

The Strategic Implications of Hypersonic Missiles



Artistic rendering of an HGV.

Credits: Raytheon. Source: [International Business Times](https://www.ibtimes.com).

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25/02/2019

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Introduction

In a context of mounting international tension, the world's three main military powers (namely the United States and its near-peer competitors, Russia and China) are developing new weapons to gain the upper edge in case of war. Among them, hypersonic missiles are playing an increasingly important role. This paper examines the intended use of hypersonic missiles and the potential implications of both conventional and nuclear-armed systems, in particular in the event of a crisis involving the three major powers. Its purpose is not to provide an abstract and academic-like demonstration on the effects of hypersonic missiles on the strategic equilibrium, but to present possible scenarios in order to raise the awareness on the risks that the deployment of such weapons could have.

Types of Hypersonic Missiles

By definition, hypersonic missiles are those vectors capable of travelling at five times or more the speed of sound. Differently said, they can travel at **Mach 5.0 or higher**. As a result, they are capable of bypassing most existing anti-missile defences thanks to their sheer speed plus the ability to perform evasive manoeuvres¹. Hypersonic missiles can be divided into two sub-categories. The first group is made of **hypersonic glide vehicles (HGVs)**, which are launched into a high-altitude ballistic trajectory by a rocket. The second is formed by **hypersonic cruise missiles (HCMs)**, which exploit rockets or scramjet engines to reach the required speed

¹ Speier, Richard H.; Nacouzi, George; Lee, Carrie; Moore, Richard M. "Hypersonic Missile Nonproliferation: Hindering the Spread of a New Class of Weapons" (Key Findings); RAND Corporation, 2017;

and follow an aircraft-like flight path. These are relatively slower than their ballistic counterparts. The world's three main military powers (and others) are all developing such weapons, albeit with different purposes.



Artistic rendering of a hypersonic vehicle developed by DARPA.

Credits: AFP. Source: [News.com.au](https://www.news.com.au)

The **United States** have considered hypersonic missiles as a possible solution (among others) to meet the requirements of the **Conventional Prompt Global Strike (CPGS)** concept, whose objective is to enable the US to *conventionally* strike a target located anywhere in the world within one hour. Dating back to the George W. Bush administration, the CPGS has become a major strategic programme since 2008; with a growing attention to hypersonic missiles. In a context of mounting rivalry with China and Russia, the concept was revived to counter the **Anti-Access / Area Denial (A2/AD)** systems that these two powers are deploying to create "bubbles" around their territory in order to undermine the ability of American forces to operate within certain areas. The CPGS would enable the US military to fire from beyond the range of enemy defences and to destroy targets located within or behind the "bubble" they create; overcoming the A2/AD challenge and preserving America's ability to project its power abroad. In this logic, hypersonic missiles seemed an effective solution, and all

last access December 30, 2018.

https://www.rand.org/pubs/research_reports/RR2137.html

the branches of the US Armed Forces have separately experimented such systems². But after many attempts, a **joint hypersonic missile programme** was recently announced³.

Russian and Chinese efforts to deploy hypersonic missiles respond to the reverse side of this logic: they plan to use them as Anti-access / Area Denial assets conceived to keep the US military and especially its aircraft carriers away from their territory. But hypersonic systems are also a response to American anti-ballistic missile defences that for Moscow and Beijing break the long-standing nuclear equilibrium based on **Mutual Assured Destruction (MAD)**. According to its principles, nuclear-armed powers will never attack each other, knowing that this would trigger a nuclear retaliation that would annihilate the aggressor. This would nullify any possible gain and make victory unachievable. But in theory, missile defence systems could end this balance by shielding who deploys them from retaliation. In this logic, hypersonic weapons are a mean to bypass such defensive assets and restore the ancient equilibrium. It should be noted that while the US is focusing on exclusively conventional systems (at least on the basis of available information), Russia and China are working also on **nuclear-capable** ones.

² For more details on US systems, see (among others): - Tucker, Patrick. "The US is Accelerating Development of Its Own 'Invincible' Hypersonic Weapons"; Defense One; March 2, 2018; last access December 30, 2018.

<https://www.defenseone.com/technology/2018/03/united-states-accelerating-development-its-own-invincible-hypersonic-weapons/146355/>.

- Keck, Zachary. "US to Test Hypersonic Missile in August"; The Diplomat; March 20, 2014; last access January 3, 2019.

