

INDIA JOINS THE GLOBAL HYPERSONIC MISSILE RACE

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India conducted its first hypersonic missile test in November 2024. However, India has been working on hypersonic technology for nearly two decades. This puts India in an intensifying global hypersonic missile arms race where the U.S., Russia, and China are the front-runners. While Russia, China, and the U.S. have advanced technology in hypersonic weapons that include air, ground, and sea-launched hypersonic missiles, India is just entering the race. It is imperative to evaluate at the nature of this race and its regional and global implications.

Why the Hype over Hypersonic Missiles?

Hypersonic missiles are essentially very fast. In order to qualify as a hypersonic missile it has to have a speed five times that of sound or Mach 5 (approximately 6,115 km per hour). There are two types of hypersonic missiles - Hypersonic Glide Vehicles (HGVs), and hypersonic cruise missiles.¹ The HGVs are mounted atop rockets and launched, which then glide towards their targets at high speeds and altitudes. The hypersonic cruise missiles are powered throughout the flight and are highly maneuverable. Hypersonic cruise missiles use supersonic combustion ramjet or turbo ramjet engines for propulsion.² Interestingly, hypersonic missiles have been around for a long time. The ballistic missiles possessed by the U.S. and Russia also travel at hypersonic speeds but follow a parabolic

1 "Hypersonic Weapons: Background and Issues for Congress," CRS Report R45811, Updated January 2, 2025, November 16, 2024, <https://sgp.fas.org/crs/weapons/R45811.pdf>.

2 Prateek Tripathi, "How Hypersonic Weapons are Redefining Warfare," Observer Research Foundation, May 2, 2024, <https://www.orfonline.org/expert-speak/how-hypersonic-weapons-are-redefining-warfare>.

trajectory after launch and are easier to intercept. The new genre of hypersonic missiles has tremendous speed as well as maneuverability. In addition, HGVs can enter low earth orbit and can change direction to evade traditional tracking and anti-missile technology. Similarly, hypersonic cruise missiles have a highly maneuverable low trajectory, combined with great speed that is very hard to track and intercept by ballistic missile defence systems.

India's Hypersonic Development

India's hypersonic missile is being developed by the Defence Research and Development Organization (DRDO). It was reported to have a range of 1500km and above. There was much jubilation in India over the hypersonic test. India's Defence Minister Rajnath Singh on X called it a "historic moment" for the country, putting her in a "group of select nations having capabilities of such critical and advanced military technologies."³

India has been working on hypersonic missile technology for nearly two decades. It first unsuccessfully tested the High-Speed Technology Demonstrator Vehicle (HSTDV) in June 2019. It conducted a successful test of HSTDV in September 2020, powered by a scramjet engine with a reported speed of Mach 6. India is also working on the hypersonic cruise missile BrahMos-II in collaboration with Russia, which is expected to have a speed of Mach 6 or more. It is designed to be a maneuverable anti-ship missile that can be launched from land, air, and sea platforms. It seems that India has invested a considerable amount of time and money to develop hypersonic missile technology. India would likely continue to invest in hypersonic technologies, and work on attaining more sophistication and range in its hypersonic missile development.

Hypersonic Missile Developments Around the World

Russia, China, and the U.S. are the leaders in hypersonic missile technology. Russia has a number of hypersonic missiles. These include the land-based Avangard deployed on top of an Inter-Continental Ballistic Missile (ICBM) since December 2019 with a speed of Mach 20; the hypersonic cruise missile Kinzhal with 1200 km range and a speed of Mach 10; as well as ship or submarine-launched Tsirkon with Mach 6-8 speed.⁴

Russia's pursuit of hypersonic missiles comes from a concern over the deployment of extensive U.S. Ballistic Missile Defence Systems (BMD). Following the U.S. withdrawal from the 1972 Anti-Ballistic

³ "India Successfully Tests first Long-range Hypersonic Missile," *The Nation*, November 18, 2024, <https://www.nation.com.pk/18-Nov-2024/india-successfully-tests-first-long-range-hypersonic-missile>.

