

# REPORT DOCUMENTATION PAGE

*Form Approved*  
OMB No. 0704-0188

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<b>1. REPORT DATE (DD-MM-YYYY)</b> 05-05-2023			<b>2. REPORT TYPE</b> FINAL		<b>3. DATES COVERED (From - To)</b> N/A	
<b>4. TITLE AND SUBTITLE</b> Don't Believe the 'Hype':  Nuclear Hypersonic Weapons are Not Destabilizing			<b>5a. CONTRACT NUMBER</b> N/A		<b>5b. GRANT NUMBER</b> N/A	
			<b>5c. PROGRAM ELEMENT NUMBER</b> N/A		<b>5d. PROJECT NUMBER</b> N/A	
			<b>5e. TASK NUMBER</b> N/A		<b>5f. WORK UNIT NUMBER</b> N/A	
<b>6. AUTHOR(S)</b> Thomas M. Tauer			<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b>  Writing & Teaching Excellence Center Naval War College 686 Cushing Road Newport, RI 02841-1207		<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b> N/A	
<b>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b>  N/A			<b>10. SPONSOR/MONITOR'S ACRONYM(S)</b> N/A		<b>11. SPONSOR/MONITOR'S REPORT NUMBER(S)</b> N/A	
<b>12. DISTRIBUTION / AVAILABILITY STATEMENT</b> Distribution Statement A: Approved for public release; Distribution is unlimited.						
<b>13. SUPPLEMENTARY NOTES</b> A paper submitted to the faculty of the NWC in partial satisfaction of the requirements of the curriculum. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.						
<b>14. ABSTRACT</b>  China and Russia have both developed hypersonic weapons capable of delivering nuclear payloads to targets within the United States. These hypersonic systems challenge U.S. defensive capabilities using speed, maneuverability, and a unique flight profile. Many believe these novel weapons will compromise strategic stability between the U.S., China, and Russia. They site three features of hypersonic weapons as destabilizing: 1) the capability to penetrate U.S. defense networks, 2) the potential to threaten a U.S. robust second strike, and 3) the potential for inadvertent escalation due to dual-use ambiguity. In fact, the fielding and proliferation of Russian and Chinese nuclear hypersonic weapons are not destabilizing for strategic balance. The U.S. is already vulnerable to existing Chinese and Russian ballistic missiles, and therefore hypersonic weapons do not introduce a new vulnerability. Hypersonic weapons do not threaten a U.S. robust second-strike capability because of the resilient nuclear triad structure. Finally, the dual-use nature of Chinese and Russian hypersonic weapons is not destabilizing because it does not change the existing status quo.						
<b>15. SUBJECT TERMS (Key words)</b> Hypersonic; DF-ZF; Avangard; Strategic Stability; Nuclear deterrence; Dual-use; Second-strike						
<b>16. SECURITY CLASSIFICATION OF:</b>			<b>17. LIMITATION OF ABSTRACT</b> N/A	<b>18. NUMBER OF PAGES</b>	<b>19a. NAME OF RESPONSIBLE PERSON</b> Director, Writing Center	
<b>a. REPORT</b> UNCLASSIFIED	<b>b. ABSTRACT</b> UNCLASSIFIED	<b>c. THIS PAGE</b> UNCLASSIFIED			<b>19b. TELEPHONE NUMBER (include area code)</b> 401-841-6499	

**Don't Believe the 'Hype':  
Nuclear Hypersonic Weapons Are Not Destabilizing**



Date Submitted: 5 May 2023

Word Count: 3,500

A paper submitted for consideration in the Naval War College Essay Competition.

