MANOHAR PARRIKAR INSTITUTE FOR DEFENCE STUDIES AND ANALYSES
मनोहर पर्रिकर रक्षा अध्ययन एवं विश्लेषण संस्थान

MP-IDSA
Issue Brief

# BrahMos: 25 Years of the Joint Venture

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May 29, 2023

## Summary

The BrahMos JV was formed in 1998 and the first successful launch of the missile took place in 2001. The missile has since been inducted into the Indian armed forces. Surprisingly, the BrahMos has not been inducted into the Russian armed forces. BrahMos has very few competitors in the international market. The 2022 Philippines deal should spur additional exports of the supersonic cruise missile. India, though, needs to more actively develop marketing and promotion networks akin to established players in the global market to promote defence sales.

BrahMos Aerospace was formed as a joint venture between the Defence Research and Development Organisation (DRDO) and the Joint Stock Company 'Military Industrial Consortium' 'NPO Manhinostroyenia' (also known as Federal State Unitary Enterprise NPOM of Russia). An Inter-Governmental agreement was signed on 12 February 1998. The JV was established with an authorised capital of US$ 250 million, with 50.5 per cent contribution from the Indian side and 49.5 per cent from the Russian side.

The collaboration was made possible by sharing the technological strength of both partners—DRDO and NPOM. DRDO had developed crucial systems like inertial navigation systems, mission software, and mobile launchers for Prithvi and Agni missiles as part of the Integrated Guided Missile development programme (IGMDP), launched in 1983. NPOM had expertise in the area of ramjet engines together with a number of technologies for space systems, launch vehicles and cruise missiles. Work on the project began in several specialised laboratories of DRDO and NPOM. The first successful launch of the missile took place on 21 June 2001. It was test-fired from its land-based launcher at the Interim Test Range off the Chandipur coast in Orissa. The two-stage supersonic cruise missile has a solid propellant booster engine as its first stage, which brings it to supersonic speed and gets separated. The liquid ramjet, the second stage, takes the missile closer to 3 Mach speed in the cruise phase. The ramjet engine, though powerful, is only functional at velocities above 1 Mach and hence the detachable solid propellant booster engine.[1]

The initial version of the BrahMos had a flight range of 290 kms. It can carry a conventional warhead weighing 200 kgs to 300 kgs, cruising altitude up to 15 kms and terminal altitude as low as 10 m. The missile is not known to be interceptable by any known weapon system in the world. It can be launched from the sea, land or air. The ship-based version was inducted in the Navy in 2005, the land-based version in the Army in 2007, and the air-launched version was inducted in the Air Force in 2020.

The range of the BrahMos was deliberately capped at 290 kms to avoid violating the Missile Technology Control Regime (MTCR).[2] The MTCR is a voluntary multilateral grouping that aims to limit the spread of missile technologies that may be used for chemical, biological and nuclear attacks. To achieve its objectives, the MTCR restricts the transfer of missiles and certain technologies to non-MTCR members. India became a member in 2016, and hence Russia would have been in violation of the MTCR if it had helped India build a cruise missile with a range of more than 300

[1] A. Sivathanu Pillai, *Success Mantra of BrahMos: The Path Unexplored*, Pentagon Press, August 2014.

[2] Vijainder K Thakur, **"India Could Boost BrahMos Supersonic Missile's Range to 1000 km Thanks to Russian Upgrade of Onyx Missile"**, *The EurAsian Times*, 10 December 2022.

kms. After India became a member of the MTCR, the BrahMos-ER version of the missile with an extended range of more than 400 kms was successfully tested in March 2017. This version was ordered by the Navy in 2022.

As for the indigenous content of the missile, India developed the seeker for the missile, which was first successfully tested in March 2018.[3] As far back as in 2008, the then-CEO of BrahMos, A. Sivathanu Pillai has flagged the desire to indigenise the technology for Brahmos's seeker and engine. India has extensively tried to procure technological offsets for the BrahMos's ramjet engine from Russia, but to no avail.[4] Consequently, India is working on developing the liquid ramjet engine for the BrahMos. A BrahMos missile with an Indian Propulsion System was tested in 2019.[5] However, it is unlikely that the propulsion unit was produced exclusively from components produced in India.[6] In any case, the technology has not been inducted yet, indicating that it is still in the development phase.