⁴ Cameron Tracy, "Slowing the Hypersonic Arms Race: A Rational Approach to an Emerging Missile Technology," Union of Concerned Scientists, May 5, 2021, <https://www.ucsusa.org/resources/slowng-hypersonic-arms-race>.

Missiles (ABM) Treaty in 2002, Russia accelerated work on its hypersonic missiles. Russia expressed concerns several times on the issue but to no avail. In his address to the nation in 2018, President Vladimir Putin stated that Russia was developing a number of hypersonic weapons that could defeat all existing missile defence systems.⁵ Russia, thus, aims to restore mutual vulnerability which is a key component of nuclear deterrence by developing hypersonic missiles that can defeat missile defence systems.

China has also been developing a number of hypersonic missiles including ground-launched DF-17, a HGV with Mach 10 speed; the air-launched CH-AS-X-13 missile with a range of 1500 km and Mach 10; the Starry Sky-2, a hypersonic vehicle prototype; the intermediate range DF-27 using an HGV; and the GDF-600, which is a hypersonic glide vehicle.⁶ Like Russia, China's pursuit of hypersonic technology emanates from the U.S. missile defence deployments in Europe and East Asia.

China fears that the "U.S. hypersonic weapons could enable the United States to conduct a preemptive, decapitating strike on China's nuclear arsenal and supporting infrastructure. The U.S. missile defense deployments could then limit China's ability to conduct a retaliatory strike against the United States."⁷ The U.S., on the other hand, maintains that missile defence deployments are meant to counter countries like Iran and North Korea. Beijing and Moscow have time and again expressed concerns that the U.S. missile defence deployments affect nuclear deterrence.

The U.S. also has pursued a hypersonic missile development program in the 2000s. As the former Commander of U.S. Strategic Command, General John Hyten stated the purpose of hypersonic missiles is they could enable "responsive, long-range, strike options against distant, defended, and/or time-critical threats when other forces are unavailable, denied access, or not preferred."⁸ The U.S. describes the 'threat' from Russian and Chinese hypersonic weapons as the rationale for its pursuit. However, many in the U.S. contend that "hypersonic weapons lack defined mission requirements, contribute little to the U.S. military capability, and are unnecessary for deterrence."⁹ Many have gone as far as saying that it is a missile in search of a mission.¹⁰ Nonetheless, the U.S. is

⁵ President of Russia, *Presidential Address to the Federal Assembly*, March 1, 2018, <http://en.kremlin.ru/events/president/transcripts/messages/56957>.

⁶ "New Details on China's Powerful Hypersonic Glide Vehicle with Drone and Bomb Submunitions," *Military Watch Magazine*, Nov 16, 2024, <https://militarywatchmagazine.com/article/details-china-hypersonic-glide-submunitions#:~:text=The%20GDF%2D600%20has%20a,glide%20vehicles%20in%20the%20world>.

⁷ Tong Zhao, "Conventional Challenges to Strategic Stability"; and Lora Saalman, "China's Calculus on Hypersonic Glide," SIPRI, August 15, 2017, at <https://www.sipri.org/commentary/topical-background/2017/chinas-calculus-hypersonic-glide>.

⁸ "Hypersonic Weapons: Background and Issues for Congress,"

⁹ *Ibid.*

¹⁰ James Acton, *Silver Bullet? Asking the Right Questions about Conventional Prompt Global Strike* Carnegie Endowment for International Peace, 2013, <https://carnegieendowment.org/files/cpgs.pdf>

developing a number of HGVs and cruise missiles for the Army, Navy, and Air Force.¹¹ Its hypersonic missiles are envisioned mostly in a conventional role. There is also a scramble to develop counter-hypersonic technologies as well as missile defence against hypersonic. The Pentagon has requested US\$6.9 billion for hypersonic research in FY2025, while the U.S. Missile Defense Agency requested US\$182.3 million for hypersonic defence in the FY2025 budget. Thus, the U.S. is actively working on hypersonic missile technology as well as hypersonic defence.¹²

U.S. Hypersonic Weapons and Funding

Title	FY2024 Request (\$ in millions)	FY2024 Enacted (\$ in millions)	PB2025 (\$ in millions)	Schedule
Conventional Prompt Strike (CPS)	901	901	904	Platform deployment in 2027
Hypersonic Air-Launched OASuW (HALO)	96	96	179	Achieve early operational capability by FY2029
Long-Range Hypersonic Weapon (LRHW)	943	943	538	Field two operational batteries by FY2027

