

**Forum:** Disarmament and International Security (GA1)

**Issue:** Addressing the potential threat posed by hypersonic weapons

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## INTRODUCTION

With the rapid advancement of technology in the past years, nations have integrated innovations in order to further develop and enhance their weapons and defense systems, which ultimately led to the development of hypersonic weapons that are redefining the landscape of modern warfare. Hypersonic weapons are guided missiles that travel at speeds of at least Mach 5, which is approximately 3,836 mph or 6,174 km/h, and these missiles are known for flying at low altitudes, typically around 200 feet about the ground and are also enhanced maneuverability and speed. In addition, they boost glide propulsion vehicles by briefly exiting and reentering the atmosphere and then glide and maneuver at hypersonic speeds to their targets.

Due to their extreme speed, they are more dangerous than standard ballistic missiles because there is significantly less time to defend and prepare against them. Furthermore, they are much harder to hit and avoid. Ballistic missiles have predictable trajectories, paving a specific path, unlike the hypersonic missiles which can maneuver during the flight, and this drastically reduces the time available to create a defense strategy. Recent studies have shown that out of 10 hypersonic missile attacks only 1 or none can be successfully intercepted and guided elsewhere with the technology of the average military. In addition, according to the Patriot Missile Systems.

There are two main types of hypersonic weapons, namely the hypersonic Glide Vehicles (HGVs) and the Hypersonic Cruise Missiles (HCMs). Hypersonic Glide Vehicles are weapons that are launched from a rocket or a missile booster which after they reach a high altitude it detaches from the booster and proceeds towards the target, taking advantage of the aerodynamic lift for the maneuverability and range. The most advanced types of HGVs are the Chinese DF-ZF and the US Long-Range Hypersonic Weapon (LRHW). The second type of weapons are the Hypersonic Cruise Missile, which are powered all throughout their flight, typically using a “scramjet engine”, a type of engine that relies on the combustion of fuel and an oxidizer in order to produce thrust, that ultimately allows the missile to maintain its original speed (Mach 5 or even greater). These types of hypersonic weapons are the ones used most of the time, since they are able to be deployed from various platforms such as aircrafts or ships. Examples of these missiles are the Russian Zircon missile and the US Air-Launched Rapid Response weapon (ARRW).

The threat of hypersonic weapons is critical today due to their extreme speed and maneuverability that make detection and interception difficult. By traveling at such speeds and capable of unpredictable flight paths, these missiles reduce warning times to just minutes, increasing the risk of miscalculation or accidental conflict. Major powers like the U.S and Russia

are currently actively developing these technologies that are altering global security dynamics and prompting a new arms race. To address these challenges all the nations are urgently working to improve their detection, interception capabilities, and international cooperation to prevent destabilizing escalations and maintain strategic stability.

## DEFINITION OF KEY-TERMS

### ***Hypersonic Glide Vehicles<sup>1</sup>***

Hypersonic Glide Vehicles (HGVs) are advanced military devices capable of hypersonic speeds of over 24,000 km/h, after being launched by rocket thrusters. After separating from the booster, these vehicles hover at an altitude of between 30 and 80 km before diving towards their target.

### ***Hypersonic Cruise Missile (HCM)<sup>2</sup>***

A missile that travels at speeds above Mach 5 within the atmosphere using an air-breathing engine, such as a scramjet, and can maneuver during flight, making it difficult to intercept

### ***Missile Defense System<sup>3</sup>***

Missile defense is a system, weapon, or technology involved in the detection, tracking, interception, and also the destruction of attacking missiles. Conceived as a defense against nuclear-armed intercontinental ballistic missiles (ICBMs), its application has broadened to include shorter-ranged non-nuclear tactical and theater missiles.

### ***Early Warning Systems<sup>4</sup>***

An early warning system is a warning system that can be implemented as a chain of information and communication systems and comprises sensors, event detectors and decision subsystems for early identification of hazards.

### ***Scramjet (Supersonic Combustion Ramjet)<sup>5</sup>***

A scramjet, or supersonic combustion ramjet, is a type of air-breathing jet engine designed for hypersonic flight, meaning speeds above Mach 5.

