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WEB ARTICLE
WA/09/24

AGNI 5 A MARVELOUS ACHIEVEMENT : THE BIG GAME CHANGER

MAJ GEN JAGATBIR SINGH, VSM (RETD)

CENTRE FOR JOINT WARFARE STUDIES



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Maj Gen Jagatbir Singh, VSM (Retd), is an alumini of Doon School and St Stephens College. He superannuated in February 2018 and has been writing articles on Defence related issues for the Tribune and various journals.

Introduction

With testing of Agni V on 11 March 2024, India has joined the select countries like USA, UK, Russia, France and China. Its range allows it to target adversaries in both the Eastern and Western directions. The launch of the MIRV (Multiple Independently Targetable Re-entry Vehicle) -capable Agni-5 thus marks an important milestone in India's nuclear development programme.

Prime Minister Narendra Modi congratulated the scientists of the Defence Research and Development Organisation (DRDO) for the successful test and said on X; "Proud of our DRDO scientists for Mission Divyastra, the first flight test of indigenously developed Agni-5 missile with Multiple Independently Targetable Re-entry Vehicle (MIRV) technology".¹

MiRV

The new weapon system, named Divyastra, has a reported range of 5,000 km, which classifies it as an Intermediate-range Ballistic Missile (IRBM), compared to the Intercontinental Ballistic Missile (ICBM), which has a range greater than 5,500 km. However, Chinese officials consider the Agni-5 to be an ICBM. Another advantage is that it enables carrying additional decoy warheads that can help defeat ballistic missile defences (BMDs).

It is equipped with indigenous avionics systems and high-accuracy sensor packages. The technology ensures that the re-entry vehicles accurately reach their target points with the required accuracy. The system uses a modified nose cone on a three-stage Agni-5 missile to accommodate multiple warheads, including micro-nukes, mini-nukes, and thermo-nuclear weapons. While work had begun in 2008 to develop the Agni-5, it was only in April 2012 that the missile had a successful launch. In 2018, India's DRDO and SFC had conducted extensive joint user trials of the canister-launched Agni-5 successfully and inducted the missile system in 2019.²

The Agni missile system remains an integral part of India's counter-strike capability. The Agni category missiles are solid propelled ballistic missiles with road and rail mobility providing greater chances of survivability during an enemy attack.³ The development of MIRV technology requires the combination of large missiles, small warheads, accurate guidance, and a complex mechanism for releasing warheads sequentially during flight.⁴

Development of MiRV's

The inception of MIRV technology was done by the US with deploying a MIRVed Intercontinental Ballistic Missile (ICBM) in 1970 and a MIRVed Submarine-Launched Ballistic Missile (SLBM) in 1971. The Soviet Union quickly followed suit and by the end of the 1970s had developed their own MIRV-enabled ICBM and SLBM technology.⁵

As per the Centre for Arms Control and Non-proliferation report, a Russian MIRVed missile under development may be able to carry up to 16 warheads, each in a separate re-entry vehicle. Warheads on MIRVed missiles can be released from the missile at different speeds and in different directions. Some MIRVed missiles can hit targets as far as 1,500 kilometers apart.⁶

Pakistan's Ababeel, which conducted the first flight test in 2017 has a reported range of 2,200 kilometres. At that time, an official press release had stated: "The test flight was aimed at validating various design and technical parameters of the weapon system." On 18 October of 2023, Pakistan again tested the Ababeel missile at the Sakhi Sarwar Range, with the Pakistani military's media wing stating that the test was "aimed at re-validating various design, technical parameters and performance evaluation of different sub-systems" of the missile.⁷

As per the International Institute of Strategic Studies (IISS) Ababeel is one of two nuclear-capable medium-range ballistic missiles that Pakistan is developing; Shaheen-III is the other. The main difference between the two is Ababeel's MIRV capability. 'Nothing visible from the test indicates the success or failure of the missile's multiple-warhead capability, which is a key priority for Pakistan's Strategic Plans Division'.⁸

Writing in the ORF, Harsh Pant stated, "building MIRV-capable ballistic missiles is not easy. This is because it requires meeting some very demanding technical criteria, such as nuclear warhead miniaturisation, ensuring that the receptacle that carries the

warhead or re-entry vehicle is of low weight or mass before its release from the Post Boost Vehicle (PBV), and also having the re-entry vehicles configured precisely to fit into the missile as well their separation from the PBV, which has to be manoeuvrable. Guidance and accuracy are a necessity as re-entry vehicles have to be spin stabilised during atmospheric re-entry.”⁹

The successful test of Agni-V is a testament of India’s expertise in missile technology, showcasing its ability to develop and deploy sophisticated systems with high precision and accuracy.

