

## Colloquium

### Reassessing India's Nuclear Doctrine

Significant changes in India's regional nuclear security environment, the progressive break-down of the global arms control regime and fresh impetus to the nuclear arms race among the US, Russia and China pose new challenges to India's security and nuclear strategy. A principal victim of these developments is the undermining of deterrence that has underpinned peace and stability among the nuclear weapon states. Pakistan's deployment of tactical nuclear weapon, the *Nasr*, its 'first use' doctrine, the persistent Chinese assistance for its nuclear programme and delivery systems, and China's own rapid military and nuclear modernisation are similarly undermining deterrence stability and nuclear restraint in the region.. Should India's 2003 nuclear doctrine based on 'no first use' and 'massive retaliation' be modified to deal with the new security challenges, as some have argued? We carry alternative perspectives on this vital issue by two of the country's leading and most knowledgeable experts in this edition of colloquium.

# Indian Nuclear Posture and National Security

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**N**ational Security may be defined as prevention and protection of the nation from external threats, securing it from internal strife and civil war, ensuring and enhancing the well-being and prosperity of the people, preservation, propagation and promotion of values and ideational elements at home and abroad.<sup>1</sup>

This essay evaluates the role of Indian Nuclear Forces in national security so that they ensure survival of the state, protect the people from destruction, provide it the freedom to act in national interest abroad and at home, take preventive and pro-active actions to defeat emerging threats, thwart coercion on policy making and support any action required to enhance the power of the state.

## The Disconcerting Record

What has been our record on national security of the past seven decades? Did we make mistakes in our assessments or policies? Did we draw any lessons from our past for the future? India has survived as a nation state but suffered due to its inability to foresee threats and plan to negate the threats. It has moderately nurtured its values and ideational elements, made inadequate gains in economic prosperity and has still not reached its full potential. India has also suffered aggression externally and internally in the form of wars, insurgencies, proxy wars and communal violence, disruptions through proxies and economic sanctions and denials.

The non-violent aspect of the freedom struggle and an idealist approach to world affairs have left India unprepared for realpolitik, resulting in the defeat of 1962 war by China which affected the psyche for many years. The lack of strategic approach also

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affected India's concessions to Pakistan in the 1947-48 conflict by not expanding the war to the International Border. The signing of the unfavourable Indus Water Treaty, the sub optimal gains at the Tashkent Agreement that prevented India from exploiting the victory of the 1965 war, the delayed testing of the atomic bomb resulted in exclusion from the NPT and made it a pariah state, the threat of intervention by the 7<sup>th</sup> US Fleet during the 1971 Indo-Pak War, and the frittering of the victory of 1971 war at Simla Agreement in the hope friendly attitude has come to haunt the nation in the continuing proxy war in Kashmir.

These decisions were also influenced by big power interests that often prevented India from taking independent or autonomous decisions in national interest. When it was the right time to take a decision India found itself in a quandary, constrained by economic or external factors. The delayed atomic bomb test and the decision not to retain critical parts of J&K after the 1965 war are cases in point. While some may dispute these opinions, common wisdom is that India has been hamstrung in pursuing its stated goals and values as it did not have the requisite power to take independent decisions. It compromised and conceded, and paid a big price later. Biased and differential approach and attitudes in international relations on resolving contentious issues is prevalent and depends upon the power of the country being addressed. China and North Korea are treated differently compared to Iran, Libya and Syria, the variance determined by the nuclear capabilities of China and North Korea. India has now come of age in economic and power terms, and it is appropriate that these are used to shape the environment in the region and secure regional leadership. India's future Nuclear Posture should provide the necessary power and capability for it to assume the desired leadership role in the region as well as build partnerships with friendly nations to obtain a stable world order.

