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Mission Divyastra: Agni-5 Missile with MIRV Technology

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Why is in news? One missile, many weapons: What makes the latest Agni-5 special

India on March 11 announced that it had successfully tested a **new Agni-5 missile** capable of carrying multiple warheads and striking multiple targets. The **most important thing** about this new missile is its integration with what is known as the **MIRV technology**.

The successful testing of an Agni-5 Missile equipped with MIRV technology is termed as **Mission Divyastra**, marks a significant milestone in the nation's defence capabilities.

March 11's test was carried out from **Dr APJ Abdul Kalam Island, off the coast of Odisha**, which hosts India's integrated missile test range. "Various telemetry and radar stations tracked and monitored multiple re-entry vehicles. The mission accomplished the designed parameters," DRDO said in a statement.

MIRV technology:

MIRV (Multiple Independently Targetable Re-entry Vehicle) technology is the capability that **allows multiple warheads to be loaded on a single missile delivery system** and programmed to **hit different targets**, thus greatly enhancing the missile's destructive potential.

The **development of MIRV capability** marks a **significant upgrade for India's missile systems**, and expands its nuclear options.

Traditional missiles carry a single warhead or weapon, that goes and hits the intended target.

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India's MIRV punch

India has joined select group of nations that have Multiple Independently Targeted Re-entry Vehicle (MIRV) technology

Agni-5 missile
uses a three-stage
solid fuelled engine

5,000km
range

USING MULTIPLE WARHEADS

- MIRVs can cause more destruction than missiles that carry single warhead.
- It will allow Agni-V to deliver multiple nuclear warheads against different targets across hundreds of kilometres

India completed its nuclear trial in 2018 when nuclear-powered ballistic missile submarine, INS Arihant, completed its first deterrence patrol

India's nuclear doctrine, promulgated in 2003, commits to a 'no first use' posture, with weapons to be used only in retaliation against a nuclear attack

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."

—NARENDRA MODI, Prime Minister



MIRV-equipped missiles can **accommodate multiple warheads**, each of which can be programmed to strike a separate target.

They can all be made to hit the same location too, one after the other, thus ensuring complete annihilation of the target.

While **simultaneous strikes at multiple locations** can have a debilitating impact on the enemy, the use of nuclear warheads can bring the opposition to its knees. The technology is not new.

It was developed in the 1960s and first deployed in the 1970s by the United States and the then Soviet Union. But it is a **complicated technology**.

The warheads have to be miniaturised, be equipped with independent guidance and navigation controls, and released sequentially from the delivery system.

Over the years, **France, the United Kingdom, and eventually China** have developed this technology.

Pakistan too has claimed to have tested an MIRV-equipped missile called Ababeel, first in 2017 and then in 2023.

The number of warheads that a missile can carry depends on its design, weight, size, range and other parameters.

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However, an MIRV-equipped missile has **never been used so far in any conflict situation**.

Arms control advocates argue that MIRV technology incentivises the urge to strike first, thus increasing the risk from nuclear weapons.

Advantages of MIRV technology:

Apart from the **obvious advantage of inflicting multiple damages with a single strike**, MIRV is a sought-after military technology for several other reasons.

One of them is its **ability to penetrate missile defence systems**.

A missile defence system is a **network of technologies** aimed at detecting, tracking, intercepting and destroying an incoming missile.

It involves the deployment of sophisticated radars, communication systems, and interceptor missiles. It's considered a good safeguard against traditional missiles, and several countries are in the process of developing or strengthening their missile defence systems.

MIRV-equipped missiles, however, can render the system useless. Multiple warheads, each with an independent trajectory, can make the job of tracking and intercepting extremely complicated.

In addition, MIRV-equipped missiles can be made to carry decoy warheads to confuse the defence system. It is thus very likely that one or more warheads penetrate the shield created by the defence system, and inflict damage.

Another key strategic benefit, especially for countries like India which has a no-first use policy for nuclear weapons, is the **capability to cause crippling damage in a response strike**. The response strike could be disproportionate, and can thus serve as a deterrence to the enemy.

Agni Missiles:

Agni missiles are **long range, nuclear weapons capable surface to surface ballistic missile**.

The first missile of the series, Agni-I was developed under the **Integrated Guided Missile Development Program (IGMDP) and tested in 1989**.

After its success, Agni missile program was **separated from the IGMDP** upon realizing its strategic importance.

It was designated as a special program in India's defence budget and provided adequate funds for subsequent development.

Variants of Agni missiles:

Agni I: It is a Medium Range Ballistic Missile with a Range of 700-800 km.

Agni II: It is also a Medium Range Ballistic Missile with a Range more than 2000 km.

Agni III: It is also an Inter-Medium Range Ballistic Missile with Range of more than 2,500 Km

Agni IV: It is also an Inter-Medium Range Ballistic Missile with Range is more than 3,500 km and can fire from a road mobile launcher.

Agni-V: Currently it is the longest of Agni series, an Inter-Continental Ballistic Missile (ICBM) with a range of over 5,000 km.

Agni- VI: The longest of the Agni series, an ICBM with a range of ICBM 11,000–12,000 km.

Agni upgrade:

The integration of MIRV technology is a long-awaited upgrade for the Agni family, indigenously developed by the DRDO.

Agni missiles are the **main land-based delivery systems** for India's nuclear weapons.

Agni-5 has been **tested several times since 2012**, with new features and capabilities. Its previous flight happened in December 2022, when its night-time capabilities were tested, among other things.

Meanwhile, DRDO has also been **developing Agni-P missiles**, which are modernised versions of the short-range Agni-1 and Agni-2 variety.

This missile was tested twice in 2021, and on both occasions there was the expectation that it would be integrated with MIRV technology.

The acquisition of MIRV technology by India was keenly awaited after China developed it in the last decade.

With Pakistan also claiming to have tested a missile with this technology, integrating this in Agni missiles had become an imperative.

The next generation Agni-6 missile, currently under development, is also expected to be equipped with MIRV.

Conclusion:

The development was significant enough for Prime Minister of India to himself tell the nation about it, much like he had done five years earlier when DRDO had successfully carried out an anti-satellite test, an equally notable technological achievement that put India among a handful of nations with the capability to strike at an enemy's space-based assets, such as satellites.