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Commentary

Chinese Nuclear Challenge and India's Response

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Summary

India needs to accelerate the development of emerging technologies and integrate them with the weapon systems deployed on the ground in the light of the Chinese challenge.

The latest report by the United States (US) Department of Defense (DoD) 'Military and Security Developments Involving the People's Republic of China'[1] estimates that China might have 'surpassed 600 operational nuclear warheads'[2] compared to 500 in 2023. The report reiterates that China will have 1,000 nuclear warheads by 2030. Compared to last year's count of 350, China possesses approximately 400 intercontinental ballistic missiles (ICBMs). The report calls China a leading power *vis-à-vis* hypersonic missiles, having developed both hypersonic glide vehicle (HGV) and hypersonic cruise missiles.

Beijing has also demonstrated its Fractional Orbital Bombardment (FOB) capabilities. Worryingly, India's northern neighbour has developed lower-yield nuclear weapons for tactical use, with DF-26 being 'the most likely weapon system to field a lower-yield warhead in the near term'.[3] Further, it has established robust counterspace weapons capabilities, which are second only to the US.

The report also mentions the construction of missile silos and the development of an 'early warning counterstrike' posture for retaliatory strikes. It throws light on the developments in sea-based nuclear deterrents in the form of JL-3 submarine-launched ballistic missiles (SLBM) and raises the possibility of China building a strategic stealth bomber in addition to the current H-6N bomber. Images and videos of so-called Chinese sixth-generation stealth fighter were circulated on social media in end 2024.[4] China has also fielded indigenous air defence systems HQ-9 and HQ-19 and had tested a land-based mid-course interceptor in February 2021.

The 2024 report of the US DoD is not very different from the 2023 DoD report. While it does not make any startling revelations about Chinese nuclear development, the 2024 report conveys that China is on the path of rapid modernisation of its strategic forces, both qualitatively and quantitatively, across the land, sea, air, space and cyberspace domains. The country is competing with the US and is on the path to realise its vision of becoming a modern military by 2035 and a world-class military by mid-century.

However, in its quest to seek parity with the US, the disparity between China and India *vis-à-vis* nuclear arsenal is rising by the day. According to the Stockholm International Peace Research Institute (SIPRI) Yearbook 2024, India is believed to have nuclear warheads in the range of 170–180, the same as those of Pakistan. India's nuclear warheads are also increasing, but not at the pace of China. Thus, the enormity of the challenge faced by India in the nuclear arena is rising with every passing day.

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[1] **"Military and Security Developments Involving the People's Republic of China 2024"**, Annual Report to the US Congress, US Department of Defense, December 2024.

[2] Ibid.

[3] Ibid.

[4] Liu Xuanzun, **"PLA Eastern Theater Command's New Year Video Sparks Discussions on Alleged China's Sixth-gen Fighter Jets"**, *The Global Times*, 1 January 2025; Cate Cadell, **"China Unveils New Futuristic Fighter Jets in Surprise Flyby"**, *The Washington Post*, 27 December 2024.

India's Response

The wide gap in nuclear numbers between China and India makes the latter susceptible to nuclear coercion by the former. Although China maintains a no-first-use and a credible minimum deterrence policy on paper, its increasing nuclear numbers and early counterstrike posture are counterintuitive to the stated policy.

While India need not match the Chinese nuclear numbers, it should have a specific number of nuclear warheads sufficient to deter China from launching the first strike. Secondly, in case deterrence fails, it should have the numbers to launch a massive second strike to inflict unacceptable damage, taking into account Chinese defensive capabilities including air defence system. Further, India should get these number of nuclear warheads within a fixed timeframe. This way, India can deal with the threat of increasing Chinese nuclear numbers.

Along with sufficient nuclear warhead numbers, India needs to develop robust offensive and defensive capabilities, which New Delhi is pursuing, albeit at a slower pace. India is making advances in the development of hypersonic technology, ballistic missile defence (BMD) and anti-satellite (ASAT) weapon systems. On 16 November 2024, India successfully tested its first long-range hypersonic missile that can carry various payloads and has a range greater than 1,500 kilometres (km).[5] The missile was developed by the Defence Research and Development Organisation (DRDO) with the help of the Indian private industry. Although it was the first test of its long-range hypersonic missile, India has been testing this technology since 2016. The Indian Space Research Organisation (ISRO) successfully flight-tested Reusable Launch Vehicle–Technology Demonstrator (RLV-TD) on 23 May 2016, which was to be "configured to act as a flying test bed to evaluate hypersonic flight".[6]

In June 2019, the DRDO conducted the maiden test of a hypersonic technology demonstrator to validate key technologies required for the hypersonic flight in the future.[7] On 7 September 2020, the DRDO successfully conducted a hypersonic flight test that used air-breathing scramjet technology.[8] The test demonstrated and validated multiple critical technologies, such as

> aerodynamic configuration for hypersonic manoeuvers, use of scramjet propulsion for ignition and sustained combustion at hypersonic flow,

[5] **"DRDO Carries Out Successful Flight-trial of India's First Long-range Hypersonic Missile Off the Odisha Coast"**, Press Information Bureau, Ministry of Defence, Government of India, 17 November 2024.