The past two decades have seen major changes in the security environment the world over and to a greater degree in the India's wider regional context. In the nuclear field geopolitical uncertainty may result in changing alignments among states in the region and relative power shifts in the international system driven by China and nations with interests aligned to it. China is making inroads into smaller nations in the region through the infrastructure and financial route. The uncertainty in technological changes includes the potential for unanticipated breakthroughs in the application of existing technologies, or the development of wholly new technologies that change the nature of the threats and the counter capabilities required. <sup>2</sup>

### **China's Military Power**

India's security environment at present and in the foreseeable future is likely to remain regional, extending from west Pacific to West Asia to include the Indian Ocean

littoral. In the regional context India has differences or adversarial relations with China and Pakistan, the illegal occupation of Indian territory and unlawful claims on other areas by both these nations will continue to pose threats to Indian security. Both these nations are collusive and collaborative in their hostility to India, the military and secret nuclear cooperation between the two are a cause of concern. The growth of China's military coupled with its expansionist policy portends ill for India. China's Defence White Papers released by its government provide insights into future actions and direction of Chinese activities in international affairs. The proposed growth in its maritime capabilities is a clear pointer to a power projection in the Pacific and Indian Oceans. The military power of China on display at the 70<sup>th</sup> anniversary of Communist takeover demonstrates its offensive content and abilities. The Chinese strategy of *Active Defence* is offensive in intent and defensive only in name. The underlying theme is offensive at all levels except strategic, this dichotomy is purposely created to exploit any situation to its advantage. If all actions at tactical and operational level are offensive it is clear that in the strategic plane they cannot be defensive. It would be naïve of India to believe what China says about its peaceful rise and defensive approach.

There are many other areas and issues on which there is no convergence between India and China. China has continued to oppose India's entry into the Nuclear Suppliers Group, China does not accept India as a nuclear power, it even refuses to accept India's view on the discriminatory nature of the Non Proliferation Treaty. There are no talks between the two on confidence building measures in the nuclear field since China does not consider India in the same league. China it is not supportive of India being a member of the UN Security Council. Chinese ingress into the Indian Ocean on the pretext of energy security has resulted in the "string of pearls" of military and commercial bases in the littoral states threatening India in its backyard. The Belt and Road Initiative (BRI) seeks to undermine India economically. Continued cartographic aggression by China seeks to undermine Indian territorial claims for future negotiations and is in the similar vein as China's South China Sea aggression and non-acceptance of the ruling of the International Court of Justice on its imperial claims. Both display China's disdain for the rules of the present world order.

China's military modernisation and Maritime forces growth pose challenges to India's security, the growth of China's nuclear forces technologically and strategically create dilemmas for the security planners. The US National Security Strategy 2017<sup>3</sup> the US Nuclear Posture Review 2018 <sup>4</sup>and the US Department of Defence report to the US Congress on China's Military Power <sup>5</sup> – all recognise the rise of China as an assertive power with regional and global ambitions. The US NPR 2018 states:

“Consistent with Chinese President Xi’s statement at the 19th Party Congress that China’s military will be ‘fully transformed into a first tier force’ by 2050, China continues to increase the number, capabilities, and protection of its nuclear forces. While China’s declaratory policy and doctrine have not changed, its lack of transparency regarding the scope and scale of its nuclear modernization program raises questions regarding its future intent. China has developed a new road-mobile strategic intercontinental ballistic missile (ICBM), a new multi-warhead version of its DF5 silo-based ICBM, and its most advanced ballistic missile submarine armed with new submarine-launched ballistic missiles (SLBM). It has also announced development of a new nuclear-capable strategic bomber, giving China a nuclear triad. China has also deployed a nuclear-capable precision guided DF-26 intermediate-range ballistic missile capable of attacking land and naval targets. As with Russia, despite criticizing U.S. homeland missile defense—which is directed against limited missile threats—China has announced that it is testing a new mid-course missile defense system, plans to develop sea-based mid-course ballistic missile defense, and is developing theater ballistic missile defense systems, but has provided few details”.<sup>6</sup>

Some other important issues applicable to US are equally relevant and maybe even more serious for India have been raised in the US OFFICE OF THE SECRETARY OF DEFENSE Annual Report to Congress: *Military and Security Developments Involving the People’s Republic of China*. The report states:

“China’s nuclear weapons policy prioritizes the maintenance of a limited but survivable nuclear force. China continues to improve its ground and submarine-based nuclear capability and is pursuing a viable nuclear “triad” with the development of a nuclear capable air launched ballistic missile. China invests considerable resources to maintain a limited, but survivable, nuclear force. China is enhancing peacetime readiness levels for these nuclear forces to ensure their responsiveness. In addition, China insists its new generation of mobile missiles, with warheads consisting of MIRVs and penetration aids, are intended to ensure the viability of its strategic nuclear forces in the face of continued advances in U.S. and, to a lesser extent, Russian strategic ISR, precision strike, and missile defense capabilities.”<sup>7</sup>