<https://thediplomat.com/2014/03/us-to-test-hypersonic-missile-in-august/>.

- Keck, Zachary. "The US Navy's Ultimate Weapon: Hypersonic Missiles fired from a Submarine"; The National Interest; November 11, 2017; last access January 3, 2019. <https://nationalinterest.org/blog/the-buzz/the-us-navys-ultimate-weapon-hypersonic-missiles-fired-23148>

More specifically, **Russia** is developing three main types of hypersonic systems. The first is the **Kh-47M2 Kinzhal**⁴, an airborne-launched missile reportedly capable of travelling at Mach 10 and having a maximum range of 2000 kilometers. It can be loaded both with a conventional or a nuclear warhead, and was tested (allegedly with success) in March 2018. It likely capable of attacking both land-based targets and ships.



MiG-31K Foxhound carrying a Kh-47M2 Kinzhal missile.

Credits: Pavel Golovnik / AP. Source: [DefenseNews](https://www.defensenews.com)

The second system is the **3M22 Zircon**⁵ cruise missile, which has an estimated range between 400 and 1000 kilometers and is mainly meant as an anti-ship weapon for striking US carriers. Capable of reaching speeds up to Mach 6, the missile will be carried by the *Kirov*-class battlecruisers and possibly by the upcoming *Husky*-class attack

³ Chin, Jeremy. "US Army, Navy, Air Force, and MDA Jointly Developing Hypersonic Weapon"; Missile Threat, Center for Strategic and International Studies; October 29, 2018; last modified October 29, 2018; last access February 25 2018.

<https://missilethreat.csis.org/us-army-navy-air-force-and-mda-jointly-developing-hypersonic-weapons/>

⁴ Missile Defense Project. "Kinzhal"; Missile Threat, Center for Strategic and International Studies; March 27, 2018; last modified July 18, 2018; last access 30 December 2018.

<https://missilethreat.csis.org/missile/kinzhal/>

⁵ Akulov, Andrei. "Zircon Missile to Be Produced in 2018: Russia Leading in Hypersonic Arms Race"; Strategic Culture. December 16, 2016; last access 30 December 2018. <https://www.strategic-culture.org/news/2016/12/16/zircon-missile-produced-2018-russia-leading-hypersonic-arms-race.html>

submarines⁶. An airborne version is also scheduled to equip strategic bombers like the Tu-160M2 Blackjack and the next-generation, stealth-capable PAK-DA. The third and final system is the *Avangard* (Project 4202 / Yu-74)⁷, a HGV which can be mounted atop ground-launched ballistic missiles, notably the RS-18 / SS-19 *Stiletto* currently in use and the RS-28 *Sarmat* / SS-X-30 *Satan II* that will soon substitute it. It is claimed that the weapons can manoeuvre and reach a speed up to Mach 20. It can carry both a conventional and nuclear payload and has a range of at least 6,000 kilometres.

As far as **China** is concerned, its main hypersonic missile will be the **DF-ZF**⁸, previously known as Wu-14. This HGV, whose speed is estimated between Mach 5 and Mach 10, is supposed to be capable of carrying both conventional and nuclear warheads, and could be mounted atop anti-ship ballistic missiles (notably the DF-21D) and used as a "carrier killer". As of today, various tests⁹ have been performed, apparently with success.



Computer-generated image depicting an attack carried out by Chinese DF-21D missiles.

Source: [Chinese Military Review](#).

⁶ Gao, Charlie. "Russia's Husky Class Submarine: Armed with Nuclear Torpedoes and Hypersonic Missiles?"; *The National Interest*; May 10, 2018; last access February 25, 2019.

<https://nationalinterest.org/blog/the-buzz/russias-husky-class-submarine-armed-nuclear-torpedoes-25784>

⁷ Missile Defense Project. "Avangard"; *Missile Threat*, Center for Strategic and International Studies; January 3, 2019; last modified January 7, 2019; last access February 25, 2019.

<https://missilethreat.csis.org/missile/avangard/>

⁸ - Gady, Franz-Stefan; "China Tests New Hypersonic Weapon"; *The Diplomat*; November 26, 2015; last access December 30, 2018.

