

Missile capability of India

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In news- Recently, at a seminar organised by the DRDO, the Defence Minister encouraged scientists to work towards developing hypersonic missile technology after China's tests of a hypersonic glide vehicle (HGV).

The history of missile technology in India-

Before Independence:

- **Mysore ruler Hyder Ali started inducting iron-cased rockets** in his army in the mid-18th century.
- By the time Hyder's son Tipu Sultan died, a company of rocketeers was attached to each brigade of his army, which has been estimated at around 5,000 rocket-carrying troops.

Post- Independence:

- **At the time of Independence, India did not have any indigenous missile capabilities.**
- The government created the **Special Weapon Development Team in 1958.**
- This was later expanded and called the **Defence Research and Development Laboratory (DRDL)**, which moved from Delhi to Hyderabad by 1962.
- In 1972, **Project Devil, for the development of a medium range Surface-to-Surface Missile was initiated.**
- By 1982, DRDL was working on several missile technologies under the Integrated Guided Missiles Development Programme (IGMDP).
- Under the IGMDP, then headed by A P J Abdul Kalam, later India's President, first came Prithvi, then Agni.

Kinds of missiles in India-

The surface-launched systems-

- **Anti-Tank Guided Missile (ATGM):**

- Nag has already been inducted into the services and **is the only fire-and-forget ATGM** meeting all weather requirements for its range (around 20 km).
- Recently Heli-Nag was tested, which will be operated from helicopters and will be inducted by 2022.
- There is also a **Stand-off Anti-Tank (SANT) missile**, with a range over 10 km that has a **millimetre wave seeker, which enhances target detection in all weather conditions.**

- **Surface-to-Air Missile:**

- The **short-range SAM system Akash** has already been inducted in the Army and the Air Force.
- For Akash (New Generation), the first tests were conducted in July this year.
- Production of MRSAM (Medium range) systems for the Navy is complete, and it is placing its order.
- The Jaisalmer-based 2204 Squadron of the Air Force became the first unit to get the MRSAM systems in September 2021.

Air-launched systems:

1. Air-to-Air:

- **Astra, India's Beyond Visual Range Air-to-Air Missile (BVRAAM)**, has been completely tested and is under induction.
- It has a **range of around 100 km**, and DRDO is trying to now induct it with more IAF platforms, including the domestically developed light combat aircraft Tejas.
- A long-range Astra is also being developed, for which initial tests have been conducted.
- The missile uses solid fuel ramjet technology, which enhances speed, and will have an indigenously-built seeker.

2. Air-to-Ground:

- **Rudram, a New Generation Anti-Radiation Missile (NGRAM)**, has cleared initial tests with a **maximum range of around 200 km**.
- **BrahMos**, which India developed jointly with Russia, **is already operational**.
- **It has a 300 km to 500 km range**, and is a short-range, ramjet-powered, single warhead, supersonic anti-ship or land attack cruise missile.

Important missiles of India-

The two most important are Agni and Prithvi, both being used by the Strategic Forces Command:

- **Agni (range around 5,000)**, is India's only contender for an inter-continental ballistic missile (ICBM), which is available with only a few countries.
- **Prithvi**, although a **short-range surface-to-surface missile** with a 350 km range, has strategic uses.
- India also tested a anti-satellite system in April 2019.
- **A modified anti-ballistic missile named Prithvi Defence Vehicle Mk 2** was used to hit a low-orbit satellite. **It put India only behind the US, Russia and China in this capability**.

India's hypersonic technology-

- India has been working on this for a few years, and is **just behind the US, Russia and China**.
- **DRDO successfully tested a Hypersonic Technology Demonstrated Vehicle (HSTDV) in September 2020**, and demonstrated its hypersonic air-breathing scramjet technology.
- India has **developed its own cryogenic engine** and demonstrated it in a 23-second flight.
- **Only Russia has proven its hypersonic missile capability**

- so far**, while China has demonstrated its HGV capacity.
- India is expected to be able to have a hypersonic weapons system within four years, with medium- to long-range capabilities.