



Hypersonic Missiles

For Prelims: Hypersonic Weapons, Hypersonic Technology Demonstrator Vehicle programme.

For Mains: Advantages of Hypersonic Missiles over Ballistic Missiles.

Why in News

Recently, Russia used a hypersonic missile for the first time in the ongoing [conflict with Ukraine](#).

What is a Hypersonic Missile?

- A hypersonic missile is a weapon system **which flies at least at the speed of Mach 5 i.e. five times the speed of sound** and is manoeuvrable.
- The manoeuvrability of the hypersonic missile is **what sets it apart from a ballistic missile as the latter follows a set course** or a ballistic trajectory.
- Thus, unlike ballistic missiles, **hypersonic missiles do not follow a ballistic trajectory** and can be manoeuvred to the intended target.
- The two types of hypersonic weapons systems are **Hypersonic Glide Vehicles (HGV) and Hypersonic Cruise Missiles**.
 - The HGV are launched from a rocket before gliding to the intended target while the hypersonic cruise missile is powered by air breathing high speed engines or [‘scramjets’](#) after acquiring their target.

What are the advantages of hypersonic missiles?

- They can enable **responsive, long range strike options against distant, defended or time critical threats** (such as road mobile missiles) when other forces are unavailable, denied access or not preferred.
- **Conventional** hypersonic weapons **use only kinetic energy i.e. energy derived from motion**, to destroy unhardened targets or even underground facilities.

Are hypersonic missiles detectable in flight?

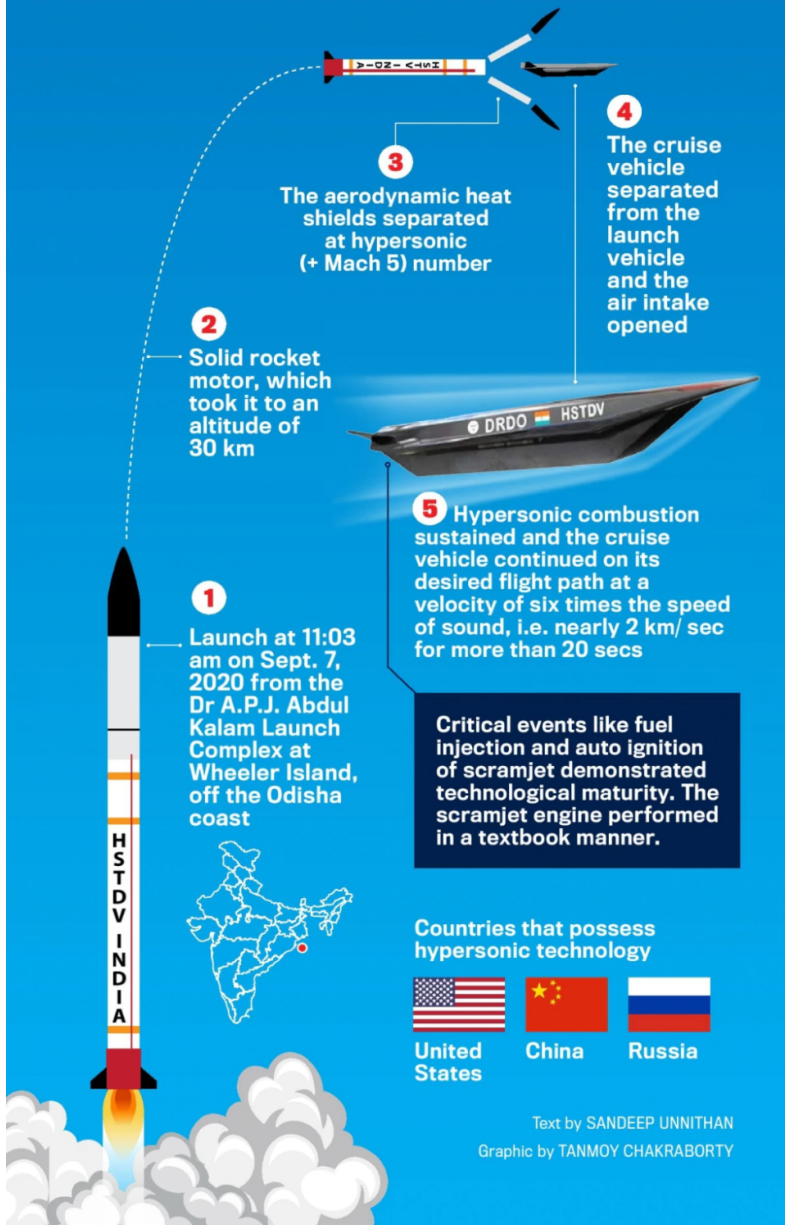
- Hypersonic weapons can challenge detection and defence due to their **speed, manoeuvrability and low altitude of flight**.
- The Ground based [radars](#) or terrestrial radars cannot detect hypersonic missiles until late in the flight of the weapon.
 - This delayed detection makes it difficult for the responders to the missile attack to assess their options and to attempt to intercept the missile.

Which countries possess hypersonic weapons?

- While the US, Russia and China are in advanced stages of hypersonic missile programmes, **India, France, Germany, Japan and Australia too are developing hypersonic weapons**.

THE HYPERSONIC BREAKTHROUGH

With the successful flight test of a Hypersonic Technology Demonstration Vehicle (HSTDV) by the DRDO, India joined an exclusive club of just three other countries



What is the Indian Hypersonic Missile Programme?

- India is also developing an indigenous, dual capable (conventional as well as nuclear) hypersonic cruise missile as part of its [Hypersonic Technology Demonstrator Vehicle Programme](#) and has successfully tested a Mach 6 scramjet in June 2019 and September 2020.
- India operates approximately **12 hypersonic wind tunnels and is capable of testing speeds upto Mach 13.**

Source: IE

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