As for the cost of the missile, reports note that the surface-launched version of the missile has an estimated cost of about US$ 3.2- 3.5 million, the air-launched version costs around US$ 5.5 million and the extended-range surface-launched version costs around US$ 4.85 million.[7]

## BrahMos and Induction in Russian Armed Forces

The missile, jointly developed by India and Russia, has surprisingly never been inducted into the Russian armed forces. From 1980s, the Soviet Union had been working on developing ramjet technology for a supersonic cruise missile. By 1993, they had developed a viable liquid propellant-based ramjet engine-based supersonic cruise missile, the P-800 Oniks, ahead of anyone in the world. The missile was inducted in Russia in 2002. It flies at a top speed of 2.2 Mach and has a range of 600 kms.

In 1998, Russia signed the BrahMos JV with India, which was to use the same engine technology as the Oniks. The 49.5 per cent of Russian capital for the venture was to

[3] **"Why the BrahMos Missile Test on March 22 is an Indian Gamechanger"**, *LiveFist Defence.com*, 25 March 2018.

[4] **"LiveFist Exclusive: The Truth About BrahMos – Part II"**, *LiveFist Defence.com*, 10 February 2018.

[5] **"BrahMos Supersonic Cruise Missile, with Major Indigenous Systems, Successfully Test-fired"**, Press Information Bureau, Ministry of Defence, Government of India, 30 September 2019.

[6] Email correspondence with Sqn Ldr Vijainder K. Thakur, former IAF pilot and military analyst, dated 11 May 2023.

[7] Ajai Shukla, **"Revealed: How Much New BrahMos Missiles Cost"**, *rediff.com*, 26 September 2022.

be obtained by converting India's dept repayments to Russia into capital.[8] Indeed, the BrahMos missile is not significantly different from the P-800 Oniks.[9] It is likely that they did not need the BrahMos for their forces, as they already had the Oniks. By the late 2000s, as India pushed Russia to induct the missiles, the Russian side time and again agreed to do so, with then Prime Minister Vladimir Putin himself agreeing to induct it in their armed forces on his 2009 visit to New Delhi.[10]

Since Russia already had its own supersonic cruise missile, its willingness to engage in the JV with the BrahMos can most likely be attributed to economic and strategic factors. Economically, Russia benefitted from the sale of the missile to India, which may or may not have bought the Oniks, certainly not in the quantities it has inducted the BrahMos. Strategically, Russia has likely benefitted from its investment in BrahMos Aerospace by utilising some technology developed for BrahMos on the Oniks. BrahMos funded the strengthening of the Su-30MKI under-fuselage hard point by Sukhoi and the Hindustan Aeronautics Limited (HAL). Russia seems to have incorporated the upgrade in its Su-30SM2 variant upgrade. Russia's equivalent of the air-launched BrahMos is the Kh-61 Yakhont. Earlier, only the Su-35S and Su-34 could carry the Kh-61. Now the Su-30SM2 can also carry the missile.[11]

## BrahMos' Competitors

One of the most prominent cruise missiles in the world is the Tomahawk, developed by the US. Notably, it is subsonic, flies around 0.8 Mach, and costs about US$ 1.7 million per unit.[12] It has a range of about 1,600 kms, much more than the BrahMos, but its speed makes it relatively slow and somewhat easier to intercept. However, since the range of the missile is above the 300kms threshold, the US would not sell the missiles to non-MTCR member states, significantly reducing the potential buyers. It has so far only been exported to the UK and Australia.

A similar argument can also be made for another US missile. The Joint Air to Surface Stand-off Missile (JASSM), like the Tomahawk, is a subsonic cruise missile. It comes in three variants of different ranges, i.e., 370 kms, 1,000 kms and 1,800 kms, priced

[8] A Sivathanu Pillai, *Success Mantra of BrahMos: The Path Unexplored*, no. 1.

[9] **"Why the BrahMos Missile Test on March 22 is an Indian Gamechanger"**, no. 3.

[10] **"Europe Can Emulate Indo-Russian Defence Corporation"**, *The Hindu*, 13 September 2009.

