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Complexities of Indian Ballistic Missile Defence

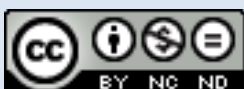
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Introduction

On November 2, 2022, India tested its Ballistic Missile Defence (BMD) interceptor missile, AD-1.¹ This missile was tested from the APJ Abdul Kalam Island test range. India needs this BMD shield due to its nuclear-armed adversaries, Pakistan and China. In the end of 1999, the Government of India started the BMD program. Things progressed quite well during the 2000s. This was observed after the supply of critical technologies came from Israel, France, and Russia. These include technologies like guidance systems, monitoring systems, etc. In April 2019, India completed Phase-I of the BMD shield,² which could intercept missiles up to 3000 km. Phase-II, which is currently ongoing, would be capable of intercepting missiles with range of over 5000 km.

Understanding BMD Phase I and II

On November 2, 2022, DRDO conducted the first test for Phase-II of the BMD. In this phase, two missiles are to be developed: AD-1 and AD-2. AD-1 is a long-range interceptor missile capable of exo-atmosphere (outside atmosphere) and endo-atmospheric (inside atmosphere) ballistic missile interception. It is a two-stage missile that can aim and kill any incoming ballistic missile. This missile can also be used to intercept warplanes at long range. Its range has not been specified, but it potentially has a range of around 200 km.

In Phase-I, there is the Prithvi Air Defence, which is an exo-atmosphere hypersonic interceptor. It can intercept at an altitude of 80-120 km.³ It successfully intercepted the simulated targets in the trials that were conducted. Another missile as part of Phase-I is the Advanced Air Defence (AAD). The AAD is an endo-atmospheric interceptor that can intercept missiles at an altitude of 15-30 km.⁴ During trials, it intercepted ballistic missiles at an altitude of 15 km. When the ASAT test was done in March 2019, at that time, the modified Prithvi missile, called the Prithvi Defence Vehicle Mach 2, was used to destroy a satellite. When the Prithvi-I missile was used, it consisted of liquid fuel. This required some preparation time before launch. So, in an emergency situation, such a waiting period could be problematic. On the other hand, the Prithvi Defence Vehicle Mach 2 uses solid fuel and can be readied more quickly for firing.

The BMD system consists of tracking and interception. For the purpose of tracking, different satellites and radars are used. All the information from the different systems then gets calculated. This is done to determine which missiles are to be fired and their quantity such that the incoming missile can be intercepted. All these decisions are made by computers. Then, the information

needed to give a command goes through the mission control centre. So then, the BMD missile is fired to intercept the incoming missile. The main radar that is used here is swordfish.⁵

Conclusion

Similar to the journey of one Indian missile after another, the BMD missiles, too, are developed from scratch by India. BMD Phases I and II will help secure Nuclear Command Authority (NCA). BMD is complementary to India's nuclear doctrine of 'No First Use' (NFU) of nuclear weapons. It is complementary because Indian BMD is the consequence of its defensive orientation, while it is together with NFU.⁶ It also helps deter by making the adversary reconsider any escalated decision before launching the first strike on India. U.S. scholar Christopher Clary argues⁷ that "Indian policymakers must be willing to make the calculation that whatever safety comes from missile defenses of dubious effectiveness outweighs the risk that come from a Pakistani nuclear arsenal that is larger than it would be without Indian missile defenses." BMD makes Pakistani ballistic missiles vulnerable, so Pakistan has worked on developing nuclear-tipped cruise missiles, Babur and Ra'ad.⁸ Initially, in terms of BMD, India had only Pakistan in mind, as its behaviour was unpredictable. This meant catering for its intense nuclear saber-rattling, as Pakistanis see nuclear weapons as a shield for them to continue Pakistan state-sponsored terrorism inside India. According to former Indian Defence Minister George Fernandes, if India has BMD in place, then the possibility of a limited war is likely.⁹ So it helps to avoid a full-scale war. Unpredictability also includes the fact that nuclear weapons could go into the hands of terrorist groups controlled by the Pakistan Army. As far as China is concerned, right now, India and China both have strategic stability due to the fact that both countries have an NFU policy for nuclear weapons as well as rudimentary BMD capabilities.¹⁰ Still, India and China must engage in dialogue¹¹ with each other on this issue to avoid any potential misunderstanding. This is so because China is building up its A2/AD capabilities in the western Pacific Ocean, which has an impact on the security dynamics of the Indian Ocean and continental India. So, a BMD is required to at least diminish these A2/AD capabilities, if not completely defeat them.

NOTES:

¹ PIB, "DRDO conducts successful maiden flight-test of Phase-II Ballistic Missile Defence interceptor off Odisha coast", *Ministry of Defence*, November 2, 2022, <https://pib.gov.in/PressReleasePage.aspx?PRID=1873179#:~:text=Posted%20On%3A%20NOV%202022%206%3A20PM%20by%20PIB,the%20coast%20of%20Odisha%20on%20November%202%2C%202022.>, Accessed on November 24, 2022.

² Snehes Alex Philip, "India completes phase one of ballistic missile defence programme, nod for missiles awaited", *The Print*, April 22, 2019, <https://theprint.in/defence/india-completes-phase-one-of-ballistic-missile-defence-programme-nod-for-missiles-awaited/224959/>, Accessed on December 1, 2022.

³ Sparsh, "Understanding India's Ballistic Missile Defence Program", *DEFENCEXP*, September 22, 2021, <https://www.defencexp.com/understanding-indias-ballistic-missile-defence-program/#:~:text=The%20Prithvi%20Air%20Defence%20%28PAD%29%20is%20an%20anti-ballistic,motor%2C%20while%20the%20second%20stage%20is%20Liquid%20fuelled.>, Accessed on December 14, 2022.

⁴ *ibid*

⁵ Frank O'Donnell and Yogesh Joshi, "India's Missile Defense: Is the Game Worth the Candle?" *THE DIPLOMAT*, August 2, 2013, <https://thediplomat.com/2013/08/indias-missile-defense-is-the-game-worth-the-candle/>, Accessed on December 14, 2022.

⁶ Balraj Nagal, "India and Ballistic Missile Defense: Furthering a Defensive Deterrent", *Carnegie*, June 30, 2016, <https://carnegieendowment.org/2016/06/30/india-and-ballistic-missile-defense-furthering-defensive-deterrent-pub-63966>, Accessed on December 14, 2022.

⁷ *ibid*

⁸ Manpreet Sethi, "Nuclear Strategy", *KW Publishers Pvt Ltd*, 2009, Page 221.

⁹ Nagal, n6.

¹⁰ Nagal, n6.

¹¹ *ibid*