It adds: “China has long maintained a NFU policy, stating it would use nuclear forces only in response to a nuclear strike against China. China’s NFU pledge consists of two stated commitments: China will never use nuclear weapons first at any time and under any circumstances, and will unconditionally refrain from using or threatening to use

nuclear weapons against any non-nuclear-weapon state or in nuclear-weapon-free zones. There is some ambiguity, however, in the narrative in China over the conditions under which China's NFU policy would apply. Some PLA officers have written publicly of the need to spell out conditions under which China might need to use nuclear weapons first; for example, if an enemy's conventional attack threatened the survival of China's nuclear force or of the regime itself. ....PLA writings express the value of a "launch on warning" nuclear posture, an approach to deterrence that uses heightened readiness, improved surveillance, and streamlined decision-making processes to enable a more rapid response to enemy attack. These writings highlight the posture's consistency with China's nuclear NFU policy, suggesting it may be an aspiration for China's nuclear forces. China's comingling of some of its conventional and nuclear missile forces, and ambiguities in China's NFU conditions, could complicate deterrence and escalation management during a conflict. Potential adversary attacks against Chinese conventional missile force-associated C2 centers could inadvertently degrade Chinese nuclear C2 and generate nuclear use-or-lose pressures among China's leadership. Once a conflict has begun, China's dispersal of mobile missile systems to hide sites could further complicate the task of distinguishing between nuclear and conventional forces and, thus, increase the potential for inadvertent attacks on the latter. China's leadership calculus for responding to conventional attacks on nuclear forces remains a key unknown...

"China's nuclear arsenal currently consists of approximately 90 ICBMs, including the silo-based CSS-4 Mod 2 (DF-5A) and Mod 3 (DF-5B); the solid-fueled, road-mobile CSS-10-class (DF-31, DF-31A and DF-31AG); and the more limited range roll-out-to-launch CSS-3 (DF-4). This strategic arsenal is complemented by road-mobile, solid-fueled CSS-5 Mod 2 and Mod 6 (DF-21) MRBMs and DF-26 IRBMs capable of ranging targets in the Indo-Pacific region. China has constructed six JIN-class SSBN, with four operational and two outfitting at Huludao Shipyard. China's JIN SSBNs, which are equipped to carry up to 12 CSS-N-14 (JL-2) SLBMs, are the country's first viable sea-based nuclear deterrent. China's next-generation Type 096 SSBN reportedly will be armed with the follow-on JL-3 SLBM, and it will likely begin construction in the early 2020s. Based on the 40-plus-year service life of China's first generation SSNs, China will operate its JIN and Type 096 SSBN fleets concurrently. The PLA is upgrading its aircraft with two new air-launched ballistic missiles, one of which may include a nuclear payload. Its deployment and integration would, for the first time, provide China with a viable nuclear "triad" of delivery systems dispersed across land, sea, and air forces. The PLA justifies developing a range of technologies China perceives are necessary to counter U.S. and other countries' ballistic missile defense systems, including MaRV, MIRVs, decoys, chaff, jamming, thermal shielding, and hypersonic glide vehicles.

The PLA will likely continue deploying sophisticated C2 systems and refining C2 processes as growing numbers of mobile ICBMs and future SSBN deterrence patrols require the PLA to safeguard the integrity of nuclear release authority for a larger, more dispersed force.”<sup>8</sup>

It further says: “China is working to develop a space-based early warning capability that could support this posture in the future. The PLA continues to maintain a robust and technologically advanced underground facility (UGF) program to protect all aspects of its military forces, including C2, logistics, missile systems, and naval forces. China has thousands of UGFs and it continues to construct more each year. The PLA utilizes these UGFs to protect valuable assets from the effects of missile strikes and to conceal military operations from adversaries. China’s NFU policy also contributed to the construction of UGFs for the country’s nuclear forces, which may have planned to survive an initial nuclear first strike by an adversary. China began to update and expand its military UGF program in the mid- to late-1980s. China will likely continue to develop and expand its UGF program to support its expanding forces”.<sup>9</sup>

