexity of the acquisition. When a program forms, the new leadership team seeks to fill the program office with well-qualified people from the various Career Fields in accordance with the defined grade and specialty structure. Some of these positions are designated Critical Acquisition Positions. Usually, these slots are filled by individuals certified at Level III in their Career Fields (e.g., Systems Engineers, Contracting Officers, or Logisticians). Most Program Executive Offices (PEOs) also have a few Key Leadership Positions (KLPs) at the General Officer/Colonel-level (or equivalents in the U.S. civil service).

In order to ensure as much continuity as possible within a program, tenure management becomes very important. Normally, a Program Manager (PM) for a major program will be assigned to that position until a major milestone closest in time to the 4-year point in the assignment. A Deputy PM is assigned for 4 years, a Program Executive Officer for 3 years, a senior Contracting Official for 3 years, and other Critical Acquisition Positions for 3 years. While these are targets for assignments to ensure stability, there are challenges to keeping individuals in these positions for the full planned periods. Sometimes Military Department obligation agreements require waivers of assignment periods. Also,

each of the DoD components applies tenure policies differently. These varying policy applications are especially noticeable in a joint program office that has personnel from several different Military Departments. An update to the DAWIA occurred within the last several years that reduced required tenure time and authorized waivers in cases where Military Departments determined there was a critical need.

### Competency Management

The training available to the U.S. DAW is based on the competencies necessary for an individual to possess and use in performing tasks as an acquisition professional. "Competency" is defined by the U.S. Office of Personnel Management as:

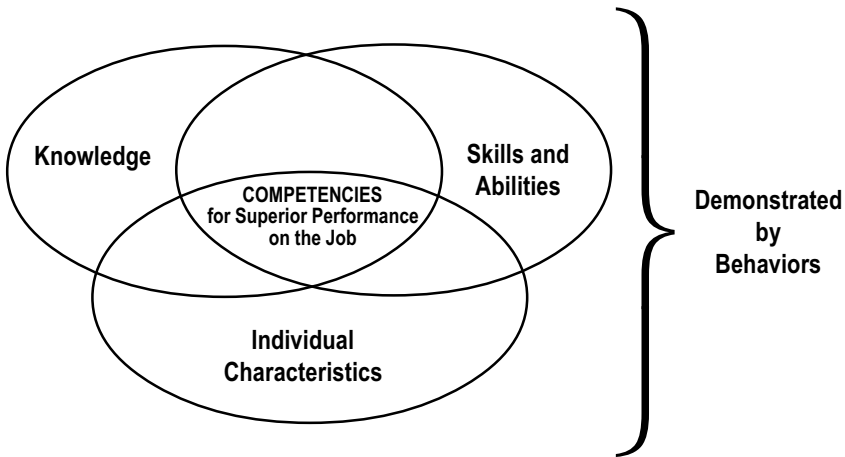
"an observable, measurable pattern of skills, knowledge, abilities, behaviors, and other characteristics that an individual needs to perform work roles or occupational functions successfully."

The blend of all the pieces within this definition leads to competencies for superior performance on the job.



## Competency is...

"... an observable, measurable pattern of skills, knowledge, abilities, behaviors and other characteristics that an individual needs to perform work roles or occupational functions successfully." (U.S. Office of Personnel Management definition)



The distinction between competencies required for performance at Levels I, II, and III are best illustrated through examples. A person in the International Acquisition Career Path, a subset of the Program Manager Career Field, needs to be able to perform with the following levels of knowledge, skills, and abilities when dealing with technology security matters:

- Level I: “Outline proper international technology security considerations”
- Level II: “Use international program security and technology transfer procedures”
- Level III: “Employ and validate proper international technology security”

When dealing with competencies and applying them to workforce performance, it is important to have a system to manage them properly. The DoD uses a competency framework that is extremely broad and touches on many aspects of resource development. The Competency Management System involves the human resources system, the learning management system, the performance management system, and the learning content system. Other elements that become considerations in competency management are succession planning, organisational effectiveness, workforce planning, career planning, selection of individuals for jobs, mission support, and the training required to meet the defined competencies.

### **The DAW Management Approach**

The DoD uses a two-tiered management structure in dealing with the DAW. At the higher, oversight level, Senior Department leadership has visibility into workforce issues and plays an active role in managing the DAW. The leaders develop and promulgate policy, guidance, and metrics. This centralized approach leads to consistency across the DAW. The lower level executes on a decentralized basis. The execution deals largely with individual career development and managing the workforce where the military departments and defense agencies conduct day-to-day activities. This level of workforce development and management is accomplished through four individuals known as Defense Acquisition Career Managers (DACMs). Each of the military departments has one specific, senior individual assigned in the position of the DACM. The defense agencies combined, sometimes referred to as the 4<sup>th</sup> Estate, have one DACM who develops and manages all DAW personnel within those agencies. All four of the DACMs have staffs to carry out the tasks involved in the decentralized execution described above. These staffs maintain appropriate databases and implement certification policy and process.

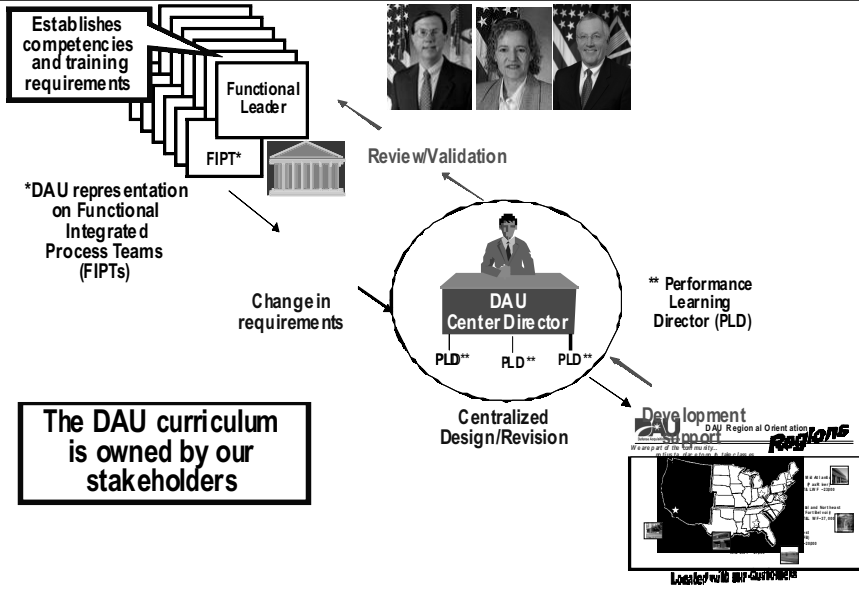
### **Curriculum Requirements and the Design Process**

