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India's BMD Programme and Acquisition of S-400 Air Defence System

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As per a contract signed between India and Russia in October 2018, Russia has begun delivery of the first of the five S-400 air defence missile systems to India. Reportedly the delivery of the first division of the missile system will be completed by end of December 2021¹. Once deployed, India would essentially have a missile defence system capable of engaging up to 36 targets at a time within a range of 400 km and able to intercept most medium and short-range ballistic missiles. Given the limitations of India's indigenous BMD system and threat perception at present time, this will contribute significantly to reduce rising concerns about the steady development of varied ranges and number of ballistic missiles by its nuclear neighbours.

Rationale of India's BMD Programme

A number of factors have made India interested in developing and procuring ballistic missile defence (BMD) systems: China's development of BMD and a growing number of ballistic missiles, its close strategic partnership with Pakistan, including significant Chinese assistance in developing Pak strategic missiles and MIRV programme, tactical nuclear weapon development by Pakistan and growing influence of non-state actors in the country.

The S-400 Deal

In a press release on 02 January 2019, the Press Information Bureau (PIB) mentioned that "A contract has been signed on 05 October 2018 for delivery of S-400 system from Russia... The deliveries will commence from October 2020 and will complete by April 2023."² The process to procure the air defence system began much earlier. The Ministry of Defence (MoD), India approved the purchase of up to five S-400 air and missile defence systems in December 2015, at an estimated cost of between \$4.5 to \$7 Billion. On 15 October 2016 at the side-line of the eighth BRICS summit, India and Russia signed an inter-governmental agreement to procure the S-400 systems³. An analyst noted that "the India military is slated to deploy three S-400 regiments in the west facing Pakistan and two regiments in the country's east near Sino-Indian border."⁴ It was further mentioned that the S-400 outperforms India's advanced air defence (AAD) on nearly all parameters, including flight speed when fitted with an upgraded 48N6 interceptor⁵.

The S-400 Air Defence System

The S-400 is a three-tier air defence system equipped with the surface to air missile system (SAM). The system is claimed to have the capability to intercept cruise and ballistic missiles, aircraft and UAVs having a range up to 3,500 km and a speed of up to 4.8 km per second at the terminal phase⁶. In the Russian military, a regiment of S-400 consists of two battalions; two

batteries make up a battalion. An S-400 battery consists of four large Transporter Erector Launchers (TELs) or 16 smaller TELs or a combination of both and each TEL can carry four long-range or up to 16 medium and short-range missiles. Reportedly the S-400 can be equipped with various kinds of advanced missiles including SAM interceptor the 40N6E, in addition to the 48N6E3, as well as the 9M96E and 9M96E2”⁷. The 40N6E is Russia’s most advanced interceptor for the system. The exact configuration of what will be available with India is not in the public domain. The first S-400 system is expected to be operational by early 2022 after completing its assembly and trials by the IAF under Russian supervision. The remaining four systems are expected to be delivered by April 2023⁸.

India’s Indigenous BMD System

Although India looked abroad to procure BMD systems for more efficient and precise defence, India’s indigenous effort to develop both mid-course and terminal phase BMD has made significant strides too. India’s BMD architecture is limited in nature and it does not seek a nationwide missile defence system.

Presently, India has a two-tier ballistic missile defence system developed by the Defence Research and Development Organisation (DRDO). The first layer of the BMD system consists of Prithvi Air Defence (PAD)/Pradyumna and Prithvi Defence Vehicle (PDV) interceptors that can intercept a missile at an exo-atmospheric altitude of 50-180 km. The second layer consists of a single staged solid rocket-propelled Advanced Air Defence (AAD)/ Ashin interceptor missile that can destroy an incoming missile in the endo-atmospheric altitude of 15-40 km. The BMD system is designed to primarily intercept medium-range missiles. PAD and PDV are designed for mid-course interception of a ballistic missile and AAD is designed to intercept missiles at the terminal phase. In their present configuration, these systems are designed to counter missiles with a range up to 2000 km and a speed of Mach 3 to Mach 8⁹. To augment the capability to track incoming hostile missiles, India has also imported two phased array Green Pine Radars in 2002 and 2005 from Israel that was used in Israel’s Arrow missile defence system¹⁰. Apart from this, the system also consists of Swordfish Long Range Tracking Radar (LRTR) capable of tracking missile launches at 600-800 km and Swordfish -2 LRTR that has a range of approximately 1500 km¹¹. The Swordfish LRTR is based on Green Pine radar technology.

