

DRDO conducts maiden test of hypersonic technology demonstrator

Some technologies have been validated, says Defence source

New Delhi: The Defence Research and Development Organisation (DRDO) on Wednesday conducted the maiden test of an indigenously developed Hypersonic Technology Demonstrator Vehicle (HSTDV) along with several technologies on wednesday morning.

“The DRDO launched a technology demonstrator vehicle to prove a number of critical technologies for futuristic missions from Dr Abdul Kalam Island off the coast of Odisha,” the Ministry of Defence (MoD) said without identifying what the technology demonstrator was or if it met the objectives. Defence Minister Rajnath Singh witnessed the launch.



The missile was successfully launched at 1127 hours and it was tracked by various radars, telemetry stations and electro optical tracking sensors through its course, the MoD added.

The test was undertaken to validate several technologies including the HSTDV, a Defence source said. “Some technologies have been validated while some remained inconclusive of which the data is being analysed,” the source added.

In the test, a missile with the technology demonstrator vehicle mounted on it is launched and the vehicle is released only after the missile reaches a certain altitude and velocity, one official explained.

Former DRDO Chief V.K. Saraswat had said in 2008, as the Chief Controller, R and D (Missiles and Strategic Systems), that through the HSTDV project the idea was to demonstrate the “performance of a scram-jet engine at an altitude of 15 km to 20 km, is on”.

“Under this project, we are developing a hypersonic vehicle that will be powered by a scram-jet engine. This is dual-use technology, which when developed, will have multiple civilian applications. It can be used for launching satellites at low cost. It will also be available for long-range cruise missiles of the future,” he had stated.

In scram-jet technology, combustion of fuel takes place in a chamber in the missile at supersonic speeds. This is different from a ram jet system where the system collects the air it needs from the atmosphere during the flight at subsonic speeds and the propellants burn in the combustion chamber.

<https://www.thehindu.com/news/national/drdo-conducts-maiden-test-of-hypersonic-technology-demonstrator/article27890922.ece>

Missile test takes DRDO closer to achieving hypersonic flight capability

Hypersonic flight involves travelling at speeds above Mach 5, or 1,500 metres/ second. An airliner travelling at hypersonic speed would reach from New York to Tokyo in a couple of hours

By Ajai Shukla

New Delhi: The Defence Research and Development Organisation (DRDO) took a step towards the coveted technological goal of achieving hypersonic flight with the launch of a technology validation mission on Wednesday.

“DRDO today (Wednesday) launched a Technology Demonstrator Vehicle to prove a number of critical technologies for future missions from Dr Abdul Kalam Island off the coast of Odisha. The data has been collected and will be analysed to validate the critical technologies,” announced the DRDO.

Rockets have long travelled at hypersonic speeds, but they have the advantage of carrying their own oxygen, along with their fuel. Achieving hypersonic flight with an air-breathing engine is the greater challenge. Only Americans, French, Chinese and Australians have managed 10-second hypersonic flights. The DRDO has targeted a 20-second flight.

Hypersonic flight involves travelling at speeds above Mach 5, or 1,500 metres/second. An airliner travelling at hypersonic speed would reach from New York to Tokyo in a couple of hours.

Hypersonic flight also achieves military objectives, such as carrying larger payloads than conventional rockets. Since a hypersonic missile does not have to carry oxygen — it uses the oxygen freely available in the ambient air — that allows it to save weight, and carry a larger payload. This is called having a larger “payload fraction”.

The key challenge in hypersonic flight is to develop an engine that can remain alight even when the air it breathes is being rammed the combustion chamber at a velocity of 6.5 Mach. That is why it is called a “supersonic combustion ramjet”, or “scramjet” engine.

While the Wednesday mission was not intended to achieve hypersonic flight, it had the aim of validating key technologies essential for hypersonic flight. Amongst these technologies was a launch vehicle – a modified Agni-1 missile to launch the technology demonstrator vehicle and boost its velocity – the guidance systems, and heat shields for protection during re-entry.

In the actual hypersonic flight demonstration, which the DRDO intends to carry out within a year, the Agni-1 booster would release the hypersonic vehicle after re-entry, which would then ignite its kerosene fuelled scramjet engine and fly for a significant duration of time.

A key challenge is developing the super-materials that can withstand the extreme temperatures and pressures of hypersonic combustion. This includes Niobium alloy, Hafnium and Nickel-based superalloys.

Last month, speaking at the Institute for Defence Studies and Analyses, the DRDO chairman mentioned hypersonics as one of the key areas for future wars.

“We are confident of achieving hypersonic flight for a significant period of time within the next four years,” states a senior DRDO manager.

https://www.business-standard.com/article/current-affairs/missile-test-takes-drdo-closer-to-achieving-hypersonic-flight-capability-119061300041_1.html