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The contents of this paper reflect the author's own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

## INTRODUCTION

On 1 October 2019, the Chinese Communist Party held a grand military parade in Tiananmen Square to celebrate the 70<sup>th</sup> anniversary of its establishment.<sup>1</sup> Among the rows and columns of capabilities on display was the DF-ZF hypersonic weapon mounted atop the DF-17 medium-range missile (see Figure 1). The DF-ZF, declared operational that day, was the first of its kind for China but not the only one used by adversaries of the United States. Less than three months later, Russia's Avangard entered combat duty joining the Russian Kinzhal weapon, which had been in the field for two years.<sup>2</sup> These nuclear-capable hypersonic weapons represent a novel threat to population centers and strategically important nodes throughout the United States.<sup>3</sup>



Figure 1. DF-ZF Hypersonic Weapon Mounted on DF-17 (Photo from Center for Strategic & International Studies Missile Database, <https://missilethreat.csis.org/missile/df-17/>)

Hypersonic weapons challenge defensive systems using speed, maneuverability, and a unique flight profile. These air vehicles travel at greater than five times the speed of sound –

<sup>1</sup> Mike Ives, "In Pictures: China's National Day Parade Features Pomp and Artillery," *New York Times*, 1 October 2019, <https://www.nytimes.com/2019/10/01/world/asia/china-national-day-parade.html>.

<sup>2</sup> Paul Bernstein and Harrison Menke, "Russia's Hypersonic Weapons," *Georgetown Journal of International Affairs*, 12 December 2019, <https://gija.georgetown.edu/2019/12/12/russias-hypersonic-weapons/>.

<sup>3</sup> Paige P. Cone, "Assessing the Influence of Hypersonic Weapons on Deterrence," *United States Air Force Center for Strategic Deterrence Studies, Future Warfare Series*, no. 59 (June 2019): 9.

covering more than 100 km per minute<sup>4</sup> – and can maneuver en route to their target.<sup>5</sup>

Hypersonic systems currently have two variants: Hypersonic Glide Vehicles (HGVs) and Hypersonic Cruise Missiles (HCMs).<sup>6</sup> Both weapons are launched with a rocket booster to accelerate them to speed before separating. HGVs use that energy to glide to their target, while HCMs use a scramjet engine to propel them after separation.<sup>7</sup> All currently fielded hypersonic weapons are HGVs; however, development work on HCMs is ongoing.<sup>8</sup> The combination of speed and a relatively low-altitude profile means that U.S. defenses will likely only have one intercept attempt on such a weapon.<sup>9</sup> Vehicle maneuverability makes that intercept further unlikely to be successful. While the potential use of Russian and Chinese hypersonic weapons is alarming, assessing their impact on strategic stability requires more careful consideration.

The concept of strategic stability grew out of the Cold War to describe the incentives for nuclear war between the United States and the Soviet Union.<sup>10</sup> When each nation had only a small number of weapons, the strategic balance was unstable due to the strong incentive to initiate a first strike.<sup>11</sup> Launching a nuclear attack could cripple the victim and leave them unable to respond. Over time each nation developed methods to ensure its ability to prosecute a nuclear retaliation. These efforts included hardening missile silos, creating mobile missile

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<sup>4</sup> This paper will use kilometers for all distances as the capabilities of most weapons and defensive systems are described in source documents using kilometers. One kilometer is equal to 0.62 statute miles or 0.54 nautical miles.

<sup>5</sup> Kelley M. Saylor, “Hypersonic Weapons: Background and Issues for Congress,” *Congressional Research Service*, 13 February 2023, 6, <https://crsreports.congress.gov/product/details?prodcode=R45811>.

<sup>6</sup> Saylor, ““Hypersonic Weapons: Background and Issues for Congress,” 6.

<sup>7</sup> Saylor, ““Hypersonic Weapons: Background and Issues for Congress,” 6.

<sup>8</sup> Corinne Kramer, “U.S. Hypersonic Weapons and Alternatives,” *Congressional Budget Office*, 14, <https://www.cbo.gov/publication/58255>.

<sup>9</sup> Bruce M. Sugden, “Analyzing the Potential Disruptive Effects of Hypersonic Missiles on Strategy and Joint Warfighting,” *Joint Forces Quarterly*, March 2022, 8, <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/2884204/analyzing-the-potential-disruptive-effects-of-hypersonic-missiles-on-strategy-a/>.

<sup>10</sup> Matt Gilbert, “When Should We Care About New Technology in the Nuclear Domain?: Assessing Emerging Technologies Impacts on Stability,” *Sandia National Laboratories*, 2, <https://www.osti.gov/servlets/purl/1826457>.

