

AIR DELIVERY AS PART OF INDIA'S NUCLEAR TRIAD

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It is no secret that in contemporary times all major nuclear weapon states are undertaking nuclear modernisation and expansion. While the Chinese are, *inter alia*, expanding their nuclear numbers, the USA and Russia are, for the moment, holding on to the ceiling on numbers stipulated by the New START (Strategic Arms Reduction Treaty), though both of them have suspended their subscription to the bilateral agreement. Unless extended, this treaty is due to expire in January 2026. The focus in the USA and Russia is to modernise legacy delivery systems, even as China is building newer capabilities across the triad. Strategic bombers stand out in this context.

By the 2030s, the US is expected to have five bases hosting over 100 new strategic bombers capable of nuclear delivery, the B-21s or the Raiders. These will be the first bombers to be inducted after the end of the Cold War and the US Air Force is looking at them to become “the backbone of the Air Force’s flexible global strike capability.”¹ These stealth aircraft are part of the estimated US\$ 1.7 trillion programme for American nuclear modernisation. The USA is also known to be upgrading its ageing bombers, the B-52 Stratofortress, and may also consider restoring the nuclear role to

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1. Riley Ceder, “US Air Forces Names Second and Third B-21 Raider Bases”, *Defense News*, September 20, 2024, available at <https://www.defensenews.com/air/2024/09/19/us-air-force-names-second-and-third-b-21-raider-bases/>. Accessed on January 2, 2025.

Despite this apparently renewed focus on strategic bombers elsewhere, India remains relatively unenthusiastic about this capability. The fact that there has been little debate or focus in the country on these aircraft as a necessity for enhancing the credibility of nuclear deterrence has been a source of curiosity for other nations.

the ones it had earlier designated only for conventional delivery.

Meanwhile, as regards China, January 2025 dawned with images on social media that were stated to be of the Chinese new stealth bomber, the H-20.² While there was no official corroboration of this and the authenticity of the reports remained in question, there is little doubt that China is working towards operationalising its bomber force which is believed to have been in the making for the last decade or more.

Despite this apparently renewed focus on strategic bombers elsewhere, India remains relatively unenthusiastic about this capability. The fact that there has been little debate or focus in the country on these aircraft as a necessity for enhancing the credibility of nuclear deterrence has been a source of curiosity for other nations.³ After all, India does live in a challenging nuclearised neighbourhood. Two of its neighbours, China on the northern and Pakistan on the western front are nuclear armed. With both of them, India has contested borders and territorial disputes. Both have different nuclear doctrines and are building up their capabilities to meet *their* idea of credible deterrence. The two also share a robust nuclear and missile proliferation relationship between themselves and both perceive India as a strategic adversary.

Caught in this security and proliferation bind, India has been honing its own strategic capability to establish credible deterrence against nuclear coercion or blackmail. Soon after India's nuclear tests, a draft nuclear

2. John A Tirpak, "Has China's Secret H-20 Stealth Bomber Broken Cover?", *Air and Space Forces Magazine*, January 6, 2025.

3. Attention to this subject was drawn by the editor of a French journal and a major part of this article is reproduced from the version that first appeared in the *Vortex*, no. 6, July 2024, pp. 215-228. The author is grateful to the editors of the journal for providing the rights to republish this piece.

doctrine had clearly articulated the need for the country to build a nuclear triad, or the capability to deliver nuclear weapons from land, sea and air-based platforms. Towards this end, the country has steadily progressed to building land-based missiles of various ranges; and the sea-based deterrence capability is on the way to becoming more credible with the addition of newer SSBNs (Ship, Submersible, Ballistic, Nuclear) and longer-range SLBMs (Submarine Launched Ballistic Missiles). Advances have also been made on nuclear warhead numbers, and command and control structures. However, there has been relative silence on the air vector. Of course, aircraft were the first available means of nuclear delivery with the country after it went nuclear, since missiles, especially those with ranges longer than 350 km were still in the making. Despite the recognition of the value of air delivery of nuclear weapons, India has not made a move towards dedicated platforms such as strategic bombers.