<https://thediplomat.com/2015/11/china-tests-new-hypersonic-weapon/>

- Gady, Franz-Stefan. "China Tests New Weapon Capable of Breaching US Missile Defense Systems"; *The Diplomat*; April 28, 2016; last access December 31, 2018. <https://thediplomat.com/2016/04/china-tests-new-weapon-capable-of-breaching-u-s-missile-defense-systems/>

⁹ Majumdar, Dave. "Nuclear War: Could China's Mach 10 Hypersonic Weapons Unleash the Unthinkable?"; *The National Interest*; November 16, 2017; last access December 30, 2018.

<https://nationalinterest.org/blog/the-buzz/nuclear-war-could-chinas-mach-10-hypersonic-weapons-unleash-23228>

The Offensive Potential of Hypersonic Missiles

Even though the specific characteristics of hypersonic missiles vary according to the different strategic needs of the powers that are developing them, they all have two prominent features in common. The first is their **extremely high speed**, which means that they are almost impossible to intercept and leave little reaction time to respond to an incumbent attack. The second characteristic derives from their **range and destructive power**: hypersonic missiles can neutralize important assets located at great distance even when armed with a conventional payload, and they can cause massive damage in case they carry nuclear warheads. As a result, such systems have **strategic-level effects**.

As with virtually every weapons system, hypersonic missiles can be employed both offensively and defensively. In the case of Russia and China, their *operational* use is to function (along with other systems) as A2/AD assets to create “bubbles” within which the US forces cannot operate. But on the *strategic* plan their role can be twofold: they could be employed *defensively* to protect Russian and Chinese territory by deterring or interdicting a foreign intervention; but they could also support *offensive* operations against countries like the Baltic states or Taiwan by preventing America to come in defence of an ally under attack. The same is true for US hypersonic missiles. *Operationally*, they should provide the US with rapid strike capabilities to meet the CPGS requirements. *Strategically* they may be used in a defensive logic to deter an enemy attack; but they also enable America to act offensively by delivering an immediate decisive blow to

undermine the adversary’s warfighting capabilities and leave it defenceless. Given that they are meant to strike anywhere in world in just one hour, US hypersonic missiles appear even more offensive-prone in this sense.

Considering the above, ***it is not possible to determine whether such systems are deployed for offensive or defensive purposes***. It is important to underline that it is not the purpose of this paper to ascertain whether they inherently favour an offensive or defensive stance; nor to determine whether they are to be classified as offensive or defensive weapons. The strategic behaviour of states depends on the complex interplay of multiple factors and not on a single weapon system, while the second question is for the most part a purely academic issue. What is important here is that ***hypersonic missiles do have a notable offensive potential***: first, because there is no truly effective way to intercept them; second, because of their range and destructive power. It is also necessary to emphasise since now that this does not imply that hypersonic missiles are game-changing weapons. As stated in an article¹⁰ on this topic, even though there are no effective defences against them, hypersonic systems “will not change the fundamentals of strategy” for the simple reason that it is not possible to achieve total invulnerability from all existing threats. A complete and invincible defence cannot be granted even against ordinary ballistic missiles. Yet, due to their offensive power, the deployment and the use of hypersonic weapons have strategic-level consequences.

¹⁰ Raitasalo, Jyri. “Hypersonic Weapons are No Game-Changer”; The National Interest; January 5, 2019; last access January 9, 2019.

<https://nationalinterest.org/blog/buzz/hypersonic-weapons-are-no-game-changer-40632>

The Debate over the Strategic Impact of Hypersonic Missiles & the Limits of MAD

The most recurrent argument in the debate over the strategic effects of hypersonic missiles is that they allegedly threaten the existing nuclear equilibrium¹¹. This raises a central point, namely **ambiguity**. As a matter of fact, it is impossible to discern whether a hypersonic missile is carrying a conventional or nuclear warhead until it reaches the target¹². In theory, this problem affects only Russian and Chinese system, since (on the basis of the available data) American hypersonic missiles have never been



Nuclear test in Licorne, French Polynesia, 1970.

Source: [Planet Deadly](#).

¹¹ This has been noted by various analysts; for example:

- Majumdar, Dave. "Nuclear War: Could China's Mach 10 Hypersonic Weapons Unleash the Unthinkable?"; *The National Interest*; November 16, 2017; last access December 30, 2018.

<https://nationalinterest.org/blog/the-buzz/nuclear-war-could-chinas-mach-10-hypersonic-weapons-unleash-23228>

- Woolf, Amy F. "Conventional Prompt Global Strike and Long-Range Ballistic Missiles: Background and Issues"; Congressional Research Service; April 6, 2018; last access December 30, 2018.