<sup>11</sup> Gilbert, “When Should We Care About New Technology in the Nuclear Domain?,” 2.

systems, putting bombers on alert, and increasing the number of nuclear warheads available.<sup>12</sup>

Once both nations had a credible second-strike capability, they were forced to seek peaceful resolutions or risk their mutual destruction. The change in incentives made the strategic balance stable.

Many believe that introducing a unique nuclear delivery capability will upset this balance. These overwrought onlookers principally cite three features of hypersonic weapons as destabilizing: 1) the capability to penetrate U.S. defense networks, 2) the potential to threaten a U.S. robust second strike, and 3) the potential for inadvertent escalation due to dual-use ambiguity. While based on *accurate* information about hypersonic systems, these arguments reach *false* conclusions. In fact, **the fielding and proliferation of Russian and Chinese nuclear hypersonic weapons are *not* destabilizing for the strategic balance between Russia, China, and the United States.** The following three sections will present each of the false claims for strategic instability. Those myths are collated with arguments detailing why each of those three concerns fails to change the strategic balance.

### **CAPABILITY TO PENETRATE DEFENSE NETWORKS IS NOT DESTABILIZING**

Some claim that hypersonic weapons' capability to penetrate U.S. defenses makes them destabilizing. The increased likelihood of successfully reaching and destroying vital strategic targets could embolden nations using nuclear hypersonic weapons to pursue a nuclear first strike.<sup>13</sup> A successful first strike on sufficient critical targets could force the United States to surrender rather than seek a second strike. For those attacks on American targets to be

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<sup>12</sup> Gilbert, "When Should We Care About New Technology in the Nuclear Domain?," 2.

<sup>13</sup> Stephen Reny, "Nuclear-Armed Hypersonic Weapons and Nuclear Deterrence," *Strategic Studies Quarterly*, March 2020, vol 14, no 4, 60, <https://www.jstor.org/stable/26956152#>.

successful, they would first have to evade a network of U.S. Ballistic Missile Defense (BMD) systems.

Concerned scholars assert that hypersonic weapons' effectiveness incentivizes China and Russia to initiate a nuclear first strike. Weapons like the DF-ZF and Avangard are nearly invulnerable to top-tier U.S. missile defense. The first component of this upper-level defense is the Ground-based Midcourse Defense (GMD) system which employs long-range Ground-Based Interceptors (GBI) out of Fort Greely, Alaska, and Vandenburg Air Force Base, California.<sup>14</sup> GMD is designed to intercept Intercontinental Ballistic Missiles (ICBMs) during the predictable portion of their flight outside the Earth's atmosphere.<sup>15</sup> These long-range interceptors can reach ICBMs inbound to the United States. Also in the upper tier is the Aegis BMD installed on Navy Aegis cruisers and destroyers. These ships employ the exo-atmospheric Standard Missile (SM)-3.<sup>16</sup> The unique trajectory of hypersonic weapons places them *within* the Earth's atmosphere for most of their flight profile, outside the engagement envelope of both these U.S. BMD systems.<sup>17</sup> Flying in a region where they are predominantly invulnerable to exo-atmospheric interceptors, hypersonic weapons need only evade the middle and lower-tier defense systems.

The remaining components of U.S. missile defense systems are limited in capacity and range, further incentivizing an adversary to make a nuclear first strike. The middle and lower tiers of the U.S. missile defense network include Terminal High Altitude Area Defense

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<sup>14</sup> Stephen M. McCall, "Defense Primer: Ballistic Missile Defense," *Congressional Research Service*, 23 November 2022, 1, <https://crsreports.congress.gov/product/details?prodcode=IF10541>.

<sup>15</sup> McCall, "Defense Primer: Ballistic Missile Defense," 2.

<sup>16</sup> Missile Defense Project, "Standard Missile-3 (SM-3)," *Missile Threat*, Center for Strategic and International Studies, June 14, 2016, last modified March 9, 2023, <https://missilethreat.csis.org/defsys/sm-3/>.

