



CENTRE FOR  
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STUDIES

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# **HYPERSONIC WEAPONS BY MAJ GEN ASHOK KUMAR SRIVASTAVA, VSM (RETD)**

**ORGANISED BY CENJOWS  
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## **HYPERSONIC WEAPONS**

**BY MAJ GEN ASHOK KUMAR SRIVASTAVA, VSM (RETD)**

**ORGANISED BY CENJOWS ON 17 APRIL 2025**

The lecture focused on the strategic, technological, and operational implications of hypersonic weapons for India's defense capabilities. Hypersonic weapons, which travel at speeds exceeding Mach 5, pose unique challenges due to their high velocity, low and maneuverable flight paths, and shorter detection-to-response windows compared to conventional ballistic missiles.

Hypersonic systems have potential to be game-changer for national security. However, realizing hypersonic technology for weapon design and production presents several complex engineering challenges. At hypersonic speeds, friction and air resistance create an incredible amount of heat, which needs to be managed through tough but lightweight heat shields and thermal protection systems. To dissipate extreme heat safely requires use of advanced materials and composites that can withstand extreme environments. A system moving at Mach 5 needs to be designed with an incredible degree of precise maneuverability. Despite high speed, system must maintain reliable communication with operators and decision-makers through sensor systems.

The Hypersonic Weapon Systems include:

### **Air-Launched Rapid Response Weapon (ARRW).**

The Air-launched Rapid Response Weapon (ARRW) program combines critical high-speed flight technologies and accelerates the weaponization of air-to-ground hypersonic strike capabilities for the US Air Force.

### **Conventional Prompt Strike (CPS).**

CPS is a hypersonic boost-glide missile development and test program that provides longer range, shorter flight times, and high survivability against enemy defenses.

**Hypersonic Air-Launched Offensive Anti-Surface Warfare (HALO).**

HALO enables carrier-based aircraft to conduct high-speed stand-off strikes against high-value surface threats so the US Navy can operate in and control contested battlespaces (artist's concept).

**Long Range Hypersonic Weapon (LRHW).**

LRHW will leverage the common hypersonic glide body and introduce a new class of ultrafast and maneuverable long-range missiles with the ability to launch from ground mobile platforms.

In addition, key enabling technologies such as scramjet engines and high-temperature-resistant advanced materials have been highlighted as critical to both the development and deployment of hypersonic platforms. The issue of detection remains a major concern. While space-based early warning systems and ground-based radars can track high-altitude trajectories, hypersonic weapons often become undetectable at lower altitudes, complicating defensive responses. This difficulty increases the risks of strategic miscalculation, conflict escalation, and undermines existing arms control regimes.

Hypersonic capabilities are critical for India and continued research and investment in these technologies is imperative. The lecture also emphasized that India possesses reserves of rare earth elements essential for advanced weapon systems, but improvements are required in their extraction, refinement, and industrial application to support indigenous development. Reference was also made to global efforts for developments, including Russia's use of hypersonic missiles in Ukraine, and counterclaims regarding their interception by Ukrainian air defense systems. These developments illustrate the urgency for India to accelerate its research, testing, and deployment efforts in both offensive and defensive hypersonic capabilities. India has made significant progress, but continued momentum is essential to ensure national security in an era where hypersonic weapons are rapidly redefining the nature of warfare.