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The aim of this paper is to examine the specific role of the air platforms in the Indian nuclear triad in the context of the country's nuclear threat environment. It examines the reasons as to why India has not acquired strategic bombers. And, even more importantly, why the lack of this capability has little implication for the credibility of its deterrence. The article concludes by identifying some of the future challenges for nuclear India and making some recommendations for the way ahead.

INDIA'S NUCLEAR THREAT ENVIRONMENT

Pakistan's nuclear capability is focussed on deterring the possibility of a conventional conflict with the superior Indian military while itself pursuing a policy of cross-border terrorism. This creates a unique challenge for India of which there is no parallel where a nuclear armed state uses terrorism against another nuclear armed state, and then uses the threat of nuclear escalation as a way of averting a riposte. Pakistan's nuclear strategy relies

on the projection of a low nuclear threshold. Through the articulation of a vague threshold for nuclear use, Pakistan seeks to amplify fears of an immediate and inevitable escalation to the nuclear level in case of a conventional conflict. These fears are stoked as much to deter India, as to scare the international audience. Such a strategy has played out after every incidence of terrorism in India that has been traced back to Pakistan.

Meanwhile, to make this projection look credible, Pakistan is steadily moving towards *full spectrum deterrence* that is based on the availability of a ready stockpile of nuclear warheads, from the low yield to the high yield varieties, and a number of delivery systems, from the very short-range to those with the longer ranges. In recent years, missile tests of Multiple Independently Retargetable Vehicle (MIRVed) missiles from sub-surface platforms, longer range cruise missile, etc., have been undertaken. The projection of Tactical Nuclear Weapons (TNWs) and placement of nuclear missiles on surface vessels are all part of this approach of deliberately creating risks to block New Delhi's response options even as it suffers frequent terrorist attacks. Therefore, for India, the challenge from Pakistan is its strategy of nuclear brinkmanship.

Meanwhile, on the eastern and northern fronts, nuclear China has a three and a half decade lead over India on nuclear capability build-up. While its military modernisation, including in the nuclear dimension, remained slow until the 1990s, the pace somewhat picked up thereafter. As the country's sustained economic growth and consequent ability to liberally spend on military modernisation was complemented by technological advances, China has focussed during the last two decades on enhancing the reliability, accuracy, penetrability and survivability of its delivery systems. Much of this was triggered also by the US withdrawal from the Anti-Ballistic Missile (ABM) Treaty in 2001 and its subsequent focus on development and deployment of Ballistic Missile Defence (BMD), along with its much-publicised strategy of conventional global prompt strike. This has changed China's threat perceptions and capability trajectory, as an increase in China's nuclear warhead numbers has been noticed over the last few years.

Given that China's deterrence strategy has been premised on the threat of its ability to cause 'unacceptable damage' while pledging no first use of own nuclear weapons, the focus of Chinese efforts has traditionally been on ensuring survivability. Further, realising the vulnerability of land-based missiles, despite the enhanced survivability measures, the spotlight has been on making sea-based deterrence capability operational. The sea leg of the Chinese nuclear triad rests on the Julang 2 (JL-2), a second-generation SLBM of over 7,000 km range that would be deployed on the indigenous Type 094 submarines. China has also worked on MIRVing its missiles.⁴ China is known to have been miniaturising warheads to make them lighter and easier to deploy in multiple numbers, ranging from 3-10, atop its delivery systems. Beijing has also developed the capability to make the re-entry of its nuclear warhead manoeuvrable (MARVed missiles), thereby making it difficult to intercept them. Well aware of the centrality of space-based capabilities for new technologies, China is rapidly modernising these for both offensive and defensive operations. Beijing's demonstration of an Anti-Satellite (ASAT) capability in 2007 has since been supplemented by its development of a range of soft kill technologies, including electronic attacks through sophisticated jamming technologies.⁵ A test of the Fractional Orbital Bombardment System (FOBS) has also been undertaken, obviously to signal deterrence.