The DAU curriculum is designed to meet the competencies required by the DAW in running an effective and efficient acquisition. A group called a Functional Integrated Process Team (FIPT) determines the competencies for each Career Field at each Level. Each Career Field has a FIPT. Membership in the FIPT consists of personnel from the DoD, the military departments, DAU, and others as appropriate. There is a mix within each FIPT of career subject matter experts (SMEs) and human resource managers. The Under Secretary of Defense (Acquisition, Technology and Logistics), the U.S. DoD Chief Acquisition

Executive and the number three person by responsibility within the DoD, directly approves and signs written charters for each FIPT. The primary responsibility for each FIPT is to decide what competencies are required and how the certification process will be implemented for their Career Field.



# Curriculum Requirements and Design Process



There is also an individual assigned as the Functional Leader (FL) for each FIPT who chairs the team. The FL is normally a very experienced, senior DoD official who has been a member of that Career Field for a number of years. Because of having experience over many years within the Career Field, and at all three Levels, the FL has great insight into the competencies necessary for a member of that Career Field.

Each FIPT (one for each Career Field) meets regularly to determine necessary competencies for members of their Career Field. These competencies are written down in lists that can be quite extensive, especially at Level III where an acquisition professional has to be completely competent in their field because of the magnitude of their likely program assignment. The FIPT passes its validated, approved list of competencies to DAU where a Performance Learning Director (PLD) works with appropriate faculty members to design or revise course material so that it teaches the competencies that the FIPT deems necessary for its Career Field. The faculty members involved in preparing course material usually have detailed knowledge of the existing course material. This allows changes to be made quickly and in targeted places in existing course material.

In the case of designing new courses or course lessons, the faculty involved are experts in that particular field.

Once the new or revised course material is developed, the DAU PLD summarizes the material for the FIPT to review and validate. Once the FIPT is satisfied that the material covers the required competencies adequately, the material is incorporated into the appropriate DAU courses.

In actual fact, the process described above is an iterative one. There is a very close working relationship between the DAU and each FIPT, so course information passes back and forth easily, with suggestions for change being made by FIPT members and worked into the new material as the changes are suggested.

### How DAU Trains the DAW?

DAU provides training for the workforce in three distinct ways:

- Continuous Learning Modules (CLMs)
- Distance Learning (DL) Courses
- Residence Courses

These training opportunities are described in great detail in the DAU iCatalog.



## DAU's iCatalog



- **Most current resource for information regarding DAU courses and the Certification Guides**
- **Accessible from the DAU home page (<http://dau.mil>) or directly at <http://catalog.dau.mil>**

CLMs are short, web-based training modules that are topic specific. Typically CLMs are from 1 to 2 hours in duration. Students can take them for credit or they can browse the course. If a student takes the CLM for credit, there is a test at the end of the module and a required score that the student must obtain

before credit is given. In browse mode there is no test but obviously no credit is available for the student. CLMs are accessible twenty-four hours a day, seven days a week, and are designed to meet student needs at locations around the world whenever the student desires the information. Typically there are two audiences for CLMs. The first consists of individuals who are completely new to the subject area. The training material provides these students with basic, beginners information. The second audience contains people who have been working in an area for a while, but desire to refresh their understanding of the topic. The following DAU website provides access to CLMs: <http://icatalog.dau.mil/onlinecatalog/tabnavcl.aspx>.

Distance Learning (DL) Courses are formal courses that are taught exclusively on-line. The information disseminated in these courses is generally only knowledge-based, i.e. it is primarily learning factual information and not information that requires the detailed discussion normally found in the classroom environment. When compared with CLMs, DL Courses are much longer in duration. Duration range is from 15 to as many as 40 hours. Once a student applies to take a DL Course for credit and is accepted, he or she has a set time to begin and then complete the course. As with CLMs, DL Courses can be taken for credit or in browse mode.

Residence Courses at DAU are formal courses that are taught at DAU campuses across the United States. One of the most important aspects of these classroom-based courses is the interaction among the students. Many of the courses use scenario-based exercises in which the students are given a set of dilemmas or challenges, they meet in small groups to determine a logical course of action, then typically the groups out brief their ideas to the class at large. Another dimension of the Residence Courses is the use of guest speakers from both government and industry who provide their views of important issues to their offices and agencies.

DAU campuses are located in proximity to high concentrations of DAW personnel. The main campus is at Fort Belvoir, Virginia. Other campuses are at California, Maryland; Huntsville, Alabama; Kettering, Ohio, and San Diego, California. Because of the curriculum design process described above, courses delivered in each location are always the same. Residence Courses vary in length from 3 days to 10 weeks.

## **Summary**

The U.S. law known as DAWIA has had a positive impact on the formation and management of the DoD Acquisition Workforce (DAW). It has been important to have the force of law behind the structure of the Career Fields so that workforce personnel have support in planning and developing their careers. The training that the DAU provides, along with the education requirements and on-the-job experience of the DAW, allow for consistency in certifying individuals at the proper Levels within various Career Fields.



## Best Practices in U.S. Defence Procurement

*Richard P. Rector and Dionis M. Gauvin*

Defence procurement is inherently complex, particularly on major projects for weapons systems, information technology systems and infrastructure. Nations must balance technological, commercial, and policy objectives in a context of ever-shifting threats, resources, and political interests. Challenges include the primacy of national security, the development of advanced and newly developing technologies, the substantial and often uncertain costs of major programs, the creation of long-term contractual relationships and risk allocations, the promotion of domestic policies,<sup>2</sup> and a heightened need for integrity, fairness, and transparency. For all nations, however, the basic goal of a procurement system is essentially the same: acquiring the best defence capability within the available budget, on a timely basis, while maintaining the public's trust and fulfilling public policy objectives.