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<sup>1</sup> "Hypersonic Glide Vehicles: A New Era in Strategic Weapons." *Fly a Jet Fighter*, 4 Dec. 2024, <https://www.flyajetfighter.com/hypersonic-glide-vehicles-a-new-era-in-strategic-weapons/>

<sup>2</sup> Congressional Research Service. *CRS Products*. Library of Congress, <https://www.congress.gov/crs-products>.

<sup>3</sup> Center for Strategic and International Studies. "Defense Systems." *Missile Threat*, Center for Strategic and International Studies, <https://missilethreat.csis.org/defsys/>

<sup>4</sup> World Meteorological Organization. "Early Warning System." *WMO*, <https://wmo.int/topics/early-warning-system>.

<sup>5</sup> "Scramjet (Supersonic Combustion Ramjet)." *EBSCO Research Starters*, EBSCO, <https://www.ebsco.com/research-starters/engineering/scramjet-supersonic-combustion-ramjet>.

### ***Integrated Air and Missile Defense (IAMD)***<sup>6</sup>

Integrated Air and Missile Defense (IAMD) refers to a comprehensive approach to defending against a wide range of aerial threats, including aircraft, cruise missiles, and ballistic missiles. It involves integrating various defense systems, sensors, and command and control capabilities to provide a layered defense

### ***Boost-Glide Trajectory***<sup>7</sup>

A boost-glide trajectory describes the flight path of a hypersonic vehicle or weapon, typically launched by a rocket, that initially accelerates to high speeds and then glides through the atmosphere to its target.

## **BACKGROUND INFORMATION**

### ***Historical Background***

The historical development of hypersonic missiles began with the early concepts and ideas of missiles in the 1930's, including the German Silbervogel design which was never built but assisted in the foundational ideas of the modern weapons. The first operational hypersonic weapon was the German V-2 rocket during World War II, which reached speeds above Mach 5 and was the first ballistic missile that was used in combat, which began the swift flight from the ballistic to the hypersonic. After the war, the United States advanced hypersonic technology with the 1949 Bumper 5 rocket, combining V-2 and WAC Corporal technology to reach Mach 6.7. In 1959, the U.S. deployed the Atlas intercontinental ballistic missile, capable of speeds up to Mach 21 during re-entry, setting a template for ballistic hypersonic weapons.

The transition from supersonic to hypersonic missiles in the late 1940s was marked by the emergence of high-speed rocket-powered missiles, entering the hypersonic speed era. During World War II, Germany's V-2 rocket, was the precursor to hypersonic weapons as it flew above Mach 5, achieving hypersonic velocities and with a body made of steel that withstood aerodynamic heating very well for that decade. Following the war, technological advancements focused on overcoming severe thermal and structural challenges associated with these extreme speeds, moving from supersonic cruise speeds (just above Mach 1) to hypersonic speeds where aerodynamic heating was the major issue in all design considerations. This era was the foundation for the later hypersonic missile developments, which were ultimately characterized by rocket propulsion and the exploration of hypersonic aerodynamics.

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<sup>6</sup> NATO Integrated Air & Missile Defence Centre of Excellence. "Integrated Air and Missile Defence (IAMD)." *IAMD COE*, <https://iamd-coe.org/about-us/iamd/>

<sup>7</sup> Tracy, Cameron L., and David Wright. "Modeling the Performance of Hypersonic Boost-Glide Missiles." *Science & Global Security*, vol. 28, no. 3, 1 Sept. 2020, pp. 135–170, <https://doi.org/10.1080/08929882.2020.1864945>.

In the 1980s the Manoeuvrable Re-entry Vehicles (MaRVs) began enabling the hypersonic glide and manoeuvrability to get into defences. Since then, research has expanded into scramjet-powered hypersonic cruise missiles and glide vehicles, with modern programs in the U.S.A., Russia, and China focusing on weapons that combine extreme speed with manoeuvrability to overcome missile defences. In 2022 the Russian Army deployed hypersonic missiles in the conflict with Ukraine marking the beginning of a new operational use. These developments reflect over eight decades of technological progress from early rocketry to sophisticated hypersonic strike systems designed for rapid, precise global reach.