It is apparent that China is moving up to a higher level of strategic capability and credibility by showcasing the mobility, invulnerability and penetrability of its nuclear delivery systems. In more recent times, a focus on rapidly expanding its nuclear warhead numbers has also been evident in China. While Beijing does not disclose any nuclear numbers, the US Department of Defence annual report published in December 2024 "estimates the PRC has surpassed 600 operational nuclear warheads in its stockpile as of mid-2024 and will have over 1,000 operational nuclear warheads by

4. "China Successfully Tests Multi-Warhead Missiles", *Yomiuri Shimbun*, February 8, 2003.

5. For more on China's space capabilities, see Manpreet Sethi, *Code of Conduct in Outer Space: A Strategy for India* (New Delhi: Knowledge World, 2016), pp. 97-122.

2030, much of which will be deployed at higher readiness levels".⁶ If this is true, China has rapidly moved up by a hundred warheads in just one year. This capability enhancement and its concomitant impact on deterrence is primarily meant for the USA. But it obviously has a downstream effect on its deterrent equation with India too.

As it stands then, India is sandwiched between two nuclear adversaries. With Pakistan, it faces the challenge of crisis instability triggered by continued use of terrorism, which creates potential for conflict escalation; and, China's arsenal expansion and capability enhancement heightens the risk of sucking India into an arms race.

INDIA'S NUCLEAR DOCTRINE

Just 18 months after the conduct of its nuclear tests, India announced a draft nuclear doctrine that unambiguously stated a political role for the nuclear weapon and explained the way India plans to 'put it to use'. It also guided the nation towards a desired ideal in global, verifiable and non-discriminatory nuclear disarmament as a national security objective. While aspiring for this ideal, it also fleshed out the concept of nuclear deterrence for India. For instance, in accepting the principle of no first use, the doctrine directed India's nuclear forces to be "based on a triad of aircraft, mobile land-based missiles and sea-based assets."

The draft nuclear doctrine, however, remains a draft to this date. But in January 2003, India released a press note on operationalisation of the nuclear doctrine, which is recognised as the official nuclear doctrine of the country. The document is a brief one and it accepts the major attributes as had been put forth in the draft. Two of these need some explanation. The first is that of credible minimum deterrence that seeks to steer clear of a maximalist stockpile accumulation in an attempt to reach parity or superiority with the adversary's arsenal. The second is that of No First Use (NFU) which aims to reassure the adversary that India would not introduce nuclear weapons into

6. US Department of Defence, "Military and Security Developments Involving the People's Republic of China 2024: Annual Report to Congress", December 2024.

a conflict, thereby relieving him of the use or lose dilemma. These doctrinal features are discussed in some detail in the following paragraphs.

Firstly, India maintains a narrow role for its nuclear weapons. These are meant only to deter the use of *nuclear weapons* by the adversary. Also, it regards them as weapons of deterrence, and seeks to deter by threatening retaliation of a kind that would negate the benefits that the adversary hopes to make by using them in the first place. India eschews the idea that nuclear weapons could be effective for fighting a war or prevailing over the adversary. Rather, it contends that the extraordinary destructive potential of these weapons constrains their utility for achieving any rational political objectives. India's prime minister at the time of nuclear testing in 1998, Mr Atal Behari Vajpayee, had then stated in Parliament that India did not "intend to use these weapons for aggression or for mounting threats against any country; these are weapons of self-defence to ensure that India is not subjected to nuclear threats or coercion".⁷

With the principal role of India's nuclear arsenal being to protect the nation from nuclear blackmail and coercion, the country has opted for 'Credible Minimum Deterrence' (CMD), a concept that eschews stockpile accumulation of the kind that the US and USSR built during the Cold War. No figure has been officially quantified as minimum. But, the underlying philosophy is based on building numbers that will be sufficient to undertake an *assured counter-strike capability* to cause *unacceptable damage* to the enemy. This guiding principle insures India against the risk of falling into the trap of wanting to build superiority or even parity on nuclear warhead numbers.