No nation has perfected the acquisition of defence supplies and services. Indeed, the failures of defence procurement around the world have sometimes been spectacular, with discouraging tales of fraud, waste, and abuse arising too frequently in both government and commercial decision-making. These failures are unacceptable and require vigilance and continuous improvement in the underlying procurement systems. But the failures should not overshadow the fact that well-structured, transparent procurement systems can work—and, indeed, do work in the overwhelming majority of acquisitions—to serve a nation's national security interests.

The United States spends more on defence than any nation in the world and, as a result, has experienced its share of procurement failures and successes. It also has developed, as a result, both a strong defence industrial base and a highly regulated procurement system, which continuously evolves in response to new problems and challenges. Set forth below are six of the "best practices" that, in the authors' view, the United States has adopted in striving to meet the defence procurement challenge faced by all nations.

## I. Government-Wide Procurement Laws, with Defence-Specific Tailoring

In the United States, almost all federal agencies—both civilian and defence—are bound by a single set of Government-wide procurement laws known as the Federal Acquisition Regulation (“FAR”) system<sup>3</sup>. The FAR system is made up of the FAR, which is the overarching set of Government-wide regulations, as well as subordinate, agency-level acquisition regulations that supplement the FAR<sup>4</sup>. For defence acquisitions, the main agency-level regulation is known as the Department of Defense FAR Supplement (“DFARS”), but individual services and organisations (e.g., Air Force, Army, Navy, Defense Logistics Agency) also have their own supplemental regulations.

The FAR and its supplements establish minimum standards in all areas of procurement and contracting, including acquisition planning,<sup>5</sup> contracting methods and types,<sup>6</sup> socioeconomic/domestic policies,<sup>7</sup> general contracting and contract management requirements,<sup>8</sup> and improper business practices and conflicts of interest<sup>9</sup>. Preventing improper business practices is a focal point of U.S. procurement regulations, with specific regulations addressing such areas as: bid rigging and collusion;<sup>10</sup> access to “inside” information;<sup>11</sup> hiring of former Government officials;<sup>12</sup> payment of gratuities, bribes, and kickbacks;<sup>13</sup> payment of improper “contingent fees” for influencing a contract award;<sup>14</sup> personal and organisational conflicts of interest;<sup>15</sup> protections for so-called “whistleblowers” who report fraud, waste, and abuse;<sup>16</sup> requirements for contractor codes of business ethics and conduct;<sup>17</sup> and mandatory reporting by contractors of overpayments and certain violations of the law in connection with procurements<sup>18</sup>.

The FAR includes 1,200 pages of detailed, prescriptive regulations covering all types of acquisitions, from “micro-purchases” (valued at less than \$3,000) to “simplified acquisitions” (valued at less than \$150,000) to “major system” acquisitions (valued, for defence programs, at more than \$189,500,000 for research, development, test, and evaluation phases or more than \$890,000,000 for a total acquisition expenditure<sup>19</sup>). The FAR contains 51 prescriptive chapters that dictate the actions that agencies “shall” and “may” take in connection with acquisitions. In addition, the FAR contains 800 pages of “standard” tender provisions and contract clauses. Each buying agency uses these “standard” provisions and clauses in creating a tender or contract, selecting and tailoring the language based on the contract’s purpose and type.

The FAR includes coverage of fundamental procurement and commercial issues such as: (1) the delegation of contracting authority to buying agencies and “Contracting Officers;”<sup>20</sup> (2) the requirement for competition in all procurements, except under limited circumstances;<sup>21</sup> (3) limitations of liability for loss or damage to Government property (including “high value items” such as aircrafts, ships, etc.);<sup>22</sup> and (4) the resolution of procurement protests and contract disputes<sup>23</sup>.

As noted above, defence agencies are also bound by the DFARS. The DFARS includes approximately 1,000 pages of supplementary, prescriptive guidance

and approximately 300 pages of defence-specific provisions and clauses for tenders and contracts. As with the FAR, the buying agency selects and tailors the applicable clauses and provisions based on the contract purpose and type.

The DFARS addresses, among other things, procurement laws that apply only to the DOD. These include laws on topics such as: (1) the hiring by contractors of former military officials;<sup>24</sup> (2) agreements for the repair and alteration of vessels;<sup>25</sup> (3) special protections for “whistleblowers” on DoD contracts;<sup>26</sup> (4) foreign military sales;<sup>27</sup> (5) acquisition of spares;<sup>28</sup> (6) special security measures for IT systems;<sup>29</sup> and (7) indemnification against unusually hazardous risks.<sup>30</sup> In addition, some Government-wide rules are specifically tailored for application to defence agencies. For example, certain limitations are placed on the use of time-and-material contracts,<sup>31</sup> enterprise software agreements,<sup>32</sup> multi-year contracting,<sup>33</sup> contractor profit on cost-type contracts,<sup>34</sup> and contractor rights in software/technical data<sup>35</sup>.

The FAR system, including agency supplements, was created in 1984 to provide a uniform set of procurement rules for all federal agencies<sup>36</sup>. The FAR replaced a system in which civilian and defence agencies were governed by different rules. The change came about because both Government and industry representatives recognized the inefficiencies and risks of using multiple procurement systems and rules. The FAR system borrowed heavily from then-existing defence regulations, but tailored these regulations for broad, Government-wide application.

The FAR system is maintained jointly by a council composed of defence and civilian agencies, with oversight by the Office of Federal Procurement Policy<sup>37</sup>. Revisions are made to the FAR and to agency-specific regulations to reflect new laws and policies, but only after public notice of the proposed change and an opportunity for comments by agencies, contractors, and the public<sup>38</sup>. In the fourth quarter of 2010, for example, there were 55 proposed, interim, or final changes published to the FAR system. Thus, the FAR system is routinely and continuously updated.

On balance, the FAR system has been a great success for the U.S. Government. While it is sometimes criticized for being overly prescriptive or complex, it provides a uniform, balanced, predictable system that both Government and industry find helpful in managing their operations. Most importantly, it accommodates the judgment and discretion of individual agencies, while providing a clear basis for monitoring integrity, fairness, and transparency in the defence procurement process.