The DoD report also details China’s Space and Counter-space Capabilities. It states: “China’s space program continues to mature rapidly. The PLA, which has historically managed the effort, continues to invest in improving its capabilities in space-based ISR, satellite communication, satellite navigation, and meteorology, as well as human spaceflight and robotic space exploration. China has built an expansive ground support infrastructure to support its growing on-orbit fleet and related functions including spacecraft and space launch vehicle (SLV) manufacture, launch, C2, and data downlink. Additionally, China continues development of multiple counterspace capabilities designed to degrade and deny adversary use of space-based assets during a crisis or conflict. In 2018, China launched 39 SLVs, of which 38 were successful, orbiting approximately 100 spacecraft that include navigation, ISR, and test/engineering satellites. Other activities in 2018 included: Beidou Navigation Satellite Constellation: Since the beginning of 2017, China has launched 19 new Beidou satellites for its worldwide satellite navigation constellation, bringing Beidou to initial operating capability in December 2018, with plans to reach full operating capability by the end of 2020. The new Beidou satellites are equipped with radiofrequency and laser inter-satellite links, new atomic clocks, and other new advanced technologies. Additionally, China plans to offer satellite-based augmentation services, a worldwide short-message service, and internationally recognized search and rescue capabilities. ....The PLA is acquiring a range of technologies to improve China’s counterspace capabilities. In addition to the development of directed energy weapons and satellite jammers, China is also developing anti-satellite capabilities and has probably made progress on the anti-satellite missile system it tested in July 2014. China is employing more sophisticated

satellite operations and is probably testing dual-use technologies in space that could be applied to counterspace missions. Although China has not publicly acknowledged the existence of any new programs since it confirmed it used an antisatellite missile to destroy a weather satellite in 2007, Chinese defense academics often publish on counterspace threat technologies. These scholars stress the necessity of “destroying, damaging, and interfering with the enemy’s reconnaissance . . . and communications satellites,” suggesting that such systems, as well as navigation and early warning satellites, could be among the targets of attacks designed to “blind and deafen the enemy.”<sup>10</sup>

China is opaque about its nuclear arsenal. The figures quoted by western sources are approximately 290,<sup>11</sup> but they do not appear realistic considering the capability it needs to address the US, Japan, South Korea, India, other US allies and also hedge on future challenges against Russia, France and UK. If China genuinely follows a ‘No First Use’ policy, then allowance for destruction and damage to the nuclear forces will be built into the overall figures. China possesses fissile material for a large nuclear weapons inventory (in excess of 1000 weapons), its missile production capability is huge and well established. Therefore, it will be judicious to assume a higher deployment of nuclear weapons by China. For discussion purposes it should be determined in the region of 600-1000, any figures lower would put to risk the deterrent capability.

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China’s doctrine of Nuclear ‘No First Use’ is conditional (applies to non-nuclear states), is in the past tense and does not apply to India. **As the *China Defence White Paper* 2015 states** “China has always pursued the policy of no first use of nuclear weapons and adhered to a self-defensive nuclear strategy that is defensive in nature. China will unconditionally not use or threaten to use nuclear weapons against non-nuclear-weapon states or in nuclear-weapon-free zones, and will never enter into a nuclear arms race with any other country”.<sup>12</sup>

### **Pakistan-a Revisionist State**

Pakistan is the other adversary India has to contend with, it is a revisionist state and a military proxy for China in the Indian context. With the China Pakistan Economic Corridor (CPEC) the relationship has further deepened economically. In its revisionist agenda Pakistan has been conducting a proxy war through terror. While India has not responded to escalate the sub-conventional plane to the conventional this has the potential to explode. Pakistan has been helped by China in its nuclear weapons programme and continues to

depend upon China for military hardware and nuclear technology, including plutonium producing reactors. Pakistan now possesses plutonium and uranium production plants at Khushab, Kahuta and Gadwal. They provide weapons grade fissile material for 10-15 weapons per year. Pakistan now has a nuclear weapons stockpile of 140 to 150 warheads (See Table 1). In the next decade Pakistan can add 100-150 weapons to its forces and with no limit announced, its final size will remain in the domain of speculation.