<sup>17</sup> Ryan Kuhns, "U.S. Options for Nuclear Deterrence in the Hypersonic Era," *Center for Strategic and International Studies*, January 2019, 90, <http://www.jstor.com/stable/resrep22545.11>.

(THAAD) and Patriot Advanced Capability (PAC)-3, respectively.<sup>18</sup> These shorter-range systems (less than 200 km) must reside near the specific defended area. The U.S. Army has seven THAAD batteries globally, each with 48-72 interceptors.<sup>19</sup> These systems are only effective in the area they are placed to defend and could rapidly become depleted if an adversary chooses to precede a hypersonic attack with salvos of conventional cruise missiles. The ineffectiveness of top-tier defenses paired with limited range and magazine of lower-tier systems allow Russia or China the opportunity to prosecute a nuclear attack on strategically essential targets. However, this claim of fresh vulnerability fails to consider the status quo with existing ballistic missiles.

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The argument that the improved survivability of nuclear hypersonic weapons makes them destabilizing is invalid because it fails to acknowledge the pre-existing U.S. vulnerability to Chinese and Russian ballistic missiles. Joseph Stalin once quipped, “Quantity has a quality all its own.”<sup>20</sup> In the context of World War Two, Stalin was referring to the sheer quantity of troops and weapons that the Soviet Union could bring to bear against the technologically superior German forces. The value of volume still applies today when considering nuclear weapons. Russia has more nuclear warheads than any nation on Earth, with 5,977 under Vladimir Putin’s control.<sup>21</sup> China has a comparatively modest 350 nuclear warheads; however, the People’s

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<sup>18</sup> McCall, “Defense Primer: Ballistic Missile Defense,” 2.

<sup>19</sup> Jonathan P. Dial, Rebecca Nortz, Brandon D. Jay, and James B. Johnson, “HYPERsonic Missiles: The Path of Temptation,” *Wild Blue Yonder Online Journal*, 15 July 2022, 4, <https://www.airuniversity.af.edu/Wild-Blue-Yonder/Article-Display/Article/3063666/hypersonic-missiles-the-path-of-temptation/>.

<sup>20</sup> Goodreads, “Joseph Stalin Quotes,” <https://www.goodreads.com/quotes/795954-quantity-has-a-quality-all-its-own>.

<sup>21</sup> Emily Washburn, “Russia Has the Most Nuclear Weapons in the World – Here Are the Other Countries With the Largest Nuclear Arsenals,” *Forbes*, 24 February 2023, <https://www.forbes.com/sites/emilywashburn/2023/02/24/russia-has-the-most-nuclear-weapons-in-the-world-here-are-the-other-countries-with-the-largest-nuclear-arsenals/?sh=485984ba9300>.

Republic of China (PRC) controls far more nuclear-capable missiles that it could use to saturate U.S. defenses.<sup>22</sup> In February 2023, Strategic Command indicated that China’s ICBM launchers now outnumber U.S. totals.<sup>23</sup> In addition to land-based ballistic missiles, China and Russia have six and eleven submarines, respectively, capable of launching ICBMs from unpredictable locations around the globe.<sup>24</sup> The volume of ballistic nuclear weapons that China and especially Russia can bring to bear presents the United States with a profound targeting problem that the current defense network capacity cannot handle.

The top tier of United States missile defense is not adequate to address the volume of nuclear weapons Russia or China could bring to bear, and therefore hypersonic nuclear weapons do not add a novel vulnerability that destabilizes strategic balance. The GMD and Aegis systems already discussed are low-density assets. The Missile Defense Agency operates 44 GBI missiles across the two GMD sites.<sup>25</sup> Aegis cruisers and destroyers share 265 SM-3 weapons across the fleet.<sup>26</sup> When considering the number of nuclear-tipped missiles and decoys that an adversary could launch, it is clear that the U.S. was vulnerable to these weapons before the advent of hypersonic systems. The Department of Defense acknowledges as much in the 2022 Missile Defense Review. “GMD is neither intended for, nor capable of defeating the large and sophisticated, ICBM, air-, or sea-launched ballistic missile threats from Russia and the PRC. The United States relies on strategic deterrence to address those threats.”<sup>27</sup> Hypersonic weapons

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<sup>22</sup> Kelsey Davenport, “Nuclear Weapons: Who Has What at a Glance,” *Arms Control Association*, January 2022, <https://www.armscontrol.org/factsheets/Nuclearweaponswhohaswhat>.