Secondly, nuclear deterrence, as conceptualised by India is premised on the threat of retaliation after the adversary's first use. With the NFU doctrine, India has conceded the onus of escalation to the adversary. In doing so, it has liberated itself on many fronts. The first of these is from the need to build large arsenals of first strike weapons (such as accurate MIRVed missiles), nuclear superiority to carry out counter-force attacks against an

7. Suo Motu Statement by Prime Minister Vajpayee in the Parliament on May 27, 1998. As reproduced in *Strategic Digest*, July 1998.

Interestingly, CMD and NFU both, relatively, reduce the demands on nuclear hardware. Given that by their very nature, nuclear weapons cause huge damage to life and property, unrestricted in time and space, the numbers do not need to be too large.

adversary's retaliatory forces, elaborate and delegated command and control structures to handle Launch On Warning (LOW) or Launch Under Attack (LUA) postures to launch simultaneous nuclear attacks from and over dispersed forces. NFU, on the other hand, requires a focus on the survivability of the nuclear forces through a mix of measures that include hardening of nuclear storage sites, deception, mobility, dispersal over different delivery vectors, and a level of defence. Secondly, NFU also

does not necessitate keeping nuclear weapons in a hair-trigger alert posture. It does not require forward deployment of nuclear forces which increases the likelihood of accidental or unauthorised use. The LOW/LUA postures require pre-delegation of authority to launch nuclear weapons and this can never be a risk-free option. Thirdly, maintaining own forces in a relaxed posture relieves pressure on the adversary to quickly launch his strike, fearing that a nuclear strike from the other side could be imminent. NFU, thus, mitigates the 'use or lose' pressure and thereby lessens crisis instability. Finally, NFU *frees the political leadership from the psychological pressure* of taking the difficult decision of using a Weapon of Mass Destruction (WMD).

Interestingly, CMD and NFU both, relatively, reduce the demands on nuclear hardware. Given that by their very nature, nuclear weapons cause huge damage to life and property, unrestricted in time and space, the numbers do not need to be too large. Moreover, given the high density of population in this region, even kiloton weapons dispersed intelligently over the target and made to explode at an optimum height to maximise damage suffice for credible deterrence.

The more important requirement, in fact, is the availability of reliable and survivable delivery systems of adequate ranges to ensure retaliation. India has opted for a triad to be able to signal this for credible deterrence. Ballistic

missiles of ranges from 750 km to 5,000 km make up the bulk of such capability. These are mobile missiles and dispersed across the geographical expanse of India as well as on SSBNs to ensure survivability. Delivery of nuclear warheads by aircraft makes up the third leg of the nuclear triad.

It is pertinent to highlight at this juncture that the Indian nuclear doctrine clearly instructed the development of a triad for nuclear delivery in order to ensure flexibility, survivability and redundancy.

So, para 3.1 of the draft nuclear doctrines reads, "India's nuclear forces will be effective, enduring, diverse, flexible, and responsive to the requirements in accordance with the concept of credible minimum deterrence. These forces will be based on a triad of aircraft, mobile land-based missiles and sea-based assets in keeping with the objectives outlined above. Survivability of the forces will be enhanced by a combination of multiple redundant systems, mobility, dispersion and deception."⁸

INDIAN AIR FORCE FOR NUCLEAR DELIVERY: STRENGTHS AND LIMITATIONS

As stated earlier, when India tested its nuclear weapons in 1998, aircraft were the first delivery platforms that were available to project deterrence. Though the Indian missile programme had been started in the 1980s, credible missile systems of adequate ranges were not ready by then. The short range (150-250 km), liquid-fuelled Prithvi I and II missiles were amongst the earliest ballistic missiles to be operationalised in the 2000s, but these obviously did not offer adequate range for credible deterrence even against Pakistan, and certainly not against China.

8. India's Draft Nuclear Doctrine, August 17, 1999. Reproduced as Appendix in Manpreet Sethi, *Nuclear Strategy: India's March Towards Credible Deterrence* (New Delhi: Knowledge World, 2009).

