



**Delhi Policy Group**

Advancing India's Rise as a Leading Power



# POLICY BRIEF

## Mission Divyastra: MIRV Capabilities and India's Strategic Posture

### *Author*

Arun Sahgal

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**Delhi Policy Group**

Core 5A, 1st Floor, India Habitat Centre, Lodhi Road, New Delhi- 110003

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### Author

**Brig. Arun Sahgal (Retd.), Ph.D.**, Senior Fellow for Strategic and Regional Security, Delhi Policy Group

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### Cover Photographs:

*Indigenously developed Agni-5 missile with Multiple Independently Targetable Re-Entry Vehicle (MIRV) technology successful tested as part of Mission Divyastra on March 11, 2024. Source: [X/@DRDO\\_India](#)*

*Defence Research and Development Organisation (DRDO) successfully flight tested a New Generation Nuclear Capable Ballistic Missile Agni P from Dr. A.P.J. Abdul Kalam island off the coast of Odisha, Balasore, on June 28, 2021. Source: [DRDO](#)*

*India conducted two tests of a nuclear-capable, submarine-launched ballistic missile (SLBM) known as the K-4, on January 19, 2020. Source: [DRDO News](#)*

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## Mission Divyastra: MIRV Capabilities and India's Strategic Posture

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### Introduction

The Defence Research and Development Organisation (DRDO) achieved a milestone on Monday, March 11, 2024 with the successful maiden test of the IRBM Agni-5, featuring the indigenous Multiple Independently Targetable Re-Entry Vehicle (MIRV) technology, named Mission "Divyastra". The test was conducted from Dr. A.P.J. Abdul Kalam Island in Odisha.

Agni-5, with the projected reach of around 5000 km, is India's Intermediate/Intercontinental range ballistic missile. The relevance of this test lies in the successful integration of MIRV technology with the Agni-5 missile. MIRV systems deploy missiles that have the capability to release warheads at different speeds and in different directions, hitting targets several hundred or even longer distances apart. MIRV technology requires nuclear warheads to be miniaturized, equipped with independent guidance and navigation controls, and released in a boost phase energy burst in a pre-designated delivery sequence.

It is important to underscore that the US, Russia, the UK, France and China have long deployed MIRV systems. Pakistan too has attempted MIRV testing by mounting two warheads on a 2250 km range Shaheen III missile in 2021. The test was a failure, with both warheads hitting the ground 2 km apart and exploding.

In India's case, the DRDO has been working to develop indigenous MIRV technology since 2013. The core thinking behind this has been to enhance regional stability, given the mounting strategic challenge from China which has been upgrading its nuclear posture both in quantity and quality, including the upgradation of its IRBM systems which are largely deployed against India and East Asia.

The MIRV system allows mounting of multiple warheads encased in a single core which can number from 2 to 10. Targets can be spread across hundreds of kilometres, or restricted to a specific area, depending upon the disbursement of energy in the booster phase. Factors behind MIRV development include the type of attack, counter force or counter value, and the nature of missile defences, whether terrestrial based Ballistic Missile Defences or space based

Anti-Ballistic Missile (ABM) systems. As per knowledgeable sources, India's maiden MIRV missile carried three warheads.

Speaking about the technological significance of this test and the road ahead, Dr. Avinash Chander, former Director General of the DRDO and the chief architect of the Agni series of missile systems, has stated that through indigenous efforts, India has developed a robust eco-system encompassing warhead design, navigation, guidance, air frame structure and booster phase subsystems. Indigenous content, according to him, is as high as 80 percent. An important point he has underscored is that despite the lifting of US sanctions, India has continued to face issues of technology denial which have forced India to go alone. He has also highlighted that Agni Prime, the latest in the series of missile systems in the Indian inventory, is a "manoeuvrable re-entry vehicle", or a MaRv system. This can manoeuvre the war head with near pin point accuracy to the target on being detached from the missile, greatly enhancing its Circular Error of Probability (CEP).