<sup>23</sup> Bryant Harris, “China Surpasses U.S. in Number of ICBM Launchers,” *Defense News*, 7 February 2023, <https://www.defensenews.com/congress/2023/02/07/china-surpasses-us-in-number-of-icbm-launchers/>.

<sup>24</sup> Nuclear Threat Initiative, “China Submarine Capabilities,” *Submarine Proliferation Resource Collection*, 6 March 2023, <https://www.nti.org/analysis/articles/china-submarine-capabilities/>.

<sup>25</sup> Missile Defense Agency, “Fact Sheet: Ground Based Midcourse Defense,” 15 December 2022, <https://www.mda.mil/system/gmd.html>.

<sup>26</sup> Missile Defense Project, “Standard Missile-3 (SM-3).”

<sup>27</sup> U.S. Secretary of Defense, *National Defense Strategy of the United States of America: Missile Defense Review* (Washington, DC: White House, 2022), 6.

represent a new nuclear delivery platform but not a new level of vulnerability for the United States. There is no reason why a country that already possessed the nuclear stockpiles that China and Russia have would suddenly consider a nuclear first strike based solely on the availability of hypersonic delivery options.

Finally, vulnerability to a nuclear first strike for a nation with a robust second-strike capability *stabilizes* rather than destabilizes. Thomas Shelling, widely considered the father of deterrence theory, advocated for mutual vulnerability.<sup>28</sup> He theorized that strategic stability between any two nuclear powers with a second-strike capability required each to be vulnerable to attack from the other.<sup>29</sup> When both parties recognize that any conflict will come with disastrous consequences for themselves, they are incentivized to cooperate and settle disputes peacefully. Even if one were to believe the claim that hypersonic nuclear weapons represented a novel capability enabling a highly effective first strike, Shelling's theory categorizes that as *stabilizing* rather than the opposite. Adding offensive capabilities only adds to mutual vulnerability and enhances strategic stability.

### **NOT A THREAT TO U.S. ROBUST SECOND-STRIKE**

The arguments made in the preceding section assume that the United States has a "robust second-strike" capability. A robust second strike is an ability to withstand a first-strike nuclear attack and retain the power to launch a sufficient nuclear retaliation to devastate the aggressor.<sup>30</sup> Without that level of resiliency, the concepts of mutual vulnerability are no longer valid, and an aggressor is incentivized to make a first strike. The nuclear theorist Albert Wohlstetter

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<sup>28</sup> Thomas Shelling, *Arms and Influence* (New Haven: Yale University Press, 1966), 42.

<sup>29</sup> Shelling, *Arms and Influence*, 42.

<sup>30</sup> Reny, "Nuclear-Armed Hypersonic Weapons and Nuclear Deterrence," 49.

supported nuclear vulnerability as described by Shelling but asserted that it must be underpinned by a robust second strike with six characteristics.<sup>31</sup> Those include: “(1) be reliable, affordable, and sustainable; (2) survive enemy attack; (3) make and communicate the decision to retaliate; (4) reach enemy territory with enough fuel to complete the mission; (5) penetrate the enemy’s active defenses; and (6) destroy the target despite passive defenses.”<sup>32</sup> Some argue that nuclear hypersonic weapons undermine the architecture necessary for a U.S. second strike and destabilize strategic balance. Proponents of this view say that hypersonic weapons reduce reaction time and increase target ambiguity, both threatening a robust second strike.