[11] Carlo Kopp, **"Soviet/Russian Cruise Missiles"**, Technical Report APA-TR-2008-0805, Air Power Australia, August 2009.

[12] Ashish Dangwal, **"Tomahawk Missiles: Japan to Spend Billions on Procuring & Deploying US Navy Missiles to Deter China"**, *The EurAsian Times*, 25 December 2022.

respectively from US$ 1–1.5 million with variations for different ranges.[13] Austria, Finland and Poland have so far imported the JASSM.

The French Apache series of missiles is also a prominent cruise missile, with a top speed of 1 Mach. This has been inducted by UAE, Greece, Saudi Arabia, the UK and Italy, besides France. The Chinese inducted the YJ-18[14] into the PLA in 2014. It has a range of 220–540 kms and cruises at subsonic speed before accelerating to supersonic speed in the terminal stage. China has approved the missile for export in 2021.[15] It has not been exported so far.

The Russian P-800 Oniks, as discussed earlier, is a supersonic cruise missile with specifications somewhat similar to BrahMos and flies at a top speed of 2.2 Mach. Its export version, with a range cap of 300 kms, was reportedly sold to Indonesia in 2009 for US$ 1.25 million, considerably lower than the BrahMos. The missile is currently possessed by Vietnam, Indonesia, Syria[16] and allegedly Hezbollah.[17]

## Export Potential

To date, a contract for the export of the BrahMos has been signed with only one country, the Philippines, in January 2022. Over the years, however, many countries have shown an interest in the missile. In 2001, the then-Malaysian Prime Minister Mahathir Mohamad expressed an interest in the missile at the Langkawi International Maritime and Aerospace Exhibition (LIMA) 2001. It was reported in 2005 that Chile was interested in buying the missile and that the Russians had consented to the sale.[18] In 2006, then-President A.P.J. Abdul Kalam said that the time had come for the marketing of the missile.[19] Later that year, CEO Pillai travelled to a friendly country not adjoining India's borders to market the missile.

In 2007, Pillai announced that the first export of BrahMos to a friendly country was expected by the end of that year.[20] An article in *The Hindu* stated that BrahMos

[13] **"JASSM/ JASSM ER"**, Center for Strategic and International Studies, 30 July 2021.

[14] **"YJ-18", Center for Strategic and International Studies**, 28 July, 2021.

[15] Ridzwan Rahmat, **"Airshow China 2021: China Showcases Export Variant of YJ-18 Submarine-launched Cruise Missile"**, *Janes,* 29 September 2021.

[16] **"P-800 Oniks/Yakhont/Bastion (SS-N-26 Strobile)"**, Center for Strategic and International Studies, 12 August 2021.

[17] Patrick Megahan, **"Russian Yakhont Missiles in Hezbollah's Hands"**, Foundation for Defense of Democracies, 4 January 2014.

[18] **"India Opens Stall in Billion Global Arms Bazaar"**, *BrahMos Aerospace*, 25 November 2005.

[19] **"Time has Come to Market BrahMos: India"**, *BrahMos Aerospace,* 18 March 2006.

[20] **"Commercial Export of BrahMos Likely by Year-end",** *BrahMos Aerospace,* 20 May 2007.

Aerospace could export at least 1,000 missiles over a decade on achieving full production. In 2009, defence officials from Brazil, Chile and South Africa showed an interest in the missile at the Latin America Aero and Defence Expo organised in Rio de Janeiro.[21] In 2010, an article in *Sputnik International*, a Russian state-owned news agency, estimated that 500 BrahMos missiles could be exported to other countries in the forthcoming decade.[22] Later that year, a senior defence official said that the missile was generating a lot of global attention, particularly from South America, the Middle East, Asia Pacific and African regions.[23] BrahMos Aerospace aimed at creating an order book of US$ 13 billion for the missile.[24]

In August 2014, then CEO of BrahMos Aerospace, Sudhir Kumar Mishra, remarked that several South East Asian and Latin American countries had expressed interest in buying the missile, and it was expected that contracts would be signed in the near future.[25] It is reported that the countries that Mishra was referring to at that time were Vietnam and Indonesia in South East Asia and Venezuela in Latin America.