<https://fas.org/sgp/crs/nuke/R41464.pdf>

- Muspratt, Adam. "Hypersonic missiles: What are they and can they be stopped?"; *Defence IQ*; August 28,

considered as nuclear-capable vectors; but reality could be different.

Ambiguity is problematic and dangerous because it raises the **risk that a conventional missile strike may be misinterpreted for a nuclear one**, thus accidentally sparking a nuclear response (this is also the main limit of hypersonic missiles as means for satisfying the objectives of the CPGS: while supposedly conventionally-armed, they may be considered – correctly or not – as nuclear weapons, with all the consequences this could have). Because of ambiguity and since they are nearly impossible to intercept, some argue that hypersonic missiles threaten the longstanding strategic balance based on MAD.

However, **this problem is not unique to hypersonic missiles**. First, a large-scale strike with ordinary missiles would be equally impossible to block. Second, there are other systems that are also affected by the ambiguity problem (for instance, all the non-hypersonic cruise missiles that are capable of carrying nuclear warheads); and yet they have not undermined the nuclear equilibrium. As such, it has been stated¹³ that hypersonic systems are no different from normal ballistic missiles, and that MAD is still fully applicable. Continuing along this logic one could argue that, in the impossibility to ascertain the conventional or nuclear nature of an attack carried out with hypersonic missiles, the

2018; last access January 3, 2019.

<https://www.defenceiq.com/defence-technology/news/hypersonic-missiles-what-are-they-and-can-they-be-stopped>

¹² Woolf, Amy F. "Conventional Prompt Global Strike and Long-Range Ballistic Missiles: Background and Issues"; Congressional Research Service; April 6, 2018; accessed December 30, 2018.

<https://fas.org/sgp/crs/nuke/R41464.pdf>

¹³ Bercuson, David J. "The global arms race no one's talking about"; *National Post*, January 22, 2019; last access February 25, 2019.

<https://nationalpost.com/opinion/david-j-bercuson-the-global-arms-race-no-ones-talking-about>

target state will always consider it as a nuclear strike and respond accordingly.

But this kind of reasoning also raises doubts. In an academic rational-based model the logic described above seems perfectly solid. However, this implies that **decision-makers who automatically launch their nuclear weapons in response to an ambiguous hypersonic attack would face the risk of inadvertently starting a nuclear war out of what was in reality a conventional strike.** Arguing that they would actually take this enormous risk is questionable: after all, MAD lies on rationality; but immediately launching nuclear weapons in response to an attack with hypersonic missiles (or with other vectors characterized by ambiguity) is hardly rational, considering that it could lead to a nuclear war could begin in response of a conventional attack.

Moreover, **it is a risky assumption to dismiss the potential dangers deriving from the deployment of hypersonic missiles (as well as other systems) on the basis that MAD is so solid that a war is simply impossible.** Of course, MAD has been the basis of the strategic equilibrium between nuclear powers for decades, and it remains a formidable conflict-preventing factor. But it is hazardous to believe that MAD is a total guarantee against the possibility of great power war. If it was actually the case, then there would be no reason to worry about growing tensions between the US and its competitors like Russia and China, about the development of new weapon systems, about the potential destabilizing consequences of the end of the Intermediate-Range Nuclear Forces Treaty (INF) or about the future of the Strategic Arms Reduction Treaty (START); since war would simply never happen because of MAD. For powerful that this concept is as a paradigm to understand the strategic equilibrium between nuclear-armed powers, it is important to remind that **MAD is a model, not an irrefutable dogma.** Moreover, directly

excluding the worst-case scenario (nuclear war) means ignoring the risks that could lead to it; and a passive approach is exactly what leaves room for the worst to happen. Finally, all while being an effective interpretative model, MAD cannot fully depict reality. The reason is double fold.