Those advocates hold that the unique flight profile and maneuverability of nuclear hypersonic weapons result in delayed detection and reduced response time compared to ballistic missiles, compromising strategic stability. Hypersonic weapons fly at relatively low altitudes compared to ballistic missiles’ trajectories.<sup>33</sup> This profile takes advantage of the curvature of the Earth to hide the weapon from detection until it is much closer to the target. For example, a hypersonic boost-glide weapon launched 3,000 km from its target would remain below the radar’s horizon at its apogee and stay there throughout the flight until approximately 850 km.<sup>34</sup> By comparison, a ballistic missile launched from the same range would be visible very quickly after launch during its initial ascent and remain visible for the duration of its flight (See Figure 2).<sup>35</sup> Later detection reduces the time available to decide on a retaliatory strike. That response time is also necessary for moving assets needed for a second strike, such as launching alert bombers and evacuating key personnel to safety.

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<sup>31</sup> Reny, “Nuclear-Armed Hypersonic Weapons and Nuclear Deterrence,” 49.

<sup>32</sup> Reny, “Nuclear-Armed Hypersonic Weapons and Nuclear Deterrence,” 49.

<sup>33</sup> Kramer, “U.S. Hypersonic Weapons and Alternatives,” 34.

<sup>34</sup> Kramer, “U.S. Hypersonic Weapons and Alternatives,” 32.

<sup>35</sup> Kramer, “U.S. Hypersonic Weapons and Alternatives,” 32.

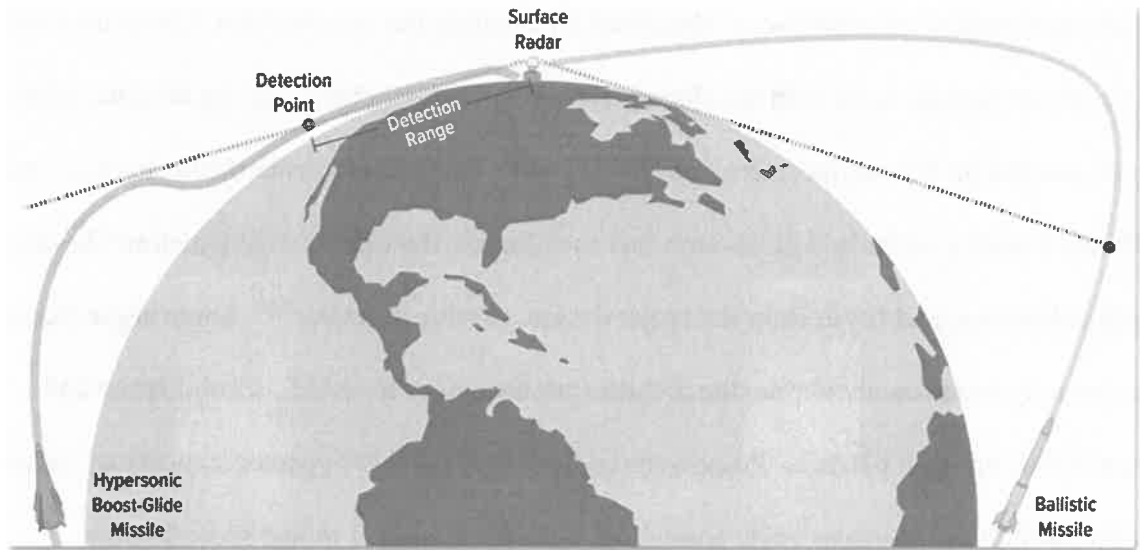


Figure 2. Comparison of Hypersonic Boost-Glide and Ballistic Missile Profiles (Graphic from Congressional Budget Office, “U.S. Hypersonic Weapons and Alternatives,” January 2023, 32, <https://www.cbo.gov/publication/58255>.)

Hypersonic systems further threaten a robust second-strike capability with their ability to maneuver in flight. Once established on their glide phase within the Earth’s atmosphere, hypersonic weapons can turn to make their destination almost impossible to predict.<sup>36</sup> By comparison, the target of a ballistic missile is easily determined by the rocket's trajectory since it has very little ability to maneuver after the booster burns out.<sup>37</sup> Even maneuverable reentry vehicles on ballistic missiles can only change their trajectory a few tens of kilometers, making the general target area obvious shortly after launch.<sup>38</sup> Without knowledge of the weapons’ target area, the U.S. would struggle to protect critical resources and personnel necessary for a second strike. While the operational characteristics of hypersonic weapons pose unique challenges, they

<sup>36</sup> Michael T. Klare, “An Arms Race in Speed,” *Arms Control Today*, vol 49, no 5, June 2019, 11, <https://www.jstor.org/stable/26755134>.