Source: "Hypersonic Weapons: Background and Issues for Congress," CRS Report R45811, Updated Jan 2, 2025, p. 10, <https://sgp.fas.org/crs/weapons/R45811.pdf>

Other countries like France, Japan, Germany, South Korea, North Korea, and Australia are also pursuing hypersonic missile technology. North Korea tested the Intermediate Range Ballistic Missile (IRBM) Hwasong 16B hypersonic missile with a range of 1500km and Mach 12 speed.¹³ Australia has been collaborating with the U.S. to develop hypersonic missile technology. More countries around the world are also expressing interest in hypersonic technology.

Implications of Hypersonic Missile Technology

Hypersonic missile technology has a number of implications at the international level as well as at the regional level. At the international level dynamics of hypersonic missile pursuit are complex. On the one hand, for countries like China and Russia, hypersonic missiles would be stabilizing. Due to their tremendous speed and maneuverability, hypersonic missiles are hard to detect and intercept

¹¹ For details see Ghazala Yasmin Jalil, "Hypersonic Missiles: Racing to Win?" Issue Brief, Sept 3, 2021, <https://issi.org.pk/issue-brief-on-hypersonic-missiles-racing-to-win/>

¹² "Hypersonic Weapons: Background and Issues for Congress,"

¹³ "N. Korea says it tested new hypersonic missile," *The Korea Herald*, Jan 7, 2025, <https://www.koreaherald.com/article/10384890>

and would be able to evade missile defence systems.¹⁴ For Russia and China, this would mean that it restores the credibility of their deterrent. However, the relentless pursuit of the technology would further fuel an arms race among major powers. The U.S. is also working on the development of hypersonic anti-missile systems and other technologies to defeat adversaries' hypersonic missiles. Another destabilizing factor is the deployment of conventional hypersonic missiles, making it harder for the adversary to differentiate between a conventional or nuclear warhead.¹⁵ This would lead to misperceptions and accidental or unauthorized nuclear launch.

At the regional level, India's pursuit of hypersonic missiles would be highly destabilizing for South Asia. The short missile flight time between India and Pakistan – 5-10 minutes – would be further shortened considerably. This would mean that the Observe Orient Decide and Act (OODA) loop which a lot of countries use to assess a threat and respond – would be compressed considerably. This means that decision-makers would have less time to assess and react to a given missile launch, increasing the chances of misperception, accidental or unauthorized launch. Possession of hypersonic missiles by India would also increase the first-strike temptations. Indian decision-makers could be tempted to launch a first-strike under a false sense of security that it can strike its adversary and absorb a counter-strike through missile defence, making the Pakistan-India nuclear theatre even more unstable. Hypersonic missiles would, thus, have a potentially negative impact on nuclear deterrence calculations in South Asia. It will make South Asian nuclear theatre more volatile.

Observe Orient Decide and Act (OODA) Loops



¹⁴ Ms. Ghazala Yasmin Jalil, "Hypersonic Missile Race: Implications for Regional and Global Security" October 2, 2020, <https://issi.org.pk/issue-brief-on-hypersonic-missile-race-implications-for-regional-and-global-security/>

¹⁵ Ibid.

Conclusion

The race to develop hypersonic missiles is deepening globally as well as regionally. India has also joined the race behind leaders in the technology like the U.S. Russia, and China. Other countries like France, Japan, Germany, and Australia are also pursuing hypersonic missile technology. However, the hypersonic missile race is destabilizing at the global level. Regionally, India's pursuit of hypersonic missiles complicates the nuclear deterrence equation with Pakistan and increases the chances of conflict in South Asia. Hypersonic missiles would further enhance India's preemptive counterforce capabilities against Pakistan. In an age where the global arms control regime is in decline, there are no arms control arrangements that cover the development and deployment of hypersonic missiles. The world is entering yet another aimless race that bodes ill for international peace and security. A hypersonic missile race ultimately makes no country secure and is likely to perpetuate arms races and security dilemmas.