When India tested its nuclear weapons in 1998, aircraft were the first delivery platforms that were available to project deterrence. Though the Indian missile programme had been started in the 1980s, credible missile systems of adequate ranges were not ready by then.

So, while missile development was prioritised and it picked up pace, the first platforms for nuclear delivery were some of the nuclear capable fighter bomber aircraft that India was operating and which had undergone testing for this purpose. Initial plans had been for the Jaguars to be used for dropping free fall nuclear bombs. While these aircraft continue to be listed for such delivery in the available literature on nuclear forces⁹, there are also reports to suggest that the Jaguars did not provide adequate clearance and the plan then shifted to using the Mirage 2000Hs. Three flight tests of mating these warheads without the cores were reportedly undertaken in 1994. It is also reported that one of the bomb designs tested in 1998 was that of a 12 kT (kiloton) warhead that had been already mock tested for air delivery. In more recent times, Sukhoi-30s and even the Rafales have been mentioned as potential nuclear delivery platforms.

This journey, however, has not been easy. Some have attributed this to the “extreme secrecy and compartmentalization within the government and the military.”¹⁰ This contains some truth since the Indian Air Force (IAF) was initially unaware of the specifications of the nuclear weapons and, hence, unable to modify its aircraft for the purpose. Even with the Mirage 2000s, the warheads have been described as an “awkward fit, and only highly skilled pilots could take off with the cumbersome payloads attached underneath their plane’s bellies – making the jets aerodynamically tricky to fly.”¹¹ According to one scholar, “The modification of aircraft for safe and reliable delivery of a nuclear weapon turned out to be a huge technical and managerial challenge that consumed the [state-owned Defence Research and Development Organisation’s] attention for six years and perhaps more”¹². In any case, the Indian Mirage 2000H is reported to be undergoing

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9. Hans Kristensen and Matt Korda, “Indian Nuclear Forces 2022”, *Nuclear Notebook, Bulletin of Atomic Scientists*, vol. 78, no. 4, pp. 224-236.
 10. Gaurav Kampani, “New Delhi’s Long Nuclear Journey: How Secrecy and Institutional Roadblocks Delayed India’s Weaponization”, *International Security*, vol. 38, no. 4, Spring 2014, pp. 79-114.
 11. Robert Beckhusen, “Why India Wants France’s Dassault Rafale Fighter Jet: They Can Carry Nuclear Weapons”, *National Interest*, September 21, 2016.
 12. Kampani, n. 10.

upgrades to extend its service life and enhance its capabilities to include new radar, avionics, and electronic warfare systems.¹³

Over the last quarter century that India has now possessed nuclear weapons, a discussion on the need for strategic bombers has surfaced only sporadically and mostly in the context of a growing threat perception from China. Potential targets in China that would qualify as unacceptable damage are deep within the country, and, hence, distant from India. Therefore, for the sake of signalling an ability to hit these targets, there has been talk of acquiring strategic bombers. The Blackjack TU-160 or its follow-on PAK DA 5th-generation fighter has been mentioned in this regard. It has been argued that such a step would help showcase India's 'strategic' mindset and, thus, deter China better, especially since Beijing is likely to have a stealth bomber force in the near future, equipped with the capability to conduct electronic warfare and deploy Directed Energy Weapons (DEWs). In the face of such capabilities with India's primary adversary, it has been opined that having a bomber of its own, capable of carrying a complement of weapon systems, would help India take the war deeper into enemy territory and make for a 'bigger deterrent'.

The above arguments, however, need some unpacking. Despite the perceived advantages, there are several reasons as to why the acquisition of this platform has not been considered. In fact, there are not many proponents of the idea within the IAF itself. Even those air force officers who have occupied important chairs in the Strategic Forces Command (SFC), the authority in charge of India's nuclear forces and action in case of deterrence breakdown, have not made a strong case in this regard.