<sup>37</sup> Kramer, “U.S. Hypersonic Weapons and Alternatives,” 17.

<sup>38</sup> Kramer, “U.S. Hypersonic Weapons and Alternatives,” 17.

do *not* threaten the United States' ability to make a robust second strike and are, therefore, *not* destabilizing.

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The United States can detect the missile launch and will, therefore, still have approximately the same time to respond as with a ballistic missile. The U.S. currently employs space-based missile warning systems that detect launches. This Space Based Infrared System can recognize missile launch indications associated with the boost phase of the boost-glide hypersonic weapons currently employed by China and Russia.<sup>39</sup> Even though the weapon would be difficult to track after booster burnout, the U.S. would still have time to react to the known threat of an inbound missile, even if they did not know the precise target. Protocols to scramble alert bombers and protect key personnel involved in launching a second strike do *not* require the specific target to be identified. Regardless of the target, they could be executed based on the known inbound threat.

The resilience of the U.S. nuclear triad ensures a robust second-strike capability and prevents adversary hypersonic weapons from threatening strategic stability. Modern ICBM silos, such as the 450 within the continental United States, are designed to withstand a nuclear blast.<sup>40</sup> Even if those weapons were disabled somehow, the U.S. also operates a fleet of B-52 and B-2 bombers that can be placed on nuclear alert when international tensions warrant.<sup>41</sup> Should the bombers be eliminated, the U.S. uses 14 Ohio-class ballistic missile submarines with 20 nuclear ICBMs each.<sup>42</sup> These submarines are extremely difficult to locate and even more

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<sup>39</sup> Missile Defense Project, "Space-based Infrared System (SBIRS)," *Missile Threat*, Center for Strategic and International Studies, August 11, 2016, last modified July 26, 2021, <https://missilethreat.csis.org/defsys/sbirs/>.

<sup>40</sup> U.S. Department of Defense, "America's Nuclear Triad," accessed 20 April 2023, <https://www.defense.gov/Multimedia/Experience/Americas-Nuclear-Triad/>.

<sup>41</sup> U.S. Department of Defense, "America's Nuclear Triad."

<sup>42</sup> U.S. Department of Defense, "America's Nuclear Triad."

difficult to target for an adversary. They offer another way for Washington to command a robust retaliatory second strike. Finally, any weapons used by the U.S. in a retaliatory strike would not have to contend with strong missile defense. Neither Russia nor China has a missile defense system capable of targeting a ballistic missile in midcourse.<sup>43</sup> This weakness means that U.S. missiles will reach the terminal phase of flight without the risk of being stopped by any BMD. Having demonstrated that adversary nuclear hypersonic weapons do *not* threaten the U.S.'s ability to retaliate, it is worth considering the role of those hypersonic capabilities from the Chinese and Russian perspectives.

Chinese and Russian nuclear hypersonic weapons also contribute positively to strategic stability when considering potential *United States* aggression. China and Russia have expressed that they fear the U.S. may initiate a nuclear-first strike to eliminate as much of their nuclear arsenal as possible.<sup>44</sup> Then, with significantly fewer weapons to use in retaliation, the United States could intercept any weapons used in a second strike on the U.S. This concern motivated China and Russia to develop nuclear hypersonic armaments to evade U.S. missile defenses and ensure a successful second strike.<sup>45</sup> While this likely sounds like bad news for residents of the United States, it is a positive influence on strategic stability. Because the U.S. has a missile defense network capable of defeating many incoming ballistic missiles, hypersonic weapons restore a robust second-strike capability for China and Russia, making them *less* likely to pursue a preemptive first-strike attack.

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<sup>43</sup> Kramer, "U.S. Hypersonic Weapons and Alternatives," 24.