## **II. Acquisition Organisations Located within each Major Defence Service, with Well-Trained Acquisition Professionals**

In the United States, each federal agency is responsible for planning and conducting its own acquisitions. Procurement rules are “centralized” through the FAR system, but individual agencies retain the authority to act and exercise business judgment within the system. The Office of Federal Procurement Policy has some centralized authority over procurement policy issues, but the office is

small and cannot dictate changes in procurement rules. Also, while agencies may—and often do—elect to acquire certain goods/services through “umbrella” contracts that allow centralized purchasing, generally there is no requirement to use these centralized contracts.

Contracting authority for U.S. Government contracts resides exclusively with the Contracting Officers (“COs”) located within each agency. Only COs have the authority to enter into, administer, or terminate contracts<sup>39</sup>. COs must follow the applicable regulations, but they have “wide latitude” to exercise their “business judgment.”<sup>40</sup> COs must ensure that no contract is entered into unless all requirements of statutes, executive orders, regulations, and other applicable procedures have been met<sup>41</sup>. They must also ensure that sufficient funds are available for performance of the contract and that contractors receive “impartial, fair, and equitable treatment”<sup>42</sup>.

The FAR acknowledges that the foundation of integrity within the system is “a competent, experienced, and well-trained, professional workforce”<sup>43</sup>. As such, all agencies are required to maintain a procurement career management program and a system for the selection, appointment, and termination of contracting officials<sup>44</sup>. Both defence and civilian agencies require acquisition officials to be “certified” before they can obtain certain acquisition positions. For example, the appointing official usually considers the complexity and dollar value of the acquisition to be assigned against the candidate’s “experience, training, education, business acumen, judgment, character, and reputation”<sup>45</sup>.

As a general rule, the more qualified, experienced candidates will be certified to handle more complex acquisitions with higher dollar values.

This is an area, however, where the U.S. has under-performed over the past decade and is currently facing major challenges. In fact, growing and improving the quality of the acquisition workforce is currently a top priority for policymakers in defence and civilian agencies. The goal is a priority in defence agencies because, although defence spending *increased* from \$138 billion in 2001 to \$384 billion in 2009, the defence acquisition workforce actually *decreased* by 2.6 per cent over roughly the same time period<sup>46</sup>. The Government’s acquisition functions were also increasingly “outsourced” to contractors during this period.

To address this shortage of acquisition personnel, the DoD developed the U.S. Defence Acquisition Strategic Workforce Plan in April 2010<sup>47</sup>. The plan identified two key goals: (1) to increase by 2015 the number of DoD acquisition personnel by 20,000 (10,000 new hires and 10,000 positions “in-sourced” from contractor-held positions to Government-held positions); (2) to improve the quality of the acquisition workforce<sup>48</sup>.

The strategies identified to achieve these two goals include: (1) increasing training, education, and experience requirements for meeting certification standards; (2) improving succession planning and demanding that management ensures that entry- and mid-level individuals receive appropriate certifications; (3) using appropriate retention strategies to keep individuals in the workforce longer; (4) improving recruiting and hiring initiatives; (5) investing in leadership development; (6) increasing acquisition training capacity; and (6) improving

retention and recognition incentives<sup>49</sup>. These strategies are currently being implemented across the DOD, but it is unclear, as of yet, if they will support the planned growth of the workforce.

Thus, the U.S. recognizes that a competent, experienced, well-trained workforce is essential to the success of defence procurement, but it has not invested sufficiently in building and retaining such a workforce over the past two decades. Thus, this “best practice” is clearly a work in progress.

### **III. Procurement Processes Based on Full and Open Competition**

In 1984, the U.S. Congress passed the Competition In Contracting Act requiring federal agencies—both civilian and defence—to promote and provide for “full and open competition” in tendering and awarding contracts<sup>50</sup>. This landmark law, the first major revision of U.S. procurement statutes since the 1940s<sup>51</sup>, means that all responsible sources are permitted to compete for a given procurement<sup>52</sup>.

As the U.S. Government Accountability Office recently stated:

Competition is a cornerstone of the acquisition system and a critical tool for achieving the best possible return on investment for taxpayers. The benefits of competition in acquiring goods and services from the private sector are well established. Competitive contracts can help save the taxpayer money, improve contractor performance, curb fraud, and promote accountability for results<sup>53</sup>.

Contracts may be awarded without competition, but this is supposed to occur in limited circumstances such as: (1) unusual and compelling urgency; (2) only one responsible source will meet the agency’s needs; (3) the procurement is “set aside” for small/disadvantaged businesses under the socioeconomic programs prescribed in the FAR; (4) competition is precluded by international agreement or by direction from a foreign buyer (e.g., as in the case of a foreign military sale); or (5) the disclosure of the agency’s needs would compromise national security<sup>54</sup>.

The detailed rules for competitive acquisitions are set forth in the FAR, the DFARS, and the military services’ FAR supplements, but these rules can be summarized into ten “best practices” for promoting competition in public procurements<sup>55</sup>:

- Only conduct an acquisition without competition, or restrict competition, as permitted by law and as necessary to satisfy a reasonable public requirement.
- Provide clear, adequate, and sufficiently definite information about public needs to allow suppliers to enter the acquisition on an equal basis.
- Use reasonable methods to publicize requirements and timely provide tender documents.
- State in tenders the bases to be used in evaluating bids and proposals and making award.

- Evaluate bids and proposals and make award solely on the criteria in the tender and applicable law.
- Ensuring that competitors receive impartial, fair, and equivalent treatment in the conduct of a procurement.
- Grant maximum public access to procurement information consistent with the protection of trade secrets, source selection information, and personal privacy rights.
- Ensure that all parties involved in the acquisition process act fairly, honestly, and in good faith.

These principles are the foundation for effective, transparent competition in the U.S. that protects the public fisc and promotes integrity and accountability in public procurement. As outlined below, if a contractor believes that any of these rules has been violated, it may “protest” the Government’s action and seek an independent review of the procurement. Thus, the rules are enforceable and, as a result, are routinely followed by both Government and industry.

#### **IV. “Best Value” Acquisition Based on an Integrated Assessment of Technical, Price, and other Factors**

In the United States, competitive defence acquisitions are accomplished using a variety of competitive procedures, but the three most common methods are (i) sealed bidding, (ii) orders under Indefinite Delivery, Indefinite-Quantity (“IDIQ”) contracts, and (iii) negotiated procurement.