First, **MAD is a model based on rationality and predictability, but reality is neither fully rational nor predictable.** Technical errors, misinterpretations, miscalculations, external factors or casual events may interfere and lead to an unexpected crisis; and even though the likelihood is low, they cannot be completely excluded and consequently ignored. The crisis scenario is an important one to consider, and it will be examined later more in detail. Here, the main point is that **while MAD is a very solid guarantee against a deliberate and pre-planned attack, it cannot fully ensure against an unforeseen event such as a crisis sparked by an external factor.**

Second, **if deterrence fails and war breaks out in spite of MAD due to the factors outlined above, then its logic might no longer be applicable.** MAD is a very powerful model to explain deterrence during peacetime; but it is not equally suitable to examine an armed conflict scenario between nuclear powers. This is an important distinction that is often overlooked. Normally, it is stated that in case war actually erupts, it will immediately escalate to the nuclear level. But if we apply the very logic of MAD, then we would conclude that nuclear weapons will never be used (unless the vital interest or the existence of the state are threatened); as it would result in the immediate defeat of both parties. The fact is that in such an unpredictable context it is impossible to determine in advance how things would actually evolve.

That said, the purpose of this paper is not to assess the validity of MAD and demonstrate what will happen in case a hypersonic missile

attack actually takes place, nor to determine which theoretical interpretations about the effects of these weapons on the strategic equilibrium is the most convincing. The aim here is to present various possible scenarios, each having different degrees of probability, but none of which can be excluded with certainty. As a matter of fact, it is impossible to determine and prove what would happen in such an eventuality, and discarding any given scenario is hazardous. In particular, as noted above, it is a disputable assumption to consider that a (hypersonic) attack would be immediately treated as a nuclear one on the basis of MAD and that, because of this, it would never occur in the first place. At the same time, this reasoning should not alight scaremongering and paranoia. It is just a necessary measure to maintain the critical spirit that is due when examining such complex and delicate issues.

In short, ***while the deployment of hypersonic missiles hardly modifies the existing nuclear balance, it is practically impossible to ascertain in advance how they would be treated in case of a real contingency such as a crisis, and consequently what the response will be.*** In this case, uncertainty is the only certain thing. Having clarified this, it is possible to proceed and examine under which conditions hypersonic weapons might actually be used.

The Conventional Use of Hypersonic Missiles

An important point that is often neglected when discussing the strategic implications of hypersonic missiles is that they are also conventional weapons. Yet, most analyses focus primarily on their impact on the nuclear balance. But in reality, it appears that such systems are primarily conceived for conventional strikes, not nuclear ones.

First of all, if hypersonic missiles were actually meant for carrying out nuclear attacks, it would be unclear why it was necessary to develop a new class weapons if they do not affect the existing strategic balance and bring no advantage to the power deploying them. Nuclear deterrence is already fully ensured by normal ballistic missiles; and while it is true that redundancy is a central element of deterrence because it ensures second-strike capabilities, it is already granted by the sheer number of land-based intercontinental ballistic missiles (ICBMs) and the existence of submarine-launched ballistic missiles (SLBMs). As such, developing a new category of weapons is not necessary. The ability of hypersonic missiles to bypass existing defences is not a justifying factor as well, because (as noted above) a large-scale attack carried out with normal ballistic missiles would be equally unstoppable.



Launch of an American ICBM.

Credits: Ringo Chiu/AFP/Getty Images. Source: [Stratfor](#).

Considering all this, it may seem unclear why the world's three leading military powers are investing so much resources in developing hypersonic missiles. The probable reason is that such weapons, while possibly being nuclear-capable, are not primarily meant for nuclear strikes. In the case of American systems, on the basis of the available information, they were never considered to be employed as nuclear weapons. The situation is different with Russian and Chinese hypersonic missiles, since they are declaredly capable of carrying nuclear warheads. Yet, this

is only a possibility, and they appear to have been essentially designed as conventional missiles for anti-ship roles. Moreover, this double conventional-nuclear profile is nothing new, as non-hypersonic cruise missiles capable of transporting both a conventional or a nuclear payload have been in service in various countries for decades; yet, their main purpose is not to perform nuclear strikes.

As such, hypersonic missiles in their various forms (HGVs or HCMs) are mainly conceived as substitutes and upgrades to existing cruise missiles and theatre ballistic missiles; especially those designed for anti-ship roles. So, *hypersonic missiles seem mainly conceived for non-nuclear operations of a relatively limited scale, notably interdiction and A2/AD.* Of course, the nuclear use remains possible, but it does not seem the primary intended purpose. Therefore, hypersonic missiles should not be automatically examined as nuclear assets, but rather as conventional weapons with nuclear capabilities. This is another reason why it would be wrong to apply the logic of MAD to the point of concluding that hypersonic missiles will never be used as this would immediately result in a nuclear retaliation: this scenario is possible, but not certain. Instead, given that such systems are first and foremost conventional weapons, it is legitimate to consider under which conditions they might *actually* be employed, an eventuality that should not be excluded and that raises indeed the risk of unintended nuclear escalation. In this regard, there is a particular scenario that is worth examining, namely a major crisis involving the US and Russia/China.