<sup>44</sup> Tong Zhao, "What Are the Aims of U.S. Missile Defense?," *Carnegie-Tsinghua Center for Global Policy*, 29 June 2020, <https://carnegieendowment.org/2020/06/29/what-are-aims-of-u.s.-missile-defense-pub-82123>.

<sup>45</sup> Tong Zhao, "What Are the Aims of U.S. Missile Defense?"

## DUAL-USE HYPERSONIC WEAPONS DO NOT CHANGE THE STATUS QUO

A third attribute of China and Russia's hypersonic weapons presented as destabilizing is that they are "dual-use." Dual-use delivery systems can carry either conventional or nuclear warheads.<sup>46</sup> Some argue that ambiguity about whether the payload of a weapon is nuclear or conventional is an underappreciated and growing danger.<sup>47</sup> Not only would the actual launch of these weapons be ambiguous, but they can also contribute to escalation with pre-launch ambiguity.

Many believe dual-use weapons are destabilizing even before launch. Placing dual-use systems in a position to intimidate can be perceived as a nuclear threat and lead to escalation. An intelligence error demonstrated this phenomenon during the 1973 Yom Kippur War. The Central Intelligence Agency (CIA) received erroneous indications of radiation from a Soviet shipment to Egypt.<sup>48</sup> When analysts observed the offload of weapons from the vessel, they concluded that Soviet nuclear weapons had been transported to Egypt when the shipment contained only conventional weapons. This false positive, caused by an unreliable radiation detector, could have easily driven the U.S. to escalate the conflict based on a perceived nuclear threat to their ally Israel.<sup>49</sup> The false negative case is also dangerous. In the lead-up to the Cuban Missile Crisis, the Soviet Union shipped about 80 cruise missiles and their associated nuclear warheads to Cuba.<sup>50</sup> The CIA identified the missiles as being conventional. This error resulted in the U.S. initiating an invasion with a gross underestimate of Soviet power in the

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<sup>46</sup> James M. Acton, "Is it a Nuke?: Pre-launch Ambiguity and Inadvertent Escalation," Carnegie Endowment for International Peace, January 2020, 2, <https://carnegieendowment.org/2020/04/09/is-it-nuke-pre-launch-ambiguity-and-inadvertent-escalation-pub-81446>.

<sup>47</sup> Acton, "Is it a Nuke?," 1.

<sup>48</sup> Acton, "Is it a Nuke?," 4.

<sup>49</sup> Acton, "Is it a Nuke?," 44.

<sup>50</sup> Acton, "Is it a Nuke?," 29.

region.<sup>51</sup> Another way that these weapons could lead to escalation is if the U.S. were to prosecute a conventional attack on them. Even though they may also be conventional weapons, China or Russia might perceive this as an attack on their nuclear second-strike capability and retaliate with nuclear force. These examples illustrate the destabilizing effect that Chinese and Russian dual-use nuclear hypersonic weapons can have without ever being used.

Still, others contend the ambiguity of dual-use weapons further destabilizes the strategic balance after launch because the victim cannot assess proportionality. If U.S. sensors were to detect a Russian or Chinese hypersonic weapon headed toward the United States, there is currently no way to know if that attack is nuclear or conventional.<sup>52</sup> If an attack was conventional, it could inadvertently escalate to nuclear war because U.S. leaders may assume the inbound weapons are nuclear. Dual-use hypersonic weapons make proportionality even more troublesome because of their maneuverability. In addition to not knowing if the strike is nuclear or conventional, the victim cannot know with certainty what the target is until after impact. These factors harm strategic stability because if the United States cannot assess proportionality before a strike, the conflict is more likely to escalate to nuclear war. While the arguments against dual-use weapons may be sound for generic nuclear competition, they fail to consider the specific timeline of a U.S. response and the status quo of Chinese and Russian weapons.

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Dual-use hypersonic weapons do *not* impact strategic stability before launch because China and Russia already employ several dual-use weapon systems. China currently uses the

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<sup>51</sup> Acton, "Is it a Nuke?," 29.

<sup>52</sup> Carrie A. Lee, "Hypersonic Missiles, Strategic Stability, and