## Global and Regional Reaction

True to form, reaction to the Indian MIRV test has largely been negative and centred around a South Asian stability-instability paradigm. According to Hans Kristin, Director of the Nuclear weapons programme at the Federation of American scientists, "If either country (China or Pakistan) believed that India could potentially conduct a decapitating or significant first strike against Pakistan, a serious crisis could potentially go nuclear with little advance warning". In his contention, Indian missiles with MIRVs would become important pre-emptive counter force targets for an adversary, to potentially reduce the damage India could inflict. Additionally, India's MIRVs might prompt Indian decision-makers to try and pre-emptively disarm Pakistan in a crisis. Further, it is conjectured, MIRV capability would force India to add to its nuclear stockpile. The additional plutonium required could come from India's prototype Fast Breeder Reactor (PFBR), which is likely to achieve criticality soon. Once commissioned, India will be the second country after Russia to have a commercially operating Fast Breeder Reactor.

Among regional reactions, China saw the test as India's bid to enhance its strategic deterrence against China and Pakistan. According to Chinese experts, India has achieved a high degree of progress in the research and development of long-range strike weapons. They termed the Indian MIRV capability more offensive and difficult to defend against. According to Qian Feng, director of the research department at the National Strategy Institute at Tsinghua University, the range of 5000 km plus of Agni-5 shows India's main

hypothetical enemy is China, with its goal of coverage over most of mainland to enhance deterrence capabilities.<sup>1</sup>

Pakistan's reaction, on the other hand, was somewhat muted. Their primary concern is that the MIRV test, along with other developments such as hypersonic weapons and advances in BMD, will impact the subcontinental strategic balance. This in Pakistani perceptions enhances India's hypothetical counter force capability, making India capable of destroying silos, command and control centres, underground facilities, and strategic missile bases. Together with the MaRV Agni Prime, Pakistan analysts perceive, the MIRV provides India the capability of launching a decapitating first strike<sup>2</sup>.

## Incipient Nuclear Order

It is important to note it is not India alone which is undertaking technological upgradation of its strategic forces to meet regional challenges. Major nuclear powers are also involved in this game of upgrading and modernising their arsenals driven by emerging global balance of power considerations and deepening strategic competition between the West, defined by US and its NATO allies, and the Eastern powers, comprising China and Russia. The nuclear force posture trajectory of the three major nuclear powers is outlined below.

China's emergence as a middle nuclear weapons power and Sino-Russia strategic collusion has led to a tripolar nuclear order, in which two major nuclear powers (Russia and China) could align against the third (the US and NATO) in asserting balance of power. This is resulting in an incipient arms race highlighted in the trajectory of their nuclear posture.

A third element is that several smaller nuclear weapon states which did not matter in the past are now clearly aligned to one or the other major power blocks, e.g. Pakistan and North Korea aligned with China, while France and the UK as NATO partners are part of the collective US umbrella. The same umbrella is also being extended to Indo-Pacific allies, including Japan, ROK and Australia. Importantly, in the above milieu, India remains a stand-alone nuclear power, facing a nuclear challenge from two collusive adversaries, China and Pakistan.

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<sup>1</sup> <https://www.globaltimes.cn/page/202403/1308703.shtml>

<sup>2</sup> "India's Agni-5 Test: Implications for Regional Strategic Stability"  
<https://thediplomat.com/2024/03/indias-agni-v-test-implications-for-regional-strategic-stability/>

## Strategic Postures of Major Powers

### The United States

Given the daunting challenge to its strategic environment, the United States undertook a major high-level review of its strategic posture. The resulting report, based on worst-case threat assessment, made recommendations for more investments in both conventional and nuclear deterrence, including strategic and non-strategic capabilities. Today, the US is in the process of implementing a decades long nuclear modernisation programme.

Under this programme, all components of US nuclear weapons - from the three legs of the "strategic triad", land-based intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles, and long-range manned strategic bombers, to the nuclear command, control, and communications network - are programmed to be rebuilt, refurbished, and recapitalised. The total cost of this major effort has been estimated at approximately \$ 1.5 trillion, to be implemented over three decades.