Hypersonic Missiles During a Crisis

The logic of MAD makes a deliberate and premeditated attack by a nuclear-armed state against another an extremely unlikely if not impossible eventuality. In general, **war between nuclear powers is a remote possibility because of MAD. Yet, as noted before, this possibility cannot and should not be ruled out completely.** Reality is complex and unpredictable, and an armed clash may still occur; and an **international crisis** is one of the circumstances that could lead to a similar outcome.

To understand the implications of this scenario and the consequences on the possible use of hypersonic missiles, it is first necessary to provide a **definition of crisis**¹⁴: *a situation where decision-makers perceive the combination of an external threat to basic values, a high probability of involvement in military hostilities, and finite time for response; resulting into elevate levels of stress.* This kind of scenario could materialize for various reasons, and does not necessarily imply a deliberate move of one state against the other, which is very unlikely to happen because of MAD. As a matter of fact, the crisis could be sparked by a casual event or by the initiative of a third-party actor. For example, China would probably react militarily if Taiwan decided to declare formal independence, thus obliging the US to intervene in defence of its ally and initiating a Sino-American crisis. This is the type of contingency during which (along with other assets) hypersonic missiles could be used. As a matter of fact, this scenario corresponds to the intended use of such systems. From China's perspective, they would be ideal assets for an A2/AD strategy aimed at blocking US carrier battle group operations (submarines excepted); whereas

¹⁴ Brecher, Michael. "Decision in crisis: Israel, 1967 and 1973"; University of California press, 1980, page 1.

on America's side they would be suited to strike the enemy's Command, Control, and Communication (C3) centres, air and naval bases, and other strategic facilities in the context of an interdiction strategy to undermine the opponent's warfighting capabilities.



American B-52 strategic bomber carrying a X-51 Waverider experimental hypersonic aircraft.

Credit: Bobbi Zapka / US Air Force / Handout. Source [DefesaNet](https://www.defesa.net).

This brings to the central point about the risks of actually using hypersonic missiles in a similar contingency. Given the considerable challenge of intercepting them, their destructive power, and most importantly the short reaction notice they leave due to their speed, **such weapons are suitable for delivering a rapid, decisive blow to hamper the enemy's ability to fight.** However, this logic has potentially destabilizing implications in a crisis context. A report by the RAND Corporation¹⁵ notes that the extremely high speed and manoeuvring capabilities make of hypersonic missiles "a new class of threat" and that such features enable them to "further compress the timelines for response by a nation under attack". Now, this is an important point to be considered in the context of how a crisis affects the decision-making process. **In a crisis situation we**

¹⁵ Speier, Richard H.; Nacouzi, George; Lee, Carrie; Moore, Richard M. "Hypersonic Missile Nonproliferation: Hindering the Spread of a New Class of Weapons" (Key Finding); RAND Corporation, 2017; last access December 30, 2018. https://www.rand.org/pubs/research_reports/RR2137.html

cannot and should not assume that decision-makers will behave in a completely rational way. On the contrary, under similar circumstances the rationality of the decision-making process is reduced as perceptions are distorted and leaders unconsciously employ mental shortcuts to interpret a complex and fast-changing reality in a simple way in order to hasten their decisions. **Faced with the threat of a rapid, powerful and virtually unstoppable hypersonic attack, decision-makers may well conclude that the only solution is to launch a pre-emptive strike in order to gain an immediate decisive advantage and/or to prevent the enemy from obtaining it by attacking first;** and due to their high speed, hypersonic missiles would be the ideal assets in this sense (even though other systems may be used as well). If both powers have hypersonic missiles, the perceived threat will appear even more urgent; due to their ability to be used to deliver a rapid and devastating strike. **This logic may realistically lead to an escalation and then to a full-fledged war between great powers;** and considering the uncertainty over the conventional or nuclear nature of the hypersonic attack, there is a real risk that the crisis could degenerate into a nuclear exchange. Under normal conditions, no country in the world "would be so suicidal that it would even think threatening to use—not to mention to actually use—hypersonic weapons against the United States"¹⁶, but also against Russia or China. **However, in the case of great powers involved in a high-tension crisis where perceptions are distorted and there is not enough time and information to properly assess the situation, decisions are not taken in a fully rational way and hypersonic missiles might be used in the hope of**