### ***Hypersonic Weapons***

By their definition hypersonic weapons are missiles designed to change the current arms, from ballistic to hypersonic. This means that the weapons will evolve since warfare is constantly changing due to technological innovation. Technologies such as Artificial Intelligence (AI) and new means of attack, conduct an important role in dictating the tenets of war in the modern days. Current wars, such as the Russia-Ukraine and the Red Sea Crisis war begin introducing this type of missiles on the battlefield, which can be seen on at least 3 occasions in the Ukraine war and both Yemen's Houthis and South Korea claim to have started experimental testing on them recently.<sup>8</sup>

### ***Types of Hypersonic Weapons***

#### Hypersonic Glide Vehicles (HGVs)

Hypersonic Glide Vehicles (HGVs) represent a new advancement in missile technology, which are capable of traveling at speeds exceeding Mach 5, as mentioned before, while maintaining exceptional maneuverability and altitude control. Unlike traditional ballistic missiles, which follow a predictable parabolic trajectory, HGVs are launched into the upper atmosphere by a rocket and then glide unpowered toward their target, making them far more difficult to detect and intercept. Their ability to change course in the middle of the flight enables them to evade existing missile defense systems and strike with great precision. This combination of speed, agility, and unpredictability positions HGVs as a transformative tool in modern warfare, raising significant planned and security implications for global defense policies.

#### Hypersonic Cruise Missiles (HCMs)

Hypersonic Cruise Missiles (HCMs) are another class of advanced weaponry designed to sustain speeds above Mach 5 while flying at lower altitudes than traditional ballistic missiles. Unlike Hypersonic Glide Vehicles, HCMs are powered throughout their flight by rapid air intake engines such as scramjets, allowing them to maintain consistent velocity and maneuverability over long distances. Their ability to fly within the atmosphere and adjust their flight path in real time makes them extremely difficult to track and intercept using conventional air defense systems. HCMs combine the speed of hypersonic flight with the precision of cruise missile guidance, making them a highly strategic asset for rapid, long-range strikes against high-value or time-sensitive targets.

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<sup>8</sup> Bull, Sam. "N. Korean Troops in Ukraine? Don't Overreact." *Responsible Statecraft*, 23 Oct. 2024, [responsiblestatecraft.org/north-korean-troops-in-ukraine/](https://responsiblestatecraft.org/north-korean-troops-in-ukraine/)

## Differences Between Ballistic and Hypersonic Missiles

The main differences in the hypersonic and ballistic missiles are in their flight paths, speed, maneuverability, detectability, defense evasion and propulsion.

Ballistic missiles is a type of missile that uses projectile motion to deliver warheads on a target. They are driven by rocket engines during their initial launch phase which typically lasts three to five minutes and are responsible for giving the missile most of its velocity. When the fuel is exhausted, the missile follows a high arched path around the orbit path which is called ballistic trajectory that is controlled by gravity and momentum. This is followed by a midcourse phase which is the longest and it reaches speeds up to 7.5-10 kilometers per second reaching altitudes up to 4,500 kilometers. During their terminal phase, the warheads re-enter the atmosphere at high speeds, often between 6-8 kilometers per second which is equivalent to 22,000-29,000 kilometers per hour. Ballistic missiles have very limited maneuverability after their launch with a predictable path and it cannot engage in maneuvering even after re-entry. These predictable flight paths make them extremely vulnerable when detected, even with decoys and warheads such as the Multiple Independently targetable Reentry Vehicle ( MIRVs ) , exoatmospheric ballistic missiles, which can complete defense efforts. The missiles are classified by range, short range which are under 1,000 kilometers and intercontinental which are over 5,500 kilometers.

Hypersonic missiles are the ones operating at speeds which are greater than Mach 5, a speed 5 times the speed of sound in air that is roughly 6,174 kilometers per hour or 2,000 meters per second. These weapons, both the hypersonic glide vehicles (HGVs) and hypersonic cruise missiles (HCMs), remain inside of the atmosphere all through the duration of their flight. Unlike traditional ballistic missiles, which follow a high, predictable arc into space and then descend toward the target, hypersonic weapons remain within the atmosphere and can glide or maneuver dynamically. This allows them to rapidly adjust their trajectory mid-flight, making them extremely difficult to detect, track, and intercept using current missile defense systems. Their unpredictable flight path and ability to fly at low altitudes give them a significant tactical advantage, particularly in evading radar and early warning systems. They are powered by rockets or advanced air-breathing engines that depend on the design which enables them to maintain these extraordinary speeds while making in-flight adjustments. This combination of speed and maneuverability represents an evolution in missile technology ultimately forcing militaries to revisit the idea of early warning and interception strategies.

