



DRDO's Scramjet Test Boosts Hypersonic Missile Development

[Source: PIB](#)

The [Defence Research and Development Organisation \(DRDO\)](#) has successfully conducted a [Supersonic Combustion Ramjet \(Scramjet\) engine ground test](#), advancing [India's hypersonic missile tech](#).

- **Scramjet Engine:** A **scramjet engine (Air-breathing engines)** is an advanced **ramjet** that uses **supersonic airflow** for **combustion**, enabling faster speeds. It uses **liquid hydrogen** and **liquid oxygen** for thrust, offering better **fuel efficiency**.
 - Unlike a turbojet engine, **ramjets** and **scramjets** have **no moving parts**, consisting only of an **inlet**, **combustor** (with fuel injector and flame holder), and a **nozzle**.
 - Scramjets are key to hypersonic vehicles to handle **airflows at speeds above the speed of sound**, offer maneuverability, and strategic advantage.
- **Achievements of DRDO:** Ground test achieved **stable combustion** in the scramjet engine, and developed **indigenous endothermic scramjet fuel** for improved cooling and ignition.
 - A **Thermal Barrier Coating** was also developed to withstand extreme temperatures.
- **Hypersonic Missiles:** Traveling at speeds greater than **Mach 5 (over 5,400 km/h)**, bypass air defences with high-speed, high-impact strikes.
- **Global Race for Hypersonic Missiles:** The US, Russia, and China are advancing hypersonic tech.
 - In 2021, China tested a **nuclear-capable hypersonic glide vehicle** that circled the globe before speeding towards its target.

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Headquartered in New Delhi, DRDO was established in 1958 from the amalgamation of the then already functioning Technical Development Establishment (TDEs) of the Indian Army and the Directorate of Technical Development & Production (DTDP) with the Defence Science Organisation (DSO).

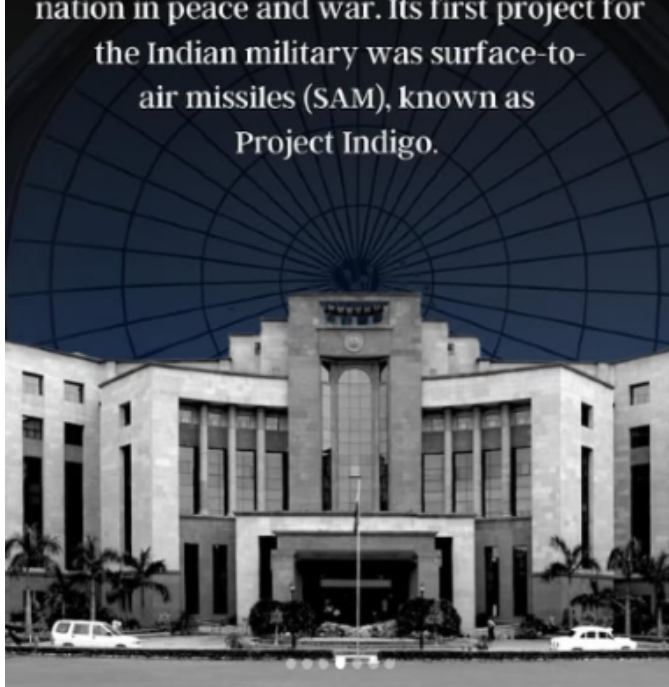
DRDO, Defense Research & Development Organisation, is an R&D wing of the Ministry of Defence. Its vision is to empower India with cutting-edge defence technologies. Its mission is to achieve *self-reliance in critical defence* technologies and systems while equipping the armed forces with state-of-the-art weapon systems per the three forces' requirements.



BALASYA MULAM VIGYANAM

DRDO is India's largest research organisation with the motto 'Balasya Mulam Vigyanam'—the source of strength is science—drives the nation in peace and war. Its first project for the Indian military was surface-to-air missiles (SAM), known as Project Indigo.

DRDO's pursuit of *self-reliance* and successful indigenous development led to the production of *strategic* systems and platforms such as the Agni and Prithvi series of missiles- light combat aircraft, Tejas- multi-barrel rocket launcher, Pinaka- air defence system, and Akash- a wide range of radars and electronic warfare systems.



Read more: [Defence Research and Development Organisation](#), [Air Breathing Engines](#)

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