Sealed bidding occurs when award is made to the responsible bidder whose bid conforms to the tender and is lowest in price<sup>56</sup>. Sealed bidding generally is used for the acquisition of commodities and other, non-complex items where the evaluation of the relative merits of suppliers’ technical approaches is not necessary.

Ordering under an IDIQ contract involves issuing a delivery order (for supplies) or a task order (for services) under a pre-existing, previously competed “framework” (or “umbrella”) contract; the orders are based on the pre-established prices, requirements, and terms of the framework contract<sup>57</sup>. IDIQ contracts are typically awarded to multiple contractors such that subsequent orders can be further “competed” among the IDIQ contract holders<sup>58</sup>. One commonly used type of IDIQ contract is called the Federal Supply Schedule contract, which is used for the acquisition of supplies and services that are commercially available or similar to those commercially available<sup>59</sup>. FSS orders allow for limited competition (i.e., soliciting just three sources)<sup>60</sup> and a streamlined procurement process, so they are a popular method of acquiring commercial goods and services<sup>61</sup>.

Under negotiated procurements, award is made to the responsible offer or that provides the “best value” to the Government in accordance with technical, cost, and other factors set forth in the tender<sup>62</sup>. The FAR defines “best value” as “the expected outcome of an acquisition that, in the Government’s estimation, provides the greatest overall benefit in response to the requirement”<sup>63</sup>.

Negotiated procurement is typically used for large and/or complex acquisitions where the evaluation of the offerors' technical approaches and other non-price factors is appropriate.

In a "best value" evaluation, the agency must identify in the tender the specific factors and subfactors that are important to the evaluation, such as price/cost, technical excellence, past performance history, use of small/disadvantaged businesses, and other non-price factors identified by an agency<sup>64</sup>. These may include factors such as the delivery schedule, management capability, personnel qualifications, and logistics capability. The agency must also clearly specify the "relative importance" of the factors and sub factors<sup>65</sup>.

For example, the relative importance of price may vary from one procurement to the next. Where requirements are clearly definable and the risk of unsuccessful contract performance is minimal, price may be the most important factor in an evaluation. By contrast, where requirements are less defined, more development work is required, or performance risk is greater, technical and other non-price factors may be most important. As a practical matter, in most large defence procurements in the U.S., non-price factors are cumulatively more important than price factors.

After the agency has identified the factors/subfactors and their relative importance, the agency then evaluates all proposals against all evaluation factors, and the proposals are ranked on an integrated assessment of all technical, price, and non-price factors<sup>66</sup>. The agency has the discretion to conduct discussions or clarifications with offerors to clarify proposals and to identify deficiencies and significant weaknesses in proposals<sup>67</sup>. If discussions are to be conducted, the agency may establish a competitive range of the most highly rated proposals and conduct discussions only with those offerors determined to be within the competitive range<sup>68</sup>. If discussions are conducted, all offerors must be treated equally, and each offeror must be given an opportunity to submit a Final Proposal Revision (formerly called a "Best & Final Offer") that includes technical, price, and other changes to its proposal<sup>69</sup>.

Contract award is made to the responsible offeror that provides the "best value" to the Government, as measured by the technical, price, and other factors—and their respective weights—set forth in the tender. As noted above, "best value" essentially means "the greatest overall benefit" to the Government. As such, best value does not always equal "lowest price." The agency can award to the higher-priced offeror if the award is consistent with the tender and the technical excellence of the offeror justifies paying a price premium. Thus, "best value" acquisition gives the agency significant discretion to make tradeoffs among price and non-price factors and to select the offer that best meets the agency's needs<sup>70</sup>.

The "best value" approach differs notably from processes that segregate the evaluation of technical merit from the evaluation of price, such as the two-step process used by the Indian Ministry of Defence in the recent Medium Multi-Role Combat Aircraft (MMRCA) procurement. In the MMRCA procurement, if "technical excellence" had been the standard, suppliers need not have been

eliminated for failing to meet threshold requirements; rather, the Ministry could have evaluated the technical merit of each offer as a whole, and perceived weaknesses in certain areas could have been traded against significant strengths in other areas. In addition, the down-select (or competitive range) decision in a best-value procurement is based on an integrated assessment of non-price and price factors, rather than just technical scores; thus, price is always a factor in such decisions.

In short, the principal advantage of “best value” acquisition is that it allows agencies to make comparisons of non-price factors among proposals and to then decide—in a common-sense way, as buyers typically do—if the non-price differences are worth the proposed price differences. A potential disadvantage of this approach, however, is that the agency’s discretion to perform such tradeoffs and exercise its business judgment can create the risk of improper influences on the award of the contract. This risk has been mitigated in the U.S., as described below, by the creation of transparent processes for debriefing suppliers and for challenging awards.

## **V. Transparent Award Process with Debriefing of All Offerors**

In competitive negotiated procurements in the U.S., both the agency’s award decision and its supporting rationale are transparent and available to all competitors. Specifically, within three days of contract award, defence and civilian agencies must provide written notice to unsuccessful offerors of the following information: (1) number of offerors solicited and proposals received; (2) name and address of offeror receiving the award; (3) items, quantities and unit prices (or total contract price if there are no unit prices); and (4) general reasons the offeror’s proposal was not accepted<sup>71</sup>.

Within three days of receiving a written notice of award, an unsuccessful offeror may request a “debriefing” that explains the agency’s evaluation and award decision<sup>72</sup>. Upon receiving a timely request for a debriefing, defence and civilian agencies must provide the unsuccessful offeror with a debriefing. To the maximum extent practicable, the debriefing should occur within five days of the request<sup>73</sup>. At the agency’s discretion, the debriefing may be done orally or in writing<sup>74</sup>.

At a minimum, the debriefing must include the following information: (1) the agency’s evaluation of deficiencies and weaknesses in an offeror’s proposal; (2) the overall evaluated cost or price and technical rating of the successful offeror and the debriefed offeror; (3) the past performance evaluation of the debriefed offeror; (4) the overall ranking of all offerors; (5) the summary of the rationale for award; (6) the make and model of commercially available items to be delivered; and (7) a reasonable response to questions about whether proper procedures and regulations were followed<sup>75</sup>.