Countering Ballistic Missile Defence

While Agni-5 's ability to strike multiple targets is a game changer but what is also an important outcome is that MIRVs make defending the intended targets more difficult for an adversary. While MIRVs were not initially meant to defeat Ballistic Missile Defence (BMD), they are much more difficult to defend against compared to traditional missiles. Though presently none of the currently operational BMDs can effectively counter ICBM-range missiles, the US has deployed its Ground-based Midcourse Defense (GMD) system, but its effectiveness against anything more than one or two ICBMs at a time is questionable. China is developing the Hongqi (HQ-19) ground-based ballistic missile interceptors, which have been tested, but their capacity to intercept Intermediate Range Ballistic Missiles (IRBMS) such as the Agni-5 remains doubtful. MIRV technology makes an Agni-5 missile more difficult to intercept because its warheads will approach their intended targets along with the mother vehicles and multiple decoys. This can lead to an adversary's BMD sensors getting overwhelmed. Multiple missiles armed with MIRVs could even make a comprehensive BMD system cost-prohibitive for the adversary. Given that China has BMD capabilities, MIRVs boosts the Agni-5's chances of hitting its targets successfully. Thus, Agni-5 is an effective BMD countermeasure.

Debalina Ghoshal, author of 'Role of Ballistic and Cruise Missiles in International Security,' contends that the MIRVed missile can help penetrate the enemy’s existing missile defense system, thus strengthening India’s deterrence.¹⁰

The Warhead

MIRVing becomes even more complex if they have both nuclear and conventional options. China’s DF-26 and North Korea’s Hwasong-10 are thought to have both nuclear and conventional warhead types, though this has not been officially confirmed by the respective countries. The questions that need to be asked is whether putting conventional warheads on an expensive missile is worthwhile? The Agni-5 has a potential range advantage because they can attack targets beyond the reach of India’s current combat aircraft, including the Su-30MKI presently the longest-range combat jet. However conventional warheads on ballistic missiles do not pack much of explosive power, especially if they carry multiple warheads. This means that unless they have

pinpoint accuracy, they will not be effective. Even with high accuracy, they are unlikely to be effective against hardened targets.¹¹

Further using such weapons creates difficulties for the defenders determining whether the incoming missile is armed with a nuclear or conventional warhead. If the same missile can be armed with both types of warheads, the defender might assume it is a nuclear attack. They may then respond with a nuclear retaliation without waiting to verify the warhead type. Hence there is a risk of inadvertent nuclear escalation.

Potential Benefits

MIRV's potentially lead to faster expansion of a country's nuclear arsenal. Theoretically, additional Agni-5 missiles with multiple warheads apiece would increase India's current nuclear warhead capability. Dr V K Saraswat, former Director General of DRDO who was deeply involved with its development called it a "force multiplier" and said it would increase the weapon's "radius of influence". The Agni-5 MIRV, the landmark ballistic weapons system, takes India's second-strike capability to the next level, giving it "higher potency, better influence and denser zone."¹²

China's current nuclear growth can lead to a huge imbalance as their pursuit of nuclear weapons to match the US could become a serious issue. This is particularly true for India when confronted with a "two-front" nuclear threat. Further, having more warheads on fewer missiles is more efficient and cost effective. On the obverse of course, fewer missiles with more warheads also means fewer potential targets for an adversary to destroy and putting more warheads on individual missiles increases their vulnerability.

While the Agni-5 is a land-based system, development of Submarine-Launched Ballistic Missiles (SLBMs) with MIRVs will add a great deal of complexities to the existing equations. Submarines can carry only a limited number of missiles. Further, nuclear-powered submarines that carry ballistic missiles are expensive and difficult to field in considerable numbers.¹³ Though, they have a higher chance of surviving an initial nuclear attack and responding. Thus, developing this cutting-edge capability seems to be the next logical step. As China continues to assert itself including through advancements in missile technology, India's ability to develop and deploy advanced missile systems can be seen as a strategic response.

Conclusion

The presence of Chinese research vessels near the Indian coast to observe the MiRV test brings out the ongoing strategic complexities and competition in the region. As per Lieutenant General Kamal Davar (Retd) "India is well on its way to acquire strategic nuclear deterrence, a mission which it has been pursuing since the past 40 years or so under its Integrated Missile Development Programme (IGMDP)".¹⁴

An increase in the range of the weapon system from 3550 kms, at which the Agni-5 was tested, will be able to equal the threat from the Chinese Dong Feng missile with a

range in excess of 8,000 km. In view of the threats India faces in the region, it needs to constantly take the necessary steps to upgrade their platforms and warhead technologies. It is imperative for India to induct missiles of various capabilities for its defence needs as it has two hostile nuclear neighbours. The force multiplier being that they are 'Made in India' highlighting India's growing self-reliance in defence technology.

DISCLAIMER

The paper is author's individual scholastic articulation and does not necessarily reflect the views of CENJOWS. The author certifies that the article is original in content, unpublished and it has not been submitted for publication/ web upload elsewhere and that the facts and figures quoted are duly referenced, as needed and are believed to be correct.

Endnotes

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