Pakistan has adopted a Nuclear Doctrine of *Full Spectrum Deterrence* with First Use policy. Though not adequately explained it seeks to support sub-conventional war through threat of nuclear escalation, links conventional war to nuclear escalation. By developing Tactical Nuclear Weapons (TNWs) Pakistan has also signalled that it has adopted a Nuclear Warfighting Strategy. The introduction of TNWs is likely to see a continuous and rapid growth in Pakistan's nuclear arsenal. Continuous sabre rattling by Pakistan's leadership on normal day to day border/terror support issues does not inspire confidence in the stability of the leadership when confronted with a crisis or war. Pakistan continues to expand its nuclear arsenal with more warheads, more delivery systems, and a growing fissile materials production industry. Analysis of a large number of commercial satellite images of Pakistani army garrisons and air force bases shows what appear to be mobile launchers and underground facilities that might be related to nuclear forces. Pakistan

**Pakistan... seeks to support sub-conventional war through threat of nuclear escalation, links conventional war to nuclear escalation.**

possibly assigns a nuclear strike mission to select F-16A/B and Mirage III/V fighter squadrons. The F-16 was probably the first aircraft in the nuclear role, but the Mirage quickly joined the mission. Pakistan appears to have six currently operational nuclear-capable land-based ballistic missiles: the short-range Abdali (Hatf-2), Ghaznavi (Hatf-3), Shaheen-1 (Hatf-4), and NASR (Hatf-9), and the medium-range Ghauri (Hatf-5) and Shaheen-2 (Hatf-6). Three other nuclear-capable ballistic missiles are under development: the medium-range Shaheen-1A, Shaheen-3, and the MIRVed Ababeel. The Pakistani road-mobile ballistic missile force has undergone significant development and expansion over the past decade-and-a-half. This includes possibly eight or nine missile garrisons, including four or five along the Indian border for short-range systems (Babur, Ghaznavi, Shaheen-1, NASR) and three or four other garrisons further inland for medium-range systems.<sup>13</sup>

### India's Options

India must be seized of these developments in China and Pakistan in order to re-evaluate its nuclear doctrine, nuclear forces, space and counterspace capabilities, command

and control systems, and all supporting elements for functioning of the nuclear deterrent. The changing geostrategic and technological environment necessitate a review of the Indian Nuclear Doctrine and Posture.

The role of the Indian Nuclear Forces should be:

- a. Strategic Deterrence, i.e., prevent nuclear attacks of any scale on India or Indian Forces anywhere in the world and when deterrence fails inflict damage on the adversary beyond the anticipated benefit.
- b. Preventing attacks by Weapons of Mass Destruction., In case of a large scale attack by WMD it should have the choice to respond with nuclear attacks on states responsible for the WMD attacks. If the attacks are launched or carried out by non-state actors, hold responsible the state providing the WMD or shelter to the entities.
- c. India must add a new clause to its stated doctrine that states any large scale conventional attack which seeks to undermine India's territorial integrity or sovereignty may be repelled by nuclear weapons.
- d. Indian Nuclear Forces, in addition, must provide an umbrella to prosecute options that do not allow conventional war to escalate beyond a limited war.
- e. The doctrine must also assist compellance or coercion, in an uncertain environment that is emerging.
- f. The doctrine must hold accountable any state which provides nuclear weapons or material that terrorist can use against India.
- g. Future capability must have capacity to hedge against an uncertain future.

India must also examine the role of nuclear deterrent in reduction of the size of conventional forces. The cost of the nuclear deterrent as a percentage of the defence budget as quoted in the US NPR is 2.7% for sustainment and 6.4% for recapitalisation. This philosophy will hold valid if India decides to change its strategy vis-à-vis China, under conditions of ambiguity and first use.

## **Nuclear Doctrine**

India's nuclear doctrine has been the focus of intense debate in India and abroad for the past two decades, ever since the draft nuclear doctrine was released in 1999 and the final doctrine published in 2003, the debate has essentially revolved on credibility of the doctrine, the understanding of massive retaliation and question of unacceptable damage.

The declaratory doctrine by India was not matched by Pakistan or China, therefore it remains isolated in comparative terms for analysis or evaluation. India by its declaratory defensive unconditional *No First Use* Nuclear policy sought to allay fears of Pakistan and China about the benign nature of the nuclear deterrent, however this has not brought about any change in the attitude of the two adversaries.