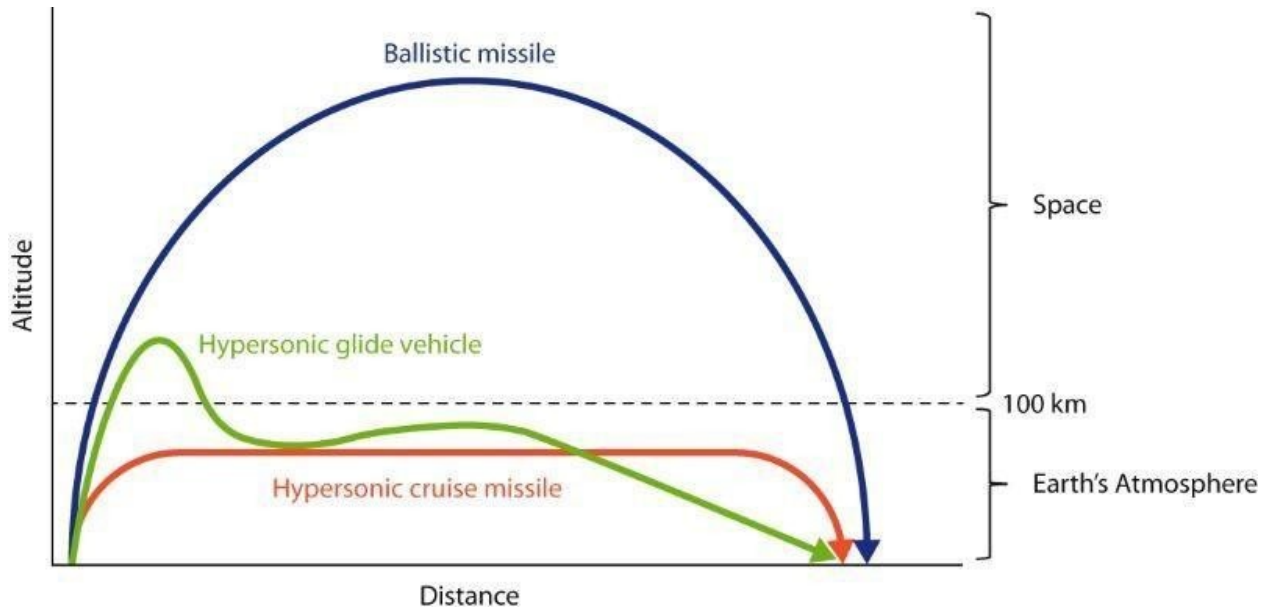


Figure 1: The flight path of hypersonic weapons that impact the strategic ability [Advantages and Disadvantages](#)

Hypersonic missiles can both have advantages and disadvantages. To begin with these types of missiles are very difficult to defend against due to their extreme speed and ability to maneuver unpredictably at much lower altitudes make them much harder to detect and intercept by existing missile defense systems compared to ballistic or cruise missiles. The missiles also improve the nations capacity to strike high value targets within the enemy territory, who unlike ballistic missiles these weapons alter in the duration of their flight which makes their path very unpredictable and hard to track. Lastly, they provide their low altitude flight path that can reduce the range at which ground-based radars can be detected offering a degree of stealth.

Although hypersonic missiles provide many advantages for Member States, they also have disadvantages. To begin, the development and production of the weapons is very expensive, making them a costly investment for any military or army. In addition, they have a high drag and energy consumption since they fly through the atmosphere generating significant drag that slows the weapon and requires substantial energy to maintain speed especially when maneuvering which can ultimately reduce their overall speed and range. The plasma effect around a hypersonic body can severely limit radio communications, making external guidance and navigation difficult, particularly reactive maneuvers. Finally, while maneuvering enhances survivability, they come at the cost of reduced speed and range due to increased drag and energy demands, potentially limiting the effectiveness of their kinetic energy impact at intercontinental ranges.