[6] **"Reusable Launch Vehicle – Technology Demonstrator (RLV-TD)"**, Indian Space Research Organisation, Department of Space, Government of India.

[7] **"DRDO Conducts Maiden Test of Hypersonic Technology Demonstrator"**, DRDO in News, Defence Research and Development Organisation, 13 June 2019.

[8] **"DRDO Successfully Flight Tests Hypersonic Technology Demonstrator Vehicle"**, Press Information Bureau, Ministry of Defence, Government of India, 7 September 2020.

thermo-structural characterisation of high-temperature materials, and separation mechanism at hypersonic velocities.[9]

India carried out another hypersonic test on 27 January 2023,[10] followed by the recent test in November 2024. India also possesses an indigenously developed advanced Hypersonic Wind Tunnel (HWT) test facility since 2020.[11] In February 2024, the Indian Institute of Technology Kanpur tested a hypervelocity expansion tunnel test facility, simulating hypersonic conditions.[12] Thus, India is working on hypersonic technology but has yet to operationalise the missile system.

India is developing a BMD system in multiple phases. On 24 July 2024, the DRDO successfully flight-tested a Phase-II BMD system capable of defending against ballistic missiles of 5,000 km category.[13] The test validated 'the network-centric warfare weapon system consisting of Long-Range Sensors, low latency communication system and Missile Control Centre and Advance Interceptor missiles'.[14] India has already deployed Phase-I BMD, which intends to protect Delhi and Mumbai from incoming ballistic missiles. The Phase-I BMD can intercept incoming ballistic missiles of the 2,000 km class.

In any BMD system, the interceptor can intercept the incoming missile at two levels—endo-atmospheric (within the atmosphere) and exo-atmospheric (beyond the atmosphere). The interceptor missile in the Phase-II BMD that was tested in July 2024 is capable of intercepting enemy missiles in the altitude bracket of endo to low exo-atmospheric regions.[15] India is also developing long-range surface-to-air missile (LRSAM) system, under Project Kusha,[16] which is expected 'to neutralise the incoming aerial threats such as stealth fighters, aircraft, ballistic and cruise missiles, precision guided munitions, and unmanned aerial vehicles (UAVs) to ranges of nearly 350 km'.[17]

By successfully destroying a live satellite in the Low Earth Orbit (LEO) on 27 March 2019, under Mission Shakti, India demonstrated its Anti-Satellite (ASAT) missile

[9] Ibid.

[10] Rajat Pandit, **"India Conducts Another Test in a Bid to Develop Hypersonic Weapons"**, *The Times of India*, 28 January 2023.

[11] **"Inauguration of Hypersonic Wind Tunnel at DRDO Hyderabad"**, Press Information Bureau, Ministry of Defence, Government of India, 19 December 2020.

[12] **"IIT Kanpur Breaks Ground with India's First Hypervelocity Expansion Tunnel Test Facility"**, *Hindustan Times*, 5 February 2024.

[13] **"DRDO Successfully Flight-Tests Phase-II Ballistic Missile Defence System"**, Press Information Bureau, Ministry of Defence, Government of India, 24 July 2024.

[14] Ibid.

[15] Ibid.

[16] **"S-400 Missile System Supplies Hindered by Russia-Ukraine War: IAF Chief",** *NDTV*, 3 October 2023.

[17] **"India Initiates Long-Range Surface-To-Air Missile Programme"**, Newspapers Clippings, DRDO, Vol. 48, No. 208, 7 November 2023.

technology.[18] DRDO's BMD interceptor was used to destroy one of the Indian satellites orbiting in the lower atmosphere to ensure that no space debris was generated. Thus, India joined the US, Russia and China, which have proven ASAT capabilities. India demonstrated a kinetic-kill model during Mission Shakti. It is to be noted that China has demonstrated non-kinetic methods to destroy enemy satellites, such as cyber-attacks, jamming and blinding the enemy satellite, among others, way back in 2021. Thus, India should equip itself with kinetic and non-kinetic ASAT capabilities to deal effectively with the adversary.

Conclusion

China is making great strides in modernising its strategic forces. Its armed forces have already incorporated emerging technologies, and are often a part of military exercises. China's increasing nuclear warhead numbers are likely to create a huge disparity with India. While India need not blindly compete with China to match the number of nuclear warheads, New Delhi should continue to keep a close eye on the modernisation of the Chinese military and develop its own deterrent capability. It is noteworthy that the private industry is partnering with public sector organisations like the DRDO to acquire cutting-edge technologies. India is one of the handful of countries in the world that have hypersonic and ASAT technology. However, China's technological developments require India to accelerate the development of emerging technologies and integrate them with the weapon systems deployed on the ground.

[18] **"India Joins Select Group of Nations, Destroys Live Satellite in Low Earth Orbit"**, Press Information Bureau, Ministry of Defence, Government of India, 27 March 2019.

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