The proposed rebuilding and refurbishing of strategic posture are being driven by the changed security and strategic environment. In the US assessment, the need to address two major power threats requires a nuclear force that is larger in size, different in composition, or both. The central argument behind revamping and modernising the strategic posture is that the US must be capable of fighting and winning two wars against peer competitor - namely, China and Russia - acting individually or in concert.<sup>3</sup>

### Russian Nuclear Forces

Driven by major strategic challenges, like the US, Russia too is in the process of completing its decade long efforts to replace all existing strategic and non-strategic nuclear-capable systems with newer versions. In December 2023, the Russian Defence Ministry reported that modern weapons and equipment now make up 95 percent of Russia's nuclear triad.

Russia's nuclear modernisation programme appears to be motivated in part by the Kremlin's strong desire to maintain overall parity with the US, and to maintain national prestige. In addition, there is a strong conviction among the

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<sup>3</sup> "Enhancing national security the Biden Administration will have to trim an exorbitant defence wish list, the Bulletin of Atomic Scientists, Mar 13 at <https://thebulletin.org/2024/03/to-enhance-national-security-the-biden-administration-will-have-to-trim-an-exorbitant-defense-wish-list/>



Russian leadership that the US ballistic missile defence system constitutes a real future risk to the credibility of Russia's retaliatory capability. The poor performance and loss of a significant portion of Russian conventional forces in the war against Ukraine, and the depletion of its weapon stockpiles, Western analysts argue, could further deepen Russia's reliance on nuclear weapons as part of dissuasive deterrence. Throughout its war in Ukraine, Russia has conducted a series of missile strikes using long-range dual-capable precision weapons, such as Kh-101 air-launched cruise missiles (the nuclear version is termed Kh-102), sea-launched 3M-54 Kalibr cruise missiles, 9-A-7760 Kinzhal ballistic missiles, air-launched Kh-22 (AS-4 Kitchen) cruise missiles, and ground-launched Iskander missiles.

Russia's nuclear modernisation programs - combined with frequent and explicit nuclear threats, has created uncertainty about its intentions and the nature of its nuclear strategy. Although most pronouncements by Russia have been in reaction to NATO's attempts at conventional escalation, allusions to the use of non-strategic nuclear weapons also impact strategic balance in Europe carrying wider consequences, including unintended escalation.<sup>4</sup>

### China's Nuclear Modernisation

China's nuclear weapons' modernisation program that commenced in the 2000s is expanding, both rapidly and significantly. It is fielding more types and greater numbers of nuclear weapons. China has continued to modernise its road-mobile intercontinental ballistic missile (ICBM), has significantly advanced the construction of its three new missile silo fields for solid-fuel ICBMs, and has also expanded the construction of new silos for its liquid-fuel DF-5 ICBMs<sup>5</sup>.

China is also significantly expanding its DF-26 intermediate-range ballistic missile force (for deployment primarily in Asia) and has also begun replacing some older conventional short-range ballistic missiles with new DF-17 medium-range ballistic missiles equipped with hypersonic glide vehicles. At sea, China has refitted its six Type-094 ballistic missile submarines with the longer-range JL-3 submarine-launched ballistic missile. In addition, China has recently reassigned a nuclear mission to its bombers and is developing an air-launched ballistic missile that might have nuclear capability.

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<sup>4</sup> "Russian nuclear weapons, 2024" Bulletin of Atomic Scientists, [hebulletin.org/premium/2024-03/russian-nuclear-weapons-2024/](https://thebulletin.org/premium/2024-03/russian-nuclear-weapons-2024/), Mar 7, 2024.