### ***Challenges and threats***

Although very useful and part of a new technological warfare they propose severe threats to global peace and security.

## Detection and Tracking Limitation

Hypersonic missiles present a major challenge to existing detection and tracking systems because of their speed and unpredictable flight patterns. Unlike the ballistic missiles, which generally follow a fixed path, hypersonic glide vehicles and cruise missiles can maneuver that fly within the atmosphere, making their trajectory far more difficult to anticipate.<sup>9</sup> Their ability to fly at lower altitudes further reduces radar visibility, often enabling them to bypass early-warning systems until only moments before impact. This gap in detection severely limits a defender's reaction time, undermines situational awareness, and significantly increases the likelihood of a successful strike.

## Missile Defense Vulnerability

Traditional missile defense systems are largely designed to counter slower-moving or predictable threats, rendering them unprepared to intercept hypersonic weapons. The speed and agility of hypersonic missiles reduce the reaction window and complicate interception trajectories, overwhelming current interceptor technologies. In particular, the atmospheric flight path of hypersonic glide vehicles and cruise missiles bypasses the engagement envelopes of many space- and ground-based defenses. This vulnerability deteriorates the strategic effectiveness of missile shields and undermines deterrence, creating a destabilizing effect on global security dynamics.

## Compressed Decision Making Time

The amazing speed of the hypersonic missiles significantly compresses the time available for political and military leaders to assess threats and make critical decisions. A missile traveling at Mach 5 or above can strike targets thousands of kilometers away in mere minutes, reducing the window for detection, verification, deliberation, and response. This accelerated timeline increases the risk of miscalculation or accidental escalation, especially in those high tension scenarios where rapid responses may be based on incomplete information. The pressure to act swiftly can undermine strategic stability and increase the likelihood of preemptive or retaliatory actions based on limited data.

## ***Impact on the Global Security***

### Disruption of Global Peace

Hypersonic weapons are a huge humanitarian risk because of their speed, manoeuvrability and unpredictable flight paths that reduce warning times for civilians. Since governments are not

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<sup>9</sup> Wright, David, and Cameron Tracy. "Hypersonic Weapons Are Mediocre. It's Time to Stop Wasting Money on Them." *Bulletin of the Atomic Scientists*, 12 Mar. 2024, [thebulletin.org/2024/03/hypersonic-weapons-are-mediocre-its-time-to-stop-wasting-money-on-th-em/](https://thebulletin.org/2024/03/hypersonic-weapons-are-mediocre-its-time-to-stop-wasting-money-on-th-em/).

able to quickly distinguish between a conventional or nuclear arms that increase the risks of fatal misjudgment or miscalculation, which would cause an escalation to be a conflict. Events such as this one would result in civilian casualties, large scale displacement and the destruction of infrastructure and major systems such as hospitals, water supply systems and energy networks. The challenge of tracking and intercepting these weapons with current defenses that leave communities more vulnerable to sudden attacks, while the vast financial cost of developing new defenses diverts resources away from humanitarian aid, disaster relief, and essential public services. The development of hypersonic weapons by major powers like the US, China, and Russia, and the potential for proliferation to other nations, could fuel a costly and destabilizing arms race.

### Regional Security Tensions

The deployment of hypersonic weapons significantly raises concerns over regional security tensions by destabilizing existing military balances and accelerating arms races. Due to their speed and maneuverability the reaction time of states that are being attacked is very limited, increasing the chances of nuclear conflicts. This uncertainty often leads countries to adopt more aggressive defence plans or a change in strategies, without even accounting trust and diplomatic efforts, as part of avoiding the strikes. As some nations rush to develop or match these capabilities in order to avoid strategic disadvantage, the risk of miscalculation and conflict escalation rises rapidly, threatening to destabilize entire regions and complicate efforts toward long term peace and security.