In September 2014, during then President Pranab Mukherjee's visit to Vietnam, India extended a US$ 100 million credit line to the country, plausibly for the sale of the missile.[26] Later that year, in October, the CEO said that a few friendly nations in the 'distant neighbourhood' had been shortlisted for the missile sale and that the Russian and the Indian government were to take a call on the same. The 'distant neighbourhood' most likely referenced Vietnam and Indonesia. He also remarked that it could happen anytime as the new government at that time had made its intent to export weapons clear.[27] A couple of days later, Mishra said that India and Russia had cleared six to seven countries for BrahMos's exports.[28] In November 2014, providing more clarity on Russia's position on the Vietnam deal, Maj Gen P. K. Chakravorty, advisor to BrahMos Aerospace, said that Russia had given clearance to India to sell the missile to Vietnam.

At the Defence Expo in March 2016, Mishra reiterated that consultations with four nations were going on regarding the export of the missile. Citing the sensitivity of the

[21] **"BrahMos Attracts Buyers at Latin American Defence Expo"**, *BrahMos Aerospace* 26 April 2009.

[22] **"India to Buy More BrahMos Missiles"**, *Sputnik International*, 2 February 2010.

[23] Peerzada Abrar, **"BrahMos Aims to Create $13 billion Order Book"**, *The Economic Times*, 1 September 2010.

[24] Ibid.

[25] **"BrahMos Missile can be Exported to SE Asian, LatAm nations"**, *BrahMos Aerospace,* 4 August 2014.

[26] Ibid

[27] S. Anandan, **"BrahMos Missile to do Near Vertical Dive in a Year"**, *The Hindu*, 17 October 2014.

[28] **"Europe Can Emulate Indo-Russian Defence Corporation",** no. 10.

matter, he did not name the nations. Two months later, it was reported that India and Russia had agreed 'in principle' to export the missile to UAE, South Africa, Vietnam and Chile.[29] Also, it was reported that with the consent of Russia, talks for export were taken to the next level with several other countries, including the Philippines, South Korea, Algeria, Greece, Malaysia, Thailand, Egypt, Singapore, Venezuela and Bulgaria.[30] A source in BrahMos was cited as stating that the deal with UAE was expected to be inked by the end of that year.[31]

In June 2016, Defence Minister Manohar Parrikar visited Hanoi, Vietnam and discussed key military issues, including the possible sale of the BrahMos missile.[32] The Ministry of Defence is believed at the time to have instructed BrahMos Aerospace, which manufactures the cruise missile in Hyderabad, to increase its production to meet potential orders from Vietnam.[33] Later that year, a blog post by the Centre for Strategic and International Studies stated that Vietnam and Malaysia were eying the BrahMos missile.[34] In 2022, there were reports of a possible deal with Indonesia, Saudi Arabia and UAE.[35] On 28 January 2022, India finally signed a contract with the Philippines for the missile worth US$ 374 million[36], 16 years after late President Kalam had envisaged the export of the missile.

In his book, *The Path Unexplored: Success Mantra of the BrahMos*, Pillai, the former CEO of BrahMos writes about the Chile deal and notes that as the talks for the deal had progressed, he has been unofficially informed by Chilean officials that they would be buying the missile from India.[37] Pillai writes that the deal was later 'blocked' without mentioning who was responsible for it.

Why did India not manage to seal a single deal for the export of the missile before 2022? A possibility that comes to mind is that the said countries scrapped the deals

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[29] Huma Siddiqui, **"India-Russia Agree to Export BrahMos, World's Fastest Anti-ship Cruise Missile"**, *Financial Express,* 27 May 2016.

[30] Ibid.

[31] Ibid.

[32] **"Parrikar Meets Vietnamese Defence Minister; Discusses Possible Sale of BrahMos"**, *BrahMos Aerospace,* 6 June 2016.

[33]Rahul Bedi, **"Four Years After Modi's 'Act East' Promise, India No Closer to Selling BrahMos to Vietnam"**, *The Wire*, 2 July 2020.

[34] Alex Vuving, **"Force Buildup in the South China Sea: The Myth of an Arms Race"**, The Center for Strategic and International Studies, 16 October 2017.

[35]Sebastian Strangio, **"Indonesia on the Cusp of BrahMos Missile Purchase: Report"**, *The Diplomat*, 22 July 2022.