This is despite the fact that the IAF has had experience of operating heavy bombers. In fact, when the British left India in 1947, they left behind three squadrons of American heavy bomber B-24 Liberators which they had used in World War II. The IAF operated these aircraft until 1968. India also placed an order for Canberra aircraft in 1957 and used them for bombing raids and photo reconnaissance for five decades. But, this was much before India

13. Kristensen, n. 9.

acquired nuclear weapons. Even after going nuclear, India has not felt the need for building a fleet of strategic bombers over the last 26 years for several reasons, as discussed below.

Geography of Threats

Amongst the unique attributes of strategic bombers is their ability to undertake attacks in enemy territories which are geographically far away. With strong stealth features, they are built to escape detection, including by flying at high altitudes over long distances, to carry out deep penetration missions to target the adversary's war-waging capability and resolve. In the case of the US Air Force, for example, the only Western country operating strategic bombers, its bombers are meant to carry out operations thousands of kilometres from the homeland. So, a B-2 SPIRIT bomber can travel 10,000 km in a single fuelling and is highly stealthy, with very low "acoustic, thermal, electromagnetic radar and visual profiles at all altitudes."¹⁴ China's H 20 and Russia Tupolev PAK DA are both believed to be capable of an operational range of 12,000 km.

Each of these three countries that operates strategic bombers has adversaries at great geographical, even trans-oceanic, distances. In contrast to their potential areas of operation, India's threats lie in geographically contiguous territories. This obviates the need for aircraft to fly long distances. In fact, India's potential targets easily fall within the attack limits of its present complement of fighter aircraft and missiles.

Besides distance, the nature of the operating environment is also different. In India's context, the use of long-distance bombers for targets in depth, particularly in China, is fraught with risks, mainly because it would not be able to achieve air superiority along the route in order to assure its safe transit towards a target in depth.

14. Sidney E Dean, "Strategic Bombers: Still Relevant?", *European Security and Defence*, December 27, 2022.

Competing Demands on Scarce Resources

The cost of raising and maintaining a fleet of strategic bombers is not inconsequential. In the case of the USA, which is one of the only country that is transparent on this issue, the next-generation B-21 strategic stealth bomber is expected to cost around \$0.5 billion each, the upgradation bill of the Pentagon triad for the next decade totalling around \$350 billion over a life-cycle. According to some reports, “The total cost, priced in fiscal year 2019 dollars, includes \$25.1 billion for development, \$64 billion for production, and \$114 billion for 30 years of sustaining and operating a fleet of 100 bombers.”¹⁵ Besides, the bombers come with a panoply of requirements for special infrastructure such as individual hangars, top level security measures at their bases, and personnel for training and operations. In case they are left in the open, the bombers would be most vulnerable to an enemy attack, especially in today’s times of advanced Intelligence, Surveillance, Reconnaissance (ISR).

Given the costs involved for a developing but security-stressed country like India, a balancing act is required on many fronts. Firstly, there is need for balancing the country’s developmental needs with defence spending. Then, within the budgetary allocations for defence, there is need to balance the requirements of the three Services. And, going further, there are competing priorities within each Service that need to be adequately considered and catered for. In the case of the IAF, for instance, currently the force is down to 30 fighter squadrons as against the authorised 42 squadrons. Going up to that level with the kind of defence budgets that can be expected is certain to be a challenging exercise. Meanwhile, as technologies advance, it would also become necessary to move to newer generation aircraft and weapon systems, which naturally would be more expensive too. Besides offensive platforms, the need for air defences is also on the rise and will have to be catered for from within the same frugal kitty. In fact, as future warfare trends bring in

15. “The Future Air Force: Northrop Grumman B-21 Stealth Strategic Bomber will Cost \$203 Billion Over 30 Years”, *Military Aerospace Electronics*, December 9, 2021, <https://www.militaryaerospace.com/defense-executive/article/14222047/b21-bomber-costs>

In fact, the large and bulky size of bombers makes them less capable of being manoeuvred as quickly as a fighter aircraft; nor can they fly at high speeds. Both these characteristics (speed and manoeuvrability) are essential for survival in a contested airspace.

a greater role for drones, cyber warfare and precision guided munitions, the competition amongst platforms, systems and capabilities will only increase.