Thus, in negotiated procurements, unsuccessful offerors in the U.S. typically have clear visibility into why they lost a procurement and whether the award decision was consistent with procurement law and the terms of the tender. The policy behind such debriefings was summarized in 2004 by the Federal



Acquisition Advisory Panel, which considered whether debriefings also should be available for FSS orders:

Where agencies are making acquisitions of goods or services under a negotiated process involving a statement of work and evaluation criteria, the Panel sees no basis for not providing a debriefing to the unsuccessful offeror(s), regardless of the contract type involved. Companies expend significant bid and proposal costs in response to [FSS] solicitations, just as they do in response to other solicitations. The Panel believes that debriefings are a good business practice. It is important that the government share its rationale regarding a task order award with losing offerors in order to create a climate of continuous improvement. Offerors need to understand where they can improve their approaches to meeting the government's needs. While FAR Part 8 encourages debriefings for [FSS] orders, it does not require them. There is no requirement for debriefings for orders under multiple award contracts. The Panel believes providing debriefings will increase confidence in the integrity of the procurement process<sup>76</sup>.

These conclusions are consistent with the authors' experience. In practice, transparency—and the possibility of a subsequent challenge to award—motivates agencies to take care regarding the integrity, reasoning, and documentation of award decisions. And this level of care leads to acquisition decisions that, in every sense, are in the public interest.

## **VI. Forums for Challenging Procurement Decisions**

In the United States, the federal Government has waived its sovereign immunity regarding challenges to procurement decisions—i.e., in U.S. parlance, “bid protests”. Thus, a contractor who believes procurement was conducted unreasonably, or contrary to law or the terms of a tender, may challenge the procurement through a bid protest filed prior to or after award. Protests may be filed directly with the agency or, as occurs more often, with either an administrative forum (U.S. Government Accountability Office) or a judicial forum (U.S. Court of Federal Claims)<sup>77</sup>.

The terms of a tender may be challenged prior to the award if the protest is filed before the due date for submission of proposals<sup>78</sup>. The classic protest of this type is a challenge to “unduly restrictive” specifications in a tender (i.e., specifications that favour a particular offeror or are unnecessary to meet the agency's minimum needs). Other examples of pre-award protests include challenges to “brand name or equal” specifications, challenges to unreasonably short proposal response periods, and challenges to an elimination or disqualification from procurement.

The award of a contract may be challenged in a post-award protest filed by an actual offeror within 10 days of learning for the basis for protest<sup>79</sup>. Common bases for post-award protests include: an erroneous or unreasonable technical or pricing evaluation; violation of procurement procedures; lack of equal treatment among offerors; and lack of meaningful discussions with one of the

offerors. If an agency or GAO protest is filed within either five days of debriefing or 10 days of award, contract performance is typically suspended until a decision on the protest is issued<sup>80</sup>. In a court protest, there is no automatic suspension of contract performance when a protest is filed, but the court can enjoin contract performance; as a result, agencies often agree to voluntarily suspend performance rather than face a court-imposed injunction. Other potential offerors can “intervene” and participate as a party in a tender protest; in an award protest, only the successful offeror(s) can intervene and participate in the protest<sup>81</sup>.

Protests must be in writing and must identify with specificity: (1) the factual and legal bases for the alleged improprieties, and (2) how the alleged improprieties adversely affected the protestor’s chances of receiving award<sup>82</sup>.

If a protest is filed, the agency must, within 30 days, respond in writing to each of the protestor’s allegations of impropriety, with citations to the written record of the procurement<sup>83</sup>. The agency also must produce the entire documentary record of the procurement, including all relevant proposals, evaluation materials, acquisition plans, and correspondence among evaluators<sup>84</sup>.

Lawyers for all parties are allowed to review the entire procurement record<sup>85</sup>. Thus, through its counsel, the protestor obtains full transparency of the procurement process. The protestor can also file new protest grounds if they are revealed for the first time in the procurement record. Parties exchange legal briefs on protest issues, and the protest forum then issues a written decision based on the briefs and the procurement record. In rare cases (less than 10 per cent), an evidentiary hearing may be conducted.

The protestor has the burden of proof and must demonstrate that the agency’s actions were contrary to procurement law, contrary to the terms of the tender, or were otherwise arbitrary, capricious, unreasonable, or an abuse of discretion<sup>86</sup>. The decision on a protest is typically rendered within three to four months of when the protest was filed. If a protest is denied, the tender goes forward or contract performance resumes, and all parties bear their own costs. However, if the protest is sustained, the agency must take “corrective action” and remedy the identified flaws in the tender or evaluation process. If the evaluation was flawed, the agency generally corrects the evaluation and makes a “new” award decision, often to the same offeror based on a corrected record. A successful protestor does not recover “lost profits” on the contract, but does receive its legal costs, and, in limited cases, its proposal preparation costs.

The GAO heard 1,989 protests in Fiscal Year 2009 and sustained 18 per cent of those<sup>87</sup>. In addition, GAO reported that protestors obtained some form of relief from the agency in 45 per cent of its FY09 protests. The U.S. Court of Federal Claims hears roughly 75 protests a year, and practitioners believe the sustain rate and “corrective action” rates are approximately the same or perhaps marginally lower.

In 2008, after GAO sustained protests in several high-profile defence procurements, some U.S. Government officials lamented the delays and costs associated with protests and questioned the policy reasons for the bid-protest system. In May 2008, the U.S. Congress ordered GAO to assess the extent to which frivolous and improper protests were increasing and provide recommendations on how to disincentivize frivolous and improper bid protests

on the part of industry<sup>88</sup>. In April 2009, after analyzing its recent experience and the policy underpinnings of the system, GAO found that bid protests play a critical role in the U.S. procurement system:

At the heart of the law's bid protest provisions is a balancing act that attempts to ensure that procurements can proceed without undue disruption, while also providing a mechanism for holding agencies accountable, and protecting the rights of aggrieved offerors to fair treatment by the government<sup>89</sup>.

The GAO identified five policy reasons<sup>90</sup> supporting the bid-protest system. First, protestors act as "private attorneys general" who use the process to identify and pursue complaints concerning the procurement system, thereby enhancing the integrity of the system. Second, because GAO is an arm of Congress, protests provide a form of indirect congressional oversight of the procurement process. Third, protests bring an important element of transparency and accountability into the federal procurement system that otherwise would be unavailable. Fourth, protests provide guidance to agencies and contractors in the form of publicly available decisions that interpret procurement laws and regulations. Fifth, protests promote competition by providing contractors confidence that concerns regarding unfair treatment can be addressed in a neutral forum.