### Arguments with Already Existing regulations

At the moment the weapons present significant challenges to the current international arms control and nonproliferation frameworks as well. All of the already existing treaties, resolutions and agreements have been found to lack specific provisions for hypersonic technologies, creating huge legal and regulatory gaps that complicate efforts to monitor and limit their development and deployment. The rapid pace of their advancements and innovation exceeds the slow negotiation processes of any typical of international diplomacy, leaving governments struggling to keep pace with their policies. In addition, the use of some hypersonic technologies blurs the boundaries between civilian and military applications, according to the Report for the Implications of hypersonic weapons for international stability and arms control by the United Nations Institute Disarmament Research (UNIDIR), making monitoring tries and enforcement even more difficult under current regimes. These are risks that are continuously accelerating in a global arms race, without any clear monitoring, according to the United Nations Office for Disarmament Affairs (UNODA).

## **MAJOR COUNTRIES AND ORGANIZATIONS INVOLVED**

### ***United States of America (USA)***

As of 2025, the U.S. hypersonic missile systems are in various stages of development and limited deployment. The United States Department of Defense is currently developing new hypersonic weapons under the Navy's Conventional Prompt Strike (CPS) program, which ultimately aims to enable rapid strikes against time sensitive targets. Their stance is to prioritize

their development as a critical response to growing threats from the major competitors such as China and Russia. A notable milestone in this effort occurred in October 2021, when the United States successfully tested a hypersonic glide vehicle launched from a sounding rocket—an important achievement following a series of earlier setbacks, signaling meaningful progress toward the future operational deployment of hypersonic capabilities. Several key milestones have marked progress in this area. In October 2021, the United States successfully tested a hypersonic glide vehicle launched from a sounding rocket, following a series of failed attempts. This event marked a turning point, demonstrating proof of concept and renewed momentum for the program. In March 2023, the Army's Long-Range Hypersonic Weapon (LRHW) system, also known as the "Dark Eagle", underwent a series of pre-operational checks, with full fielding expected soon after.

### **South Korea**

South Korea recognizes an emerging threat coming from hypersonic missile technology on the Korean Peninsula, due to the development and testing of such systems. Their policy mainly consists of accelerated development and deployment as well as a main focus on conventional supremacy according to the Asia-Pacific Leadership Network. South Korea has pledged to accelerate their hypersonic missile development as part of a broader vision of "missile sovereignty," which aims to effectively deter North Korean provocations and its involvement. The government views hypersonic weapons as a critical means of closing deterrence gaps and boosting the credibility of its conventional response capabilities. In addition, by focusing on the development of hypersonic weapons, they seek to avoid a need for nuclear storage, mostly relying on high speed and hard to neutralize weapons to offset the nuclear and missile program advancements made by North Korea.

### **India**

India is one of a few Asian member states that has invested in the development of advanced missiles and more specifically they have created a new type of hypersonic missile which can "outrun any advanced air defense system and shift the balance in Asia"<sup>10</sup>.the Defense Research and Development Organization (DRDO) has finished with the testing phase of the country's most advanced missile systems up to date, which is the Extended Trajectory Long Duration Hypersonic Cruise Missile ( ET-LDHCM).The main difference of the ET-LDHCM from the other missiles are the scramjet engines which use oxygen from the atmosphere instead of carrying oxidizers on board, that creates a lighter missiles which reach and maintain high speeds for longer. Due to this development, regional tensions are high making the member state join an elite club of nationals with indigenous hypersonic capability.

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<sup>10</sup> ET Online. "Why India's New Hypersonic Missile May Outrun Israel's Iron Dome and Russia's S-500 and Shift the Balance." *The Economic Times*, Economic Times, 16 July 2025, [economictimes.indiatimes.com/news/defence/why-indias-new-hypersonic-missile-may-outrun-israels-iron-dome-and-russias-s-500-and-shift-the-balance-in-asia/articleshow/122576044.cms?from=mdr](https://economictimes.indiatimes.com/news/defence/why-indias-new-hypersonic-missile-may-outrun-israels-iron-dome-and-russias-s-500-and-shift-the-balance-in-asia/articleshow/122576044.cms?from=mdr)

### ***Missile Technology Control Regime (MTCR)***

The Missile Technology Control Regime (MTCR) is a multilateral export control regime aimed at limiting the proliferation of weapons of mass destruction (WMD) by controlling transfers of missile technology. It focuses on rockets and unmanned aerial vehicles capable of delivering a payload of at least 500 kg to a range of at least 300 km, and related equipment, software, and technology. Though indirectly they play an important role in the overseeing of hypersonic missile technologies especially in nonproliferation. The systems that they provide overlook for fall under the Category I of the MTCR that includes the most sensitive missile technologies and is subject to the strictest export restrictions among the member states. The MTCR does not control or restrict weapons, it plays a significant role in limiting their spread, particularly to non-member states.