It is for this reason that India has not found it prudent to spend on a dedicated strategic bomber fleet. A mix of the existing and planned multi-role fighter bomber aircraft, as well as land-based ballistic missiles has been found to be adequate for projecting credible nuclear deterrence.

Benefits of Multi-Role Aircraft

The multi-role capabilities of modern attack aircraft have reduced the need for dedicated strategic bombers. Additionally, air-to-air refuelling has enabled enhancement of range to undertake deep strikes into enemy territory. In this context, India's fleet of Mirage 2000, Su-30MKI and now even the Rafales are the IAF's options to deliver nuclear bombs inside enemy territory. The indigenously built Light Combat Aircraft (LCA) Tejas is also estimated to become available for this role in the coming years. Enabled by aerial refuelling, this would suffice to reach strategic targets in Pakistan and China. Such aircraft would also enable negating the traditional vulnerability of large bombers to modern air defences and anti-access/area-denial strategies. In fact, the large and bulky size of bombers makes them less capable of being manoeuvred as quickly as a fighter aircraft; nor can they fly at high speeds. Both these characteristics (speed and manoeuvrability) are essential for survival in a contested airspace.

Meanwhile, multi-role aircraft have their benefits while also being able to offer the advantages of air delivery of nuclear weapons, such as recall even after take-off, the ability to change course frequently, thereby making targeting unpredictable, and using not just gravity bombs but also stand-off cruise missiles to counter air defences. However, it needs to be mentioned

that India has not declared any of its cruise missiles, irrespective of their launch platform, for the nuclear delivery role.

Availability of Land-Based Ballistic Missiles of Varied Ranges

Over the last decade and a half, India has invested in the development and gradual deployment of a number of land-based ballistic missiles of multiple ranges. The short range Prithvis and intermediate range Agni variants are already operational. The latter are rail and road mobile, solid-fuelled missiles. Graduating to the next level, long-range, canisterised Agni V missiles are in the process of being tested for operational induction. Meanwhile, in the context of the sea-based leg of India's nuclear triad, the INS *Arihant*, the indigenous SSBN, has marked the initiation of the journey. But operational, credible sea-based deterrence requires a fleet of at least 4-5 SSBNs with the ability to carry SLBMs of longer ranges. What have been tested until now are the K-15 with a range of 700-750 km and the K-4 with a range of 2,000-2,500 km.¹⁶ But, the missile range will have to be enhanced to at least 5,000 km to remain away from the adversary while being able to hit targets whose loss would be deemed unacceptable by Beijing. This remains work in progress.

Meanwhile, India has maintained a clear distinction of designating its ballistic missiles only as nuclear delivery platforms. The sub-sonic Nirbhay or the supersonic BrahMos cruise missiles have not been designated for carrying nuclear warheads. Even though the BrahMos have been tested from the Su-30 MKI, official statements do not attribute a nuclear role to them.¹⁷

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16. "India Tests New Underwater Nuclear Missile", *The Times of India*, March 26, 2014.

17. <https://www.pib.gov.in/PressReleaseDetail.aspx?PRID=1572385>

Nature of India's Nuclear Deterrence

New Delhi has always maintained that nuclear weapons are not for war-fighting. Their purpose is narrow and limited to safeguarding the country against nuclear coercion, blackmail or its possible use. This strategy seeks to deter nuclear use by conveying *assured retaliation* in response to a first use, irrespective of its yield or choice of target. For India, therefore, any use of the nuclear weapon would have strategic implications and would invoke a punitive response. The focus of the Indian nuclear arsenal has, therefore, remained on ensuring credibility through the survivability of reliable delivery systems to mount the necessary retaliation. Effective nuclear signalling must dispel any doubt in the mind of the adversary that he could get away with any kind of a nuclear misadventure without having to suffer the consequences of retaliation of the kind that would inflict unacceptable costs on him. For this reason, perhaps, India has not been fixated on counter-force nuclear targeting capabilities. Despite the high accuracy targeting available with its cruise missiles, these have not been designated for a nuclear role.