Thus, the protest process in the U.S. is generally perceived as a system that ensures the integrity and fairness of federal procurements. While there is a cost associated with providing transparency to all participants, the benefits of that transparency are better acquisition decisions and less fraud, waste, and abuse in the procurement system.

## **VII. Conclusion**

The consensus among procurement professionals, legal practitioners, academics, and commentators in the U.S. is that a well-structured and transparent procurement process is essential for effective defence procurement. That being said, each country's procurement system must reflect its national objectives and requirements, so there clearly is room for discussion and for learning from each other regarding the procurement practices that are best suited for each nation. This description of defence procurement in the U.S. and its "best practices" is offered as an example of how the United States has attempted to address the central acquisition challenge for all nations of building a strong procurement legal structure.

### NOTES

1. Mr. Rector is a partner in the Washington, D.C. office of DLA Piper LLP, where he chairs the U.S. Government Contracts practice. Ms. Gauvin is an associate in the U.S. Government Contracts practice of DLA Piper LLP.
2. Domestic policies can include developing and maintaining a self-reliant capability in defence production, requiring foreign suppliers to provide investment (or "offsets") within the acquiring country, encouraging the creation of small businesses, protecting the interests of disadvantaged businesses, and promoting fair labor and employment practices. As this list makes clear, domestic concerns—alone—can require complex tradeoffs and decision making.

3. The FAR system, which is set forth in Chapter 48 of the U.S. Code of Federal Regulations, provides uniform policies for acquisitions by most executive agencies of the U.S. federal government; however, there are a small number of federal entities to which the FAR does not apply. For example, the Federal Aviation Administration, the United States Postal Service, and the Central Intelligence Agency—due to their special missions—are not bound by the FAR. In addition, certain Government entities that acquires goods and services using self-generated revenues, rather than funds appropriated by the U.S. Congress, are also exempt from the FAR. The FAR is jointly issued and maintained by three agencies: the Department of Defense (“DOD”), the General Services Administration (“GSA”), and the National Aeronautics and Space Administration (“NASA”). See 48 Code of Federal Regulations (“C.F.R.”) § 1.103(b). The development of the FAR system is dictated by the requirements of the Office of Federal Procurement Policy Act of 1974 (Pub. L. 93-400), as amended by Pub. L. 96-83. See 48 C.F.R. § 1.103(a).
4. See 48 C.F.R. § 1.101.
5. See generally FAR Parts 5-12.
6. See generally FAR Parts 13-18.
7. See generally FAR Parts 19-26.
8. See generally FAR Parts 27-33, 42-51.
9. See FAR Part 3.
10. See 48 C.F.R. § 3.103-1 (requiring the insertion of the Certificate of Independent Pricing clause, through which offerors certify, inter alia, that their prices have been arrived at independently without any collusion with others, in tenders contemplating a fixed-price contract).
11. See 48 C.F.R. § 3.104-3(b) (establishing a prohibition on knowingly obtaining another contractor’s bid/proposal information or the Government’s non-public, “source selection” information before the award of a contract); 48 C.F.R. § 9.505(b) (prohibiting contractors from competing for a procurement in which they have an “organisational conflict of interest” based on obtaining unequal access to inside information through the performance of a prior Government contract).
12. See 48 C.F.R. § 3.104-3(d).
13. For the prohibition against gratuities, see 48 C.F.R. § 3.101-2. For the prohibition against kickbacks, see 48 C.F.R. § 3.502.
14. See 48 C.F.R. § 3.400.
15. See 48 C.F.R. § 3.104-2 (personal conflicts of interest); 48 C.F.R. § 9.500 (organisational conflicts of interest).
16. See 48 C.F.R. § 3.900.
17. See 48 C.F.R. § 3.1000.
18. *Id.*
19. See 48 C.F.R. § 2.101 (defining each type of acquisition).
20. See 48 C.F.R. § 1.601, 1.602.
21. See generally FAR Part 6.
22. See 48 C.F.R. § 45.104; 48 C.F.R. § 52.245-1(h).
23. See generally FAR Part 33.
24. See DFARS 203.171.
25. See DFARS 217.71.
26. See DFARS 203.903.
27. See DFARS § 225.73.
28. See generally DFARS § 217.75.
29. See DFARS 239.71.
30. See DFARS 250.104-3.
31. See DFARS 216.601-3(d).
32. See DFARS 208.7402.
33. See DFARS 217.170.
34. See, e.g., DFARS 216.306(c).
35. See generally DFARS 227.71.