### **TIMELINE OF EVENTS**

<b>DATE</b>	<b>DESCRIPTION OF EVENT</b>
1985	The Soviet Union tests the first prototype of the Kh-15, the AS-16 "Kickback, a quasi-ballistic missile with a flight speed near Mach 5, which is considered an early prototype to the modern hypersonic strike weapons.
15 February 2000	The U.S. conducts a test of the Hypersonic Technology Vehicle as a part of DARPA's early hypersonic research which failed due to a launch issue.
January 2003	The United States officially launches the DARPA FALCON program.
11 August 2011	The U.S. tests DARPA's HTV-2, a hypersonic glide vehicle reaching Mach 20 before losing control.
27 December 2019	The first operational hypersonic weapon was declared in Russia

19 March 2020	The U.S. Army and Navy conduct a successful test of the Common Hypersonic Glide Body (C-HGB) in Hawaii
March 2022	Russia uses the Kinzhal hypersonic missile in combat during its invasion of Ukraine which was the first known use of such a weapon in warfare.
28 July 2022	The United Nations Conference on Disarmament (UNCD) formally introduces hypersonic missiles.
23 July 2024	The first UNGA Resolution on Current developments in science and technology and their potential impact on international security and disarmament efforts, which introduces for the first time hypersonic missiles
2025	The US Army plans to deploy the “Dark Eagle”, marking the first US fielded hypersonic systems

## RELEVANT UN RESOLUTIONS, TREATIES AND EVENTS

### Report for the Implications of hypersonic weapons for international stability and arms control by the United Nations Institute Disarmament Research (UNIDIR)

The most important part of the report included a tabletop exercise by the UNNIDIR and the UNODA which explored the significant impact that hypersonic weapons could have on international security and arms control. The participants focused on how the extreme speed and high maneuverability of these weapons create serious challenges for interpreting intentions during crises. These factors drastically shorten the countries judgment time, increasing the risk of misjudgments and unintended escalation between states. It was highlighted how hypersonic weapons blur the distinction between conventional and nuclear use, complicating deterrence strategies and escalation management. Additionally, it showed the likelihood of a renewed arms race, as countries may rush to develop or acquire hypersonic capabilities to maintain strategic

balance. The report also pointed out the gaps in current arms control agreements which have failed to cover many hypersonic systems and technologies. In order to address these concerns, the exercise stressed the importance of building confidence measures, transparency efforts, and communication protocols particularly through notification systems and clearer policies as vital

tools to reduce uncertainty and maintain stability in an evolving strategic landscape shaped by hypersonic technology.

### ***Treaty on the Non-Proliferation of Nuclear Weapons (NPT)***

The Non-Proliferation Treaty is a landmark international treaty whose objective is to prevent the spread of nuclear weapons and weapons technology, to promote cooperation within the peaceful uses of nuclear energy and to further the goal of achieving nuclear disarmament and general and complete disarmament. The Treaty represents the only binding commitment in a multilateral treaty to the goal of disarmament by the nuclear-weapon States. More countries have ratified the NPT than any other arms limitation and disarmament agreement, a testament to the Treaty's significance. The Treaty is recognized as a foundational pillar of the global nuclear non-proliferation framework and a crucial basis for advancing nuclear disarmament.

Their objectives are to prevent the spread of nuclear weapons, promote progress toward both nuclear and general disarmament, and encourage international cooperation in the peaceful use of nuclear energy. While its provisions address nuclear weapons more directly than their delivery systems, it indirectly influences missile-related policies by promoting safety, security, and responsible handling.

## PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

### UNIDIR Expert Discussions and Reports (2019–to the present)

The United Nations Institute for Disarmament Research (UNIDIR) is a Geneva-based autonomous institute that provides independent research and analysis on disarmament, arms control, and generally international security<sup>12</sup>. Since 2019, the UNIDIR has hosted discussions with specialists and released technical reports addressing threats posed by emerging military technologies, including weapons, cyber warfare, and hypersonic missiles. Despite the depth and the relevance of its findings, UNIDIR's work has often failed to translate into binding international agreements or decisive policy shifts. This is largely due to geopolitical rivalries, lack of political will among major powers, and the voluntary and non-binding nature of the UNIDIR's outputs. As a result, many of its recommendations remain advisory rather than actionable, limiting their real-world impact and not being able to provide any results .

### Strategic Stability Talks (U.S.–Russia, U.S.–China)

Strategic Stability Talks between the United States and Russia, and more recently between the United States and China, are diplomatic dialogues that aim to reduce the risks of conflict through communication, transparency, and arms control measures. These talks have served as critical platforms for managing strategic competition and preventing escalation, especially avoiding nuclear or full scale conflicts. However, in recent years, the effectiveness of these dialogues has been very limited. After the collapse of foundational arms control treaties such as the INF Treaty, mistrust, and having competition in the geopolitical agendas, they have lost their meaningful progress. In the case of U.S. and China talks, the absence of formal arms control agreements and China's reluctance to engage in treaty-based negotiations have further limited outcomes show that the diplomatic input has had no effective outcome. As a result, while the stability talk show a sense of diplomacy, they have failed to provide concrete and enforceable agreements and don't provide results.

### Project Excalibur

Project Excalibur was a Cold War era program that was created to develop a space-based laser weapon intended to destroy multiple incoming missiles simultaneously. However, it ultimately failed because the tests were later found to be flawed due to instrumentation errors and misunderstood physical effects. In the testing stages, scientists discovered that the laser output was much weaker than they had claimed, and had no conclusive evidence of effective lasing. Additionally, the concept faced strategic and practical issues. For instance, a single Excalibur satellite could be destroyed by one enemy missile, either by being hit directly or by defending itself and getting destroyed, making the system

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<sup>12</sup> "UNIDIR | Building a More Secure World." *Unidir.org*, [unidir.org](https://www.unidir.org).

vulnerable and very impractical. These scientific, technical, and operational shortcomings led to its cancellation in the early 1990s.

## POSSIBLE SOLUTIONS

### ***International Transparency through a United Nations-monitored platform***

International transparency through a United Nations-monitored platform refers to a system or mechanism overseen by the UN that promotes open sharing of information among countries, especially regarding sensitive issues like weapons development, military activities, or arms control. Specifically, any military activity regarding hypersonic weapons will be shared among member states to provide their policies for the missiles and ensure broader goals, peace and security. Such a platform aims to build trust and prevent conflict by enabling states to report and verify their actions in a clear and standardized way. In the context of emerging technologies like hypersonic weapons, a United Nations monitored transparency platform could help track deployments, notify other states of tests or developments through a secure platform overlooked by the United Nations, and support confidence-building measures that contribute to global security and stability.

### ***Strengthen the Missile Technology Control Regimes existing frameworks***

Strengthening the current Missile Technology Control Regime frameworks for hypersonic missiles begin by updating export control lists in order to embrace hypersonic technologies, enhancing verification and monitoring mechanisms, and improving member-state information sharing. Given the advanced speed, maneuverability, and dual-use nature of hypersonic systems, tighter controls are needed to prevent their proliferation and to weaken actors.

Strengthened framework measures would help limit the threat of hypersonic missile technology, support global security, and reduce risks of arms races and conflict escalation linked to these emerging weapons.

### ***Monitoring Mechanism***

A United Nations-monitored technical verification and monitoring mechanism for hypersonic weapons would provide a transparent and accountable framework to oversee their development, testing, and deployment. This system would require states to share data on hypersonic activities through a secure platform and would include provisions for independent verification using tools such as satellite monitoring, and on-site inspections. The mechanism would also support real-time notification and early warning protocols to reduce the risk of misinterpretation or escalation during tests or launches. By fostering transparency and mutual confidence, this UN-based system would help mitigate the destabilizing effects of hypersonic weapons and contribute to global arms control and non-proliferation efforts.

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