<sup>5</sup> Arun Sahgal, "Rethinking India's Strategic Deterrence to Address the China Challenge" DPG Policy Brief, Volume VII, Issue 15, Feb 2022, [www.delhipolicygroup.org](http://www.delhipolicygroup.org)



China has an estimated stockpile of approximately 400 nuclear warheads for delivery by land and sea-based ballistic missiles, including bombers. Additional warheads are thought to be in production, to eventually arm additional road-mobile and silo-based missiles and bombers. The Pentagon's 2023 report estimates a nuclear stockpile of 1,000 operational weapons by 2030. If expansion continues at the current rate, as per Pentagon projections, China might field a stockpile of about 1,500 nuclear warheads by 2035.<sup>6</sup>

The Pentagon's latest projections appear to assume that China intends to deploy many missiles capable of carrying multiple independently targetable re-entry vehicles (MIRVs) in the new silos. As per open-source information, each DF-5 ICBM (MIRV) can carry up to five warheads, while the DF-41 ICBM carries no more than three MIRVs.

The main purpose of the massive silo construction program undertaken by China is being assessed as an attempt to safeguard China's retaliatory capability against a surprise first-strike. The purpose of the MIRV programme on the other hand is to ensure effective penetration of US missile defences, as also to possibly maximise the number of warheads of the Chinese missile force. As the US and regional adversaries like India strengthen their offensive forces and missile defences, China can be expected to further modify its nuclear posture to ensure the credibility of its retaliatory strike force, including deploying hypersonic glide vehicles.

The projected increase in strategic capabilities has triggered a wide range of speculation about China's nuclear intentions. There is speculation that "China no longer intends to field a minimal deterrent." Its investments in nuclear command and control - and launch under warning, launch under attack capabilities - are being seen as nuancing its NFU posture, towards "operational readiness" from the historic "minimum-deterrence posture".

Broad Conclusions on the Global Scenario:

- The global strategic balance of power is shifting; arms control and associated treaties are either abrogated or are in cold storage. All three major nuclear powers are improving their nuclear posture, upgrading their arsenals, and developing new systems, including ground and sea launched MIRV systems as well as hypersonic and hypersonic glide systems.

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<sup>6</sup> <https://thebulletin.org/premium/2023-03/nuclear-notebook-chinese-nuclear-weapons-2023/>

- Cutting edge and critical technologies are at the centre of this modernisation, such as MIRV (both ground and sea launched), hypersonic and glide weapons, ballistic missile defence, long-range precision strike, and anti-satellite and cyber weapons, among others.
- Similar developments can be seen in delivery systems – greater range and precision in all three domains of ground, air and underwater.
- Non-strategic nuclear weapons are being increasingly leveraged as conventional deterrence is being stretched by the escalation of conflict in Ukraine with the possible induction of NATO forces.
- China is rapidly increasing and modernising its arsenal as a credible deterrence against primarily the US, and potentially Russia.

It flows from the above that flux in the global balance of power, competition among major powers, and on-going conflicts are creating an environment of great instability, which an emerging power like India can ignore at its own cost.

## Asian Regional Perspective

India's major concerns are with China's nuclear modernisation, as also the fact that China and Pakistan are individually and collusively involved in a military and nuclear arms race with India. Nuclear equations are being driven by shifting doctrines, force modernisation, development, and employment options. Resultantly, strategic stability is impacted by the China and Pakistan dyad, separately and collectively.

Despite this apparent reality, the Western analyst continue to see India's strategic capability from the limited perspective of a South Asian stability paradigm. They tend to equate India's strategic concerns primarily from a Pakistan-centric point of view. This is at best a short-sighted view.

In any holistic assessment of India's MIRV test, taken together with the MaRV capability developed by India, we need to take cognisance of rapidly developing regional nuclear capability and associated doctrines, not merely from an immediate but also a medium-term perspective.

Coming to nuclear equations, the primary concern of Indian policy planners is the credibility of strategic deterrence against the challenge of adversarial nuclear armed neighbours. In terms of capability, while against Pakistan our policy planners are comfortable with NFU and the doctrine of massive retaliation, with China it is the reverse. Growing capability asymmetry, massive drive-in enhancement, and upgradation of arsenal, are sources of major concern. Nuclear weapons are part of a "punishment strategy" of assured

retaliation and unacceptable damage, and are based on the principles of survivability, credibility, and unacceptable damage, backed by certitude of response. Whereas China claims its deterrence to be US-centric, lately it has also begun to take cognisance of Indian capabilities, both in terms of deployment and upgradation of medium range systems.