¹⁶ Raitasalo, Jyri. "Hypersonic Weapons are No Game-Changer"; The National Interest; January 5, 2019; last access January 9, 2019. <https://nationalinterest.org/blog/buzz/hypersonic-weapons-are-no-game-changer-40632>

undermining the enemy's warfighting capabilities without crossing the threshold that would trigger a nuclear retaliation.

As noted above, it is impossible to determine in advance how events would unfold under such conditions due to ambiguity and to the risks it generate, and we cannot and should not exclude any scenario. In the case of a hypothetical US-China crisis over Taiwan or analogous contingencies, it is practically certain that a *large-scale* hypersonic strike would be considered as a nuclear attack, thus sparking a nuclear response. But the situation is more blurred in the case of a *relatively limited* strike with a *specific* objective (for instance, destroying a US carrier battle group or China's Command & Control centres); as this kind of attack would likely be carried out with conventional warheads. This is more logical, as the strategic objective of the strike would be to obtain a decisive advantage on the enemy without provoking a nuclear retaliation.

It is also true that other assets could be used by either side for delivering a rapid blow to disrupt the enemy's ability to operate, thus pushing both of them into a preemptive strike logic that would escalate the crisis. This is notably the case of submarines, which can furtively approach the target and launch salvos of cruise missiles or even SLBMs. Compared to hypersonic missiles, the former are relatively easier to intercept and therefore less effective as a mean to ensure a decisive advantage on the enemy. On their part, SLBMs exist mainly to ensure second-strike nuclear retaliation capabilities and are not intended for first use; even though it remains possible. But in such case they would be surely armed with nuclear warheads and consequently treated as such. Therefore, they are not suitable assets for a first strike conceived to

gain an immediate advantage, as their use would trigger a nuclear response.

With hypersonic missiles, the situation is more ambiguous. If it is true that the US is developing such systems as conventional-only weapons, this (in theory) eliminates the problem of ambiguity. But for this very reason, **American hypersonic assets would be even more prone to be used for preemptive strikes, thus raising fear in potential target countries and triggering the escalatory logic described above.** On their part, Russian and Chinese hypersonic missiles are both nuclear-capable. Still, they are mainly designed as anti-carrier weapons to be employed on a theatre scale as A2/AD assets, and they can effectively perform this role also with conventional warheads. So, it is more reasonable that they would be employed as conventional weapons to avoid a nuclear escalation; even though the problem of ambiguity persists.

It should be underlined that ***hypersonic missiles could have destabilizing effects not much because they increase the likelihood of a crisis, but because they would make it more acute and favour an escalatory logic in case a crisis occurs in the first place.*** An article published on the *Strategic Studies Quarterly* of the US Air Force also supports this thesis¹⁷. Examining the case of a US-China confrontation, the author notes that thanks to their precision, high survivability and low cost, hypersonic assets are useful for both China's A2/AD doctrine and for America's strategy to counter it by targeting enemy Command & Control centres from outside the A2/AD "bubble". The main objective of both powers is to deter the adversary, while defeating it in battle comes only if dissuasion fails. However, either side has "embraced an equally offensive operational thinking" to ensure deterrence; considering a possible escalation as a limited event capable of granting victory

¹⁷ Ekmektsioglou, Eleni. "Hypersonic Weapons and Escalation Control in East Asia"; *Strategic Studies Quarterly*; Summer 2015, last access December 30,

2018.
https://www.airuniversity.af.edu/Portals/10/SSQ/documents/Volume-09_Issue-2/ekmektsioglou.pdf

by hampering the adversary's ability and willingness to fight¹⁸. But this is a risky assumption, because the escalation may easily get out of control and result into a large-scale war: as the author states, such operational use of hypersonic weapons "might have deleterious consequences, forcing both parties into a highly escalatory conflict"¹⁹. For this reason, the article argues that the use of hypersonic missiles should be assessed in and governed by a crisis management logic rather than in a warfighting one. Mentioning another RAND report²⁰, which notes that conventionally-armed ballistic missiles can lead to an escalation by raising fears of an imminent surprise attack, she also concludes that "[g]iven hypersonic weapons' comparative greater reach than ballistic missiles and the weapons' higher speed, the RAND findings apply in their case to an even greater degree".