The current doctrine is essentially defensive in nature based more on moral values and a non-threatening approach. However this doctrine does not ensure protection of the state in the first instance. The first responsibility of the doctrine and the government is to ensure survival and protection of the state from destruction, annihilation and devastation, however the present doctrine of No First Use of Nuclear weapons does not meet the critical criteria of no damage, minimal or least damage to the nation. The doctrine allows the adversary to strike first and cause destruction and devastation of its own choosing. Compared to this the US NPR states "If deterrence fails, the initiation and conduct of nuclear operations would adhere to the law of armed conflict and the Uniform Code of Military Justice. The United States will strive to end any conflict and restore deterrence at the lowest level of damage possible for the United States, allies, and partners, and minimize civilian damage to the extent possible consistent with achieving objectives".<sup>14</sup> In permitting the adversary to strike first India exposes its population, infrastructure and nuclear forces to destruction less those at sea, if the adversary chooses then the entire nation may be targeted. Those advocating limited strikes by the adversary are basing their assessment on conjecture, however no adversary would start a nuclear war without the knowledge there are no runner-up in war and what India's reaction will be. It is no solace for a destroyed nation to know that later the adversary will also face destruction at whatever level it can be imposed. To enter war with a disadvantage is a cardinal mistake, and to enter a war with nuclear escalation where destruction of the nation is possible is the gravest mistake any nation can make or do.

The US NPR 2018 states:

"To help preserve deterrence and the assurance of allies and partners, the United States has never adopted a "no first use" policy and, given the contemporary threat environment, such a policy is not justified today. It remains the policy of the United States to retain some ambiguity regarding the precise circumstances that might lead to a U.S. nuclear response. In addition, the United States will maintain a portion of its nuclear forces on alert day-to-day, and retain the option of launching those forces promptly. This posture maximizes decision time and preserves the range of U.S. response options. It also makes clear to potential adversaries that they can

have no confidence in strategies intended to destroy our nuclear deterrent forces in a surprise first strike.”<sup>15</sup>

The UK is also clear about not adopting a No First Use Nuclear policy. Its National Security Strategy of 2015 states “Only the Prime Minister can authorise the launch of nuclear weapons, which ensures that political control is maintained at all times. We would use our nuclear weapons only in extreme circumstances of self-defence, including the defence of our NATO Allies. While our resolve and capability to do so if necessary is beyond doubt, we will remain deliberately ambiguous about precisely when, how and at what scale we would contemplate their use, in order not to simplify the calculations of any potential aggressor”.

**It is an opportune time for India to change its doctrine to one of “Ambiguity”**

The Russian Federation Military Strategy nuclear policy<sup>16</sup> is similarly enunciated as “The Russian Federation shall reserve the right to use nuclear weapons in response to the use of nuclear and other types of weapons of mass destruction against it and/or its allies, as well as in the event of aggression against the Russian Federation with the use of conventional weapons when the very existence of the state is in jeopardy. The decision to use nuclear weapons shall be taken by the President of the Russian Federation.”<sup>17</sup> An analysis of all the nuclear powers, including China, demonstrates that No First Use has outlived its value and protection of the state is the primary responsibility of the government.

It is an opportune time for India to change its doctrine to one of “Ambiguity”, where First Use Strategy may be a preferred option. The doctrine may then discard the options of massive retaliation and unacceptable damage, these will be replaced by preventive and pro-active options. However in case of pre-emptive first strike by the adversary, capability to cause unacceptable damage through retaliation will be retained, as is the case with other powers.

The growing size of the nuclear forces of China and Pakistan demands that India should build a large arsenal to maintain the ability to deter both the adversaries and if deterrence fails retaliate in adequate measure. At present US faces two nuclear adversaries but is supported by UK and France against Russia, even then it has 1750 deployed weapons and 2050 in reserve, plus 2385 that are retired but not dismantled.<sup>18</sup> Russia has similar number of weapons to deter against these three nations and NATO.<sup>19</sup> Pakistan is continuing to enhance its weapons rapidly and in the next decade its numbers may exceed 250 nuclear weapons. Drawing from the above data it becomes clear that India needs a large arsenal to ensure strategic deterrence and hedge against future threats. Whilst it is not wise to

suggest exact figures, it is prudent that India work on a figure between 500 to 1000 to meet the needs of national security.