India cannot overlook developments in its neighbourhood and in broader Asia. An imperative that is often overlooked is the fact that China and Pakistan are active collaborators, with the former playing an important role in Pakistan's nuclear capability enhancement, be it nuclear fuel, design, or advanced CNC machines (shipped from Italy through China for Pakistan).

Second, maintaining a NFU declaratory doctrine allows China to leverage its conventional asymmetry to its advantage. China's growing conventional strike capability, which is co-located with its nuclear assets (PLA Rocket Forces), provides it conventional counter-force options. It is important to note that against China's estimated 400 nuclear warheads, it is estimated to have over 4000 delivery vectors, providing China the capability of decapitating conventional missile strikes using warheads that can penetrate hardened bunkers.

Developments in BMD is another perspective of concern. China is rapidly building both operational and strategic BMD capability. BMD systems allow detecting, tracking, and intercepting incoming missile systems. They can be intercepted during the boost phase, in their space trajectory, and when they re-enter the atmosphere and head to the target in the terminal phase. Over the years, China has developed capabilities in all these areas. A further boost has been given by its abilities in the ASAT domain. China acquired the S-400, with its ability to deal with missiles with ranges up to 3,500 km. It also has its own HQ-9 long-range SAM, a derivative of the S-300, which can handle ballistic missiles of 500 km range. This latter system has reportedly been shared with Pakistan. The important issue here is that China is well on the course of developing and deploying a credible BMD system, which will become increasingly sophisticated and accurate in targeting incoming missiles.

Against China's strategic and conventional capabilities, India must ensure the survival of not only the country's nuclear assets against the adversary's first strike, whether counter-force or counter-value, as well as the efficacy of its own response. While India has taken the route of developing road and rail mobile systems to enhance survivability, the reality is that ballistic missile systems are increasingly becoming vulnerable to the satellite-based intelligence gathering capabilities of our adversaries, either directly or through allies and partners. This demands, apart from ensuring survivability of the strategic assets, a

credible massive retaliation capability as well. The MIRV and MaRV systems being developed by India are part of necessary technological advancements to ensure the credibility of India's nuclear deterrence.

Pakistan's perspective is shaped by three considerations based on the singularity of the threat from India. First, it perceives nuclear capability as the ultimate compensation for its conventional inferiority, which is likely to only increase with time. Second, the geographical disadvantage has compelled Pakistan to overcome this vulnerability by building a much larger nuclear force. This belief is driven by the increasing gap in India's economic growth and military capability, that is seen to put Pakistan at greater security risk. A large nuclear force backed by reasonable conventional capability is thus regarded as credible deterrence, including an opportunity for conducting sub-conventional operations, imposing both costs and restraint on India. This has led to the concept of "Full Spectrum Deterrence", or what Pakistan refers to as 0 – 2250 km deterrence.

## Concluding Observations

The foregoing analysis clearly highlights that India's strategic environment is worsening, driven by both the doctrinal precepts of our neighbours and the modernisation of their arsenals. Strategic collusion between Pakistan and China is a major factor India cannot overlook. The scenario in the future will get further vitiated, as India's sphere of economic and strategic influence comes under pressure from multiple challenges with an increased Chinese foot print in the IOR.

The above underscores that the constant technological upgradation of strategic capability is not a choice, but an imperative. Emerging dynamics of the global power play demand that India must develop even more credible strategic and military power. India's MIRV test is at best an initial step of upgrading its strategic posture through technology development and innovation. MIRV, MaRV, planned cannisterisation, development of SLBM launched capability, ASAT and BMD systems, are all essential parts of the above build-up. MIRV nuclear missiles therefore are part of our strategic response mechanism.

Given the technology developments being undertaken by China, in any escalatory scenario, MIRV based strike systems provide a greater degree of assurance, and hence contribute to deterrence. The proposed technology upgradations being undertaken by India fall well within the purview of its minimum credible deterrence, with the focus on both 'credible' and 'minimum'.

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