[36] Huma Siddiqui, **"Middle-East Countries Could Soon Seal BrahMos Missile Deals"**, *Financial*

*Express*, 30 November 2022.

[37] Rahul Bedi, **"Four Years After Modi's 'Act East' Promise, India No Closer to Selling BrahMos to Vietnam",** no. 33.

at their end for financial reasons. For instance, Venezuela could not have bought the missile post the collapse of the country's economy around 2015. Accordingly, Venezuela's name does not appear in the frequent so-called 'potential deals' listed above after that time. It is very unlikely, however, that this happened for all the countries involved.

There was little competition to the BrahMos missile in the export market. Hence, it is safe to assume that the countries that had entered negotiations to buy the missile had been fairly serious about equipping their defence forces with the mighty BrahMos. The only missile that is available for export and has comparable attributes to the BrahMos is the Russian P-800 Oniks. However, SIPRI arms transfer data for the countries mentioned above for the past two decades shows that none of them bought the Oniks after entering negotiations for buying the BrahMos. This may be so due to reluctance on the part of countries to buy from Russia, especially after sanctions by the United States post the 2014 annexation of Crimea. The data also corresponds to this reasoning as most Oniks sales have been made before 2014. Hence, the presence of the P-800 can not be considered a reason for the failure to ink contracts for the BrahMos.

Another plausible explanation could have been that the production lines were already working at full capacity and hence could not produce additional missiles for export. However, it is evident by Sudhir Mishra's statements concerning the Vietnam deal in 2014 that there existed no problems vis-à-vis production lines. BrahMos Aerospace has also confirmed to this author in email correspondence that adequate production capacity exists to meet the orders of the Indian defence forces as well as potential foreign buyers.[38]

Possible defence deals are highly competitive, with major players extensively marketing their products. Countries indulge in intense lobbying for their defence products, which is contingent on extensive contacts and networks in the importing countries. India needs to develop marketing and promotion networks akin to established players in the market such as Israel to promote defence sales.

## Going Forward

While the BrahMos missile is not significantly different from the P-800 Oniks, it costs twice as much. This can be attributed perhaps to a more developed military industrial base in Russia which results in a lower cost of production. One might argue that India would have been better off without the venture, buying the Oniks directly from the Russians at a cheaper price. However, the Brahmos JV has helped

[38] Email correspondence with BrahMos Aerospace dated 1 May 2023.

India develop its military-industrial complex and produce the non-engine-related components of the missile. An Indian propulsion system is also currently in the developmental stages.[39] This would not have been possible in a buyer–seller relationship with Russia. In the long run, moreover, it helps the country achieve strategic autonomy in the defence sector, which is important to safeguard the country's national interests.

The undersea submarine missile version of the BrahMos is currently in the testing phase. BrahMos Aerospace is also currently developing the BrahMos-NG (next generation), which would be a lighter version of the missile, for the indigenously made LCA-Tejas aircraft.[40] The BrahMos-NG and the submarine-launched version of the missile will attract a wider spectrum of the export market, especially so for the BrahMos-NG as it is envisaged as a universal missile that can be fit on any aircraft.[41]

Since the inception of the BrahMos project, it has been envisaged as a huge export opportunity. The aim of harnessing strategic alliances with the potential export of the missile to friendly countries of JV partners was enshrined in the mission statement itself. This has not been realised. Additional BrahMos exports could to some extent help in fulfilling Prime Minister Narendra Modi's vision of 'Making in India, Making for the world', achieving the defence hardware export target of US$ 5 billion by 2025.

[39] Vijainder K Thakur, **"India Could Boost BrahMos Supersonic Missile's Range To 1000 Km Thanks To Russian Upgrade Of Onyx Missile"**, *The EurAsian Times*, 10 December 2022.

[40] Sakshi Tiwari, **"Stealthier & Lighter, India's LCA Tejas To Be Armed With BrahMos-NG Missile; Could Be Used By Russian Air Force Too"**, *The EurAsian Times*, 9 February 2023.

[41] Huma Siddiqui, **"Middle-East Countries Could Soon Seal BrahMos Missile Deals"**, no. 36.

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