36. See Office of the Federal Procurement Policy Act of 1974 (Pub.L. 93-400), as amended by Pub. L. 96-83.
37. See 48 C.F.R. § 101.4; 48 C.F.R. § 1.201-1 (describing the two FAR councils and their responsibilities).
38. See 48 C.F.R. § 1.501-2 (describing opportunity for public comment on proposed significant revisions to the FAR).
39. See 48 C.F.R. § 1.602-1.
40. 48 C.F.R. § 1.602-2 (“Contracting Officers should be allowed wide latitude to exercise business judgment.”).
41. See 48 C.F.R. § 1.602-1(b).
42. 48 C.F.R. § 1.602-2.
43. 48 C.F.R. § 1.102-2(c)(1).
44. See 48 C.F.R. § 1.603-1.
45. 48 C.F.R. § 1.603-2.
46. U.S. Department of Defense, DOD Strategic Human Capital Plan Update: The Defense Acquisition Workforce, at 1-3 (April 2010).
47. *Id.*
48. *Id.*
49. *Id.* at 1-3, 1-6 to 1-12.
50. See 10 U.S.C. § 2304 (defence agencies); 41 U.S.C. § 251 (civilian agencies). See also 48 C.F.R. § 6.101(a) (“Contracting officers shall promote and provide for full and open competition in soliciting offers and awarding Government contracts.”); 48 C.F.R. § 6.101(b) (“Contracting officers shall provide for full and open competition through use of the competitive procedure(s) contained in this subpart that are best suited to the circumstances of the contract action and consistent with the need to fulfill the Government’s requirements efficiently.”); 48 C.F.R. § 2.101 (defining full and open competition as meaning that “all responsible sources are permitted to compete”).
51. Ralph C. Nash, Steven L. Schooner, Karen R. O’Brien, *The Government Contracts Reference Book* 106 (2d ed. 1998).
52. See 48 C.F.R. § 2.101 (defining “full and open competition” to mean that “all responsible sources are permitted to compete”).
53. U.S. Government Accountability Office, *Opportunities Exist to Increase Competition and Assess Reasons When Only One Offer Is Received*, GAO-10-833, at 1 (July 2010).
54. See FAR Part 6 for a fuller discussion of the circumstances in which contracts can be awarded without competition. Over the past decade, the wars in Iraq and Afghanistan have reportedly led to a decline in competitive contracting by the DoD. For example, in fiscal year 2009, among agencies that obligated over \$1 billion, the Navy and Air Force had some of the highest percentages of non-competitive contract obligations, at about 45 percent. See U.S. Government Accountability Office, *Opportunities Exist to Increase Competition and Assess Reasons When Only One Offer Is Received*, GAO-10-833, at 11 (July 2010). See also The Center for Public Integrity, *iwatch news*, *Windfalls of war: Pentagon’s no-bid contracts triple in 10 years of war* (August 29, 2011).
55. See American Bar Association, *Sections of Public Contract Law and State and Local Government Law, Principles of Competition In Public Procurements*, August 1998.
56. See FAR Part 14.
57. See FAR Part 8.4.
58. See FAR Subpart 16.5.
59. See FAR Subpart 8.4.
60. See, e.g., 48 C.F.R. § 8.405-2(c)(2)(ii).
61. See FAR Subpart 8.4.
62. See FAR Part 15.
63. See FAR Part 2, “Definitions.”
64. See 48 C.F.R. § 15.304, “Evaluation Factors and Significant Subfactors.”
65. 48 C.F.R. § 15.203(a)(4).
66. See FAR Part 15.305, “Proposal Evaluation.”

67. See FAR Part 15.306.
68. See 48 C.F.R. § 15.306(c).
69. See 48 C.F.R. § 15.306(e)(1)(discussing equal treatment of offerors); 48 C.F.R. § 15.307 (discussing Final Proposal Revision).
70. 48 C.F.R. § 15.308 (“The source selection authority’s (SSA) decision shall be based on a comparative assessment of proposals against all source selection criteria in the solicitation. While the SSA may use reports and analyses prepared by others, the source selection decision shall represent the SSA’s independent judgment. The source selection decision shall be documented, and the documentation shall include the rationale for any business judgments and tradeoffs made or relied on by the SSA, including benefits associated with additional costs.”).
71. See 48 C.F.R. § 15.503(b)(1).
72. See 48 C.F.R. § 15.506.
73. See 48 C.F.R. § 15.506 (a)(2).
74. See 48 C.F.R. § 15.506(b).
75. See 48 C.F.R. § 15.506(d).
76. Report of the Acquisition Advisory Panel to the Office of Federal Procurement Policy and the U.S. Congress, 107 (January 2007).
77. See 48 C.F.R. § 33.103 (providing for protests filed with the agency awarding the contract); 28 U.S.C. § 1491 (providing an independent judicial forum, the U.S. Court of Federal Claims); 4 C.F.R. Part 21 (providing an independent administrative forum, the U.S. Government Accountability Office).
78. See, e.g., 4 C.F.R. § 21.2(a)(1) (GAO protest); 48 C.F.R. § 33.103(e) (agency protest); *Blue & Gold Fleet, L.P. v. United States*, 492 F.3d 1308 (Fed. Cir. 2007) (court protest).
79. See, e.g., 4 C.F.R. § 21.2(a)(2) (GAO protest); 48 C.F.R. § 33.103(e) (agency protest). There is no deadline for filing of a post-award protest in court; however, if the delay is unreasonable, the court may be disinclined to award injunctive relief (e.g., suspension of contract performance while the protest is pending).
80. See 31 U.S.C. § 3553(c)(1) (GAO protest); 48 C.F.R. § 33.103(f)(3) (agency protest).
81. See, e.g., 4 C.F.R. § 21.0(b)(1) (“Intervenor means an awardee if the award has been made or, if no award has been made, all bidders or offerors who appear to have a substantial prospect of receiving an award if the protest is denied.”).
82. See, e.g., 4 C.F.R. § 21.1.
83. See, e.g., 4 C.F.R. § 21.3(c).
84. See, e.g., 4 C.F.R. § 21.3(d).
85. See, e.g., 4 C.F.R. § 21.4 (discussing “Protective Order” process allowing counsel access to the entire procurement record).
86. See *Neeser Const. Co./Allied Builders Sys., J.V.*, B-285903, Oct. 25, 2000, 2000 CPD ¶ 207, at 2 (stating that the protester must demonstrate that the evaluation was unreasonable, a “burden that is not met by mere expressions of disagreement with the evaluation”); *L-3 STRATIS*, B-404865, June 8, 2011, 2011 CPD ¶ 119, at 7 (denying protest because protester failed to show that the agency’s evaluation was unreasonable or otherwise improper); *RCD Cleaning Serv., Inc. v. United States*, 97 Fed. Cl. 582, 586 (2011), quoting *Banknote Corp. of Am. v. United States*, 365 F.3d 1345, 1350-51 (Fed. Cir. 2004) (stating that the proper legal standard to be applied in bid protest cases is whether the agency action was arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law). *Accord Glenn Def. Marine (Asia) PTE, Ltd. v. United States*, 97 Fed. Cl. 311, 317 (2011).
87. See U.S. Government Accountability Office, *Annual Report to Congress on Bid Protests*, GAO 10-264-R, at 2 (January 2010).
88. See U.S. Government Accountability Office, *Report to Congress on Bid Protests Involving Defense Procurements*, GAO B-401197, at 1 (April 2009). *GAO Bid Protests Overview*, GAO 10-534-SP, at 3.
89. *Id.* at 3.
90. *Id.* at 13-15.

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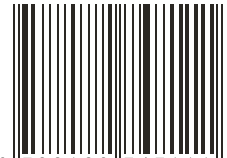
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