Basically, India needs a secure second-strike arsenal in the form of hardened silos, mobile launchers, deployment beyond the reach of hostile delivery systems, dispersion of the arsenal on a triad, and structured weapon release authority in order to guarantee an assured appropriate response facilitated through a robust Command, Control, Communication and Intelligence (C3I) system. Effective surveillance and early warning capabilities to acquire intelligence on the adversary's force posture are also necessary to minimise the risks of a miscalculated or inadvertent strike based on faulty intelligence or false alarms.

New Delhi should focus on building its own military strength (conventional and nuclear) and political influence, including through the use of its unique soft power appeal. While, on the one hand, India must undertake conventional modernisation to raise the nuclear threshold, on the other, it needs to enhance the credibility of own nuclear deterrence through a programme aimed at increasing the survivability of its nuclear

forces. In view of the varied and complex nuclear threats that India faces, its relevant strategy must be able to find the right approach to stabilise the situation with Pakistan while avoiding getting into a messy and expensive arms race with China. This requires staying focussed on certain necessary nuclear hardware while, at the same time, playing a sophisticated game of perception manipulation of the adversary.

CONCLUSION

As indicated in its doctrine, the IAF well recognises that “one of the important national military objectives is to prevent war through credible deterrence across the spectrum of conflict... The air-vector, which is the most flexible element of our nuclear deterrence, remains robust, ready and resilient.”¹⁸ India has reached the conclusion that multi-role fighters can undertake these tasks too and the doctrine acknowledges that “given the depth of such targets, coordinated planning, surprise, decoy, and deception is necessary to enhance mission success”.

The IAF is also obviously well cognisant of the need to develop a ‘balanced air force’, which can carry out both strategic and tactical missions. Even a tactical fighter aircraft can well carry out a strategic role. Hence, the need for putting into place a dedicated strategic bomber fleet has been deemed unwarranted and unnecessary. While one could put it into the category of *desirable* force accretion, it is not an *essential* one, especially since India’s nuclear threats are all in relatively close vicinity. The physical proximity, in fact, could make the bombers more vulnerable since their operating bases could be within range of enemy strike aircraft. This would only make this leg of the triad, besides being expensive to build and maintain, most vulnerable too, including to fast improving air defences and electronic warfare capabilities. In the Indian threat landscape, missiles offer more cost - effective and credible delivery platforms owing to the speed at which they can travel. If these become hypersonic and manoeuvrable in the future over the requisite ranges, they would offer better advantage of credible deterrence.

18. *Doctrine of the Indian Air Force*, June 2022, p. 59.

In view of the above, it would be most prudent for the IAF to continue with its envisaged acquisition plans centred around the Su-30s, Rafales and the AMCA (Advanced Multi-Role Combat Aircraft). Availability of these aircraft for multi-role tasking, including being made available to the SFC when necessary, should suffice as a credible deterrent. This will, of course, be supplemented with land and sea-based ballistic missiles of multiple ranges for nuclear targeting.

Nuclear deterrence is premised on the principle of assured retaliation. Accordingly, the credibility of India's deterrence demands focus on the survivability of its nuclear forces. In this journey, India has to build at least 4-5 SSBNs with long range submarine launched ballistic missiles, a number of canisterised Agni V land-based missiles that could be effectively moved around on the road for the purpose of deception and dispersal, and a redundant and robust command and control infrastructure. All of these are time and cost intensive enterprises. At this juncture, therefore, a move towards acquisition of strategic bombers with the attendant infrastructure for maintenance and operations could prove to be a distraction. While all militaries like to have all kinds of weapon platforms and systems, the absence of a strategic bomber does not compromise India's ability to air deliver nuclear ordnance. Indeed, the country's nuclear deterrence sits credibly on the nuclear triad.