Again, **this does not necessarily mean that hypersonic missiles will indeed have destabilizing effects in the case of a crisis**, and it does not allow to foresee whether it will turn nuclear or not. The actual employment in a real crisis scenario depends on various factors, many of which are non-rational or casual. But exactly because of this, it shows that **there are risks associated with hypersonic systems in a similar context, which should be taken into account by strategist and decision-makers alike.**

Conclusion: Key Findings on the Strategic Effects of Hypersonic Missiles

The world's top three military powers (the United States, Russia and China) are all developing hypersonic missiles, both in the form of HGVs or HCMs. These systems can travel at speeds equal or superior to five times the speed of sound (Mach 5), and are therefore almost impossible to intercept. Hypersonic missiles can be armed with both conventional or nuclear warheads, and this raises the problem of ambiguity: it is impossible to know which kind of payload they are carrying before they hit the target.

On the basis of the available information, American systems will be exclusively conventional; whereas Russian and Chinese ones will also be nuclear-capable. Yet, they are mainly conceived as Anti-Access / Area Denial (A2/AD) assets to disrupt the operational capabilities of US carrier battle groups in order to deter American interventions in the case of a contingency. As such, *it is reasonable to believe that hypersonic missiles would be used with conventional payloads to avoid a nuclear escalation; but the ambiguity problem persists.*

Their extremely high-speed notwithstanding, *hypersonic missiles do not alter the global strategic equilibrium based on Mutual Assured Destruction (MAD) and their existence does not make war more likely.* A large-scale attack performed with ordinary intercontinental ballistic missiles would be equally unstoppable, and there are other weapons (such as cruise missiles) that are also

¹⁸ *Ibidem*, page 57.

¹⁹ *Ibidem*, page 58.

²⁰ *Ibidem*, page 59.

The RAND report she refers to is the following:
Morgan, Forrest E. "Crisis Stability and Long-Range

Strike: A Comparative Analysis of Fighters, Bombers, and Missiles"; RAND Corporation, 2013; last access December 30, 2018.

<https://www.rand.org/pubs/monographs/MG1258.html>

affected by the ambiguity problem but did not alter the strategic balance. So, MAD's logic still applies and it represents a very strong deterrent against the eventuality of a conflict between nuclear-armed powers. Under normal circumstances no nuclear state would attack another out of fear of a nuclear retaliation; and because of this, hypersonic missiles would never be used to attack another country.

Yet, ***war remains possible because unforeseen events might trigger a crisis that could eventually degenerate into full-scale armed conflict in spite of MAD.*** Under such conditions, hypersonic missiles might push the two parties to escalatory moves; especially if both possess such systems. One side may decide to use hypersonic missiles for a first strike in order to immediately undermine the enemy's warfighting capabilities. Alternatively, out of fears of suffering such a sudden and debilitating attack, either side may decide to launch a preemptive attack (with hypersonic weapons or other assets). In both cases, this would escalate the crisis and could result into an unintended and possibly nuclear war. As such, ***hypersonic missiles may lead to an escalatory logic during a crisis.*** Even though this option would be too risky to be considered under

ordinary conditions, it is important to remind that ***in a crisis context marked by stress and distorted perception the decision-making process is not fully rational.***

For what concerns the possible nuclear escalation, MAD is not appropriate to predict whether nuclear weapons (ordinary or hypersonic) will be used or not. MAD is meant to ensure deterrence; but if this fails and war breaks out, then the scenario become very unpredictable. According to the very principles of MAD, it is even more reasonable to state that nuclear weapons will *not* be used, unless the state's vital interests or its existence are threatened. Yet, ***it is impossible to determine in advance what would happen in such a complex and rapidly-changing scenario.***

Finally, hypersonic missiles are not the only weapons alighting this escalatory dynamic; but they are certainly among the most important. As such, ***the main destabilizing effect of hypersonic missiles is that, in case of a crisis, they increase the likelihood that an escalation will actually occur;*** and this could have devastating consequences. Because of this, decision-makers should be well aware of this in the case a major crisis takes place, especially in today's tense international scene.



Artistic rendering of a hypersonic missile.

Source: [The National Interest](#).