Since 2006, India has been actively testing components of its missile defence programme. The first Prithvi Air Defence (PAD) system test was conducted in November 2006 and AAD was tested in December 2007. The latest interceptor was test fired in September 2018 under Prithvi Defence Vehicle (PDV) that is being mooted to replace the existing PAD system in near future. The

PDV was first tested in April 2014. During a recent series of tests, DRDO demonstrated its capability to intercept multiple targets using both AAD and PAD systems. However, it is uncertain at this time when the indigenous BMD will be deployed. Indeed, claims have been made by some media report that the BMD development has been completed and seeking government approval for activation near New Delhi¹². But there is no such confirmation by the DRDO or the government. There is also some dispute over the claimed accuracy of 90 per cent of India's indigenous system. The claim is debated especially compared to the interception accuracy of around 70 per cent for other advanced technology states¹³.

Conclusion

India's quest for developing new military technology is influenced by the myriad security challenge it faces in the nuclear domain by China and Pakistan. Acquisition of S-400 systems from Russia is a stride towards that direction. While the indigenous BMD development is still at the research and development stage, procurement of the advanced missile defence system will fulfil India's immediate requirement of a functional BMD to provide adequate protection.

Notes

¹ Rahul Bedi, "Russia begins S-400 deliveries to India", *Janes*, <https://www.janes.com/defence-news/news-detail/russia-begins-s-400-deliveries-to-india>, 15 November 2021. Accessed on 18 November 2021.

² Press information Bureau, "Missile Defence System", *Ministry of Defence* at <https://pib.gov.in/PressReleasePage.aspx?PRID=1558148>, 02 January 2019. Accessed on 18 November 2021.

³ Press information Bureau, "Defence agreements with Russia", *Ministry of Defence* at <https://pib.gov.in/PressReleaseDetail.aspx?PRID=1495957>, 18 July 2017. Accessed on 18 November 2021

⁴ Franz-Stefan Gady, "India and Russia Ink S-400 Missile Air Defense System Deal", *The Diplomat*, at <https://thediplomat.com/2016/10/india-and-russia-ink-s-400-missile-air-defense-system-deal/>, 20 October 2016. Accessed on 19 November 2021

⁵ Ankit Panda, "India Tests Supersonic Advanced Air Defense Missile", *The Diplomat*, at <https://thediplomat.com/2021/07/q-pop-a-musical-expression-of-kazakhstans-national-and-global-identity/>, 23 November 2015. Accessed on 19 November 2021

⁶ Anand Sharma, "Missile Defence Systems", *Ballistic Missile defence Frontier of the 21st Century*, KW Publishers Pvt. Ltd., 2010. Accessed on 18 November 2021

⁷ Ibid.

⁸ Rahul Bedi, "Russia begins S-400 deliveries to India", *Janes*, <https://www.janes.com/defence-news/news-detail/russia-begins-s-400-deliveries-to-india>, 15 November 2021. Accessed on 19 November 2021

⁹ Yogesh Joshi and Frank O'donnell, "India in Nuclear Asia: Evolution of Regional Forces, Perceptions and Politics", ed. Harsh V. Pant, *Orient BlackSwan*, pp. 39, 2018. Accessed on 17 November 2021

¹⁰ See Yogesh Joshi and Frank O'donnell.

¹¹ “India’s Ballistic Missile Defence Phase-I deployment starts in 2022-23”, *Indian Defence Research Wing* at <https://idrw.org/indias-ballistic-missile-defence-phase-i-deployment-starts-in-2022-23/>, 04 October 2020. Accessed on 17 November 2021

¹² SNEHESH ALEX PHILIP, “India’s ballistic missile shield ready, IAF & DRDO to seek govt nod to protect Delhi”, *The Print*, <https://theprint.in/defence/indias-ballistic-missile-shield-ready-iaf-drdo-to-see-govt-nod-to-protect-delhi/345853/>, 08 January 2020. Accessed on 20 November 2021

¹³ Yogesh Joshi and Frank O’donnell, “India in Nuclear Asia: Evolution of Regional Forces, Perceptions and Politics”, ed. Harsh V. Pant, *Orient BlackSwan*, pp. 42, 2018. Accessed on 20 November 2021