To address the two adversaries simultaneously India has been building a Triad with capabilities based on distances of the likely targets-- against China a long range set of delivery systems in the triad, whereas against Pakistan short to medium range of systems in all three modes. The need for a Triad was well established during the Cold War, where each delivery means provided distinct advantage. The sea based deterrent was least vulnerable but yet responsive, the land based deterrent was most responsive and flexible and the air deterrent provided flexibility and recall capability. The progress on India's Triad seems sub-optimal considering the reports that appear in the media. The pace should cater for the rapid modernisation of the arsenals of the two adversaries and Pakistan's build-up of nuclear weapons. To ensure that adequate capability is maintained by India against both the adversaries there is a need to increase the production of nuclear weapons and delivery systems.

Indian nuclear weapons are now more than two decades in age. Considering that new weapons are being introduced by the other nuclear weapon states India will follow suit. India should discard some shorter range missiles and consolidate the inventory-- one set specifically for Pakistan and the longer range missiles for China. This is not to suggest that there should not be flexibility in application, but optimisation of ranges is a challenge to be addressed. A new longer range missile with MIRV capability that covers the entire land area of China and also its maritime areas, including its bases in the Indian Ocean, must be brought into the inventory at the earliest. The current in-service missiles should be continuously modernised to incorporate the latest technologies of penetration against BMD and other defensive measures, MaRV and decoys. Where feasible MIRV systems may be added to the existing long range missiles. MIRV capability must not be disclosed. The next generation of missiles, i.e., Hypersonic missiles should enter service as soon as possible.

India has one operational SSBN, but there is an inescapable need to have 6 x SSBNs, each with 12-16 launchers with MIRV capability and a range of 3000-7000 km, 12 SSNs for seek and destroy capability of enemy sub-surface vessels. Of the 6 x SSBNs, at least 4 x SSBNs should be operational whilst one is under repair and one in maintenance. The 4 x SSBNs must provide 300-320 nuclear weapons capability. For the land based system the inescapable need is for 300-350 missiles with the division between short and long range being 1:2, the ranges varying from 2000 to 7000km. Since SSBNs take time to construct and operationalise, the land based missiles must be operationalised at the earliest. India lacks a bomber aircraft, hence the role of air delivery of Air Launched Cruise Missiles (ALCM) will

be performed by front line Dual Use Aircraft. At the least India requires 60-80 such nuclear capable ALCMs.

The last two decades have witnessed China's exploitation and use of Space. Its demonstration of Anti Satellite (ASAT) capability and Ballistic Missile Defence (BMD) amply prove that any future conflict will see use of space as a major force multiplier. India too should build Space and counterspace capabilities for navigation, early warning, surveillance, detection, tracking and monitoring. These should be part of the nuclear deterrent. Offensive counterspace capabilities to ensure survival of own satellites and support systems should form part of the system.

Ballistic Missile Defence development by India began some years ago, and its operationalisation is a necessity. The areas to be covered shall be a political decision rather than a technical one. Cyber systems, defensive and offensive, are vital for the deterrent and its effective functioning, and must receive due attention. Since this subject is in the opaque domain not much is known or quantified in open sources.

### **In Conclusion**

The draft nuclear doctrine of 1999 laid down the features and characteristics of nuclear deterrent-- it must be survivable, robust, protected and effective, enduring, diverse, flexible, and responsive to the requirements in accordance with the concept of credible minimum deterrence. These continue to be valid even now. The draft also emphasised the importance of a robust command and control system, effective intelligence, early warning capabilities, comprehensive planning and training for operations in line with the strategy, and the will to employ nuclear forces and weapons. A modern, robust, flexible, secure and survivable Command, Control, Communication, Computer, Intelligence, Surveillance and Reconnaissance System is a continuous need for the deterrent to be ready and effective.

Learning from the past it is time for India to create a powerful nuclear deterrent and use the power of the nuclear deterrent to further national security objectives, ensure an environment of peace for economic prosperity of the nation, promote our values and ideas and take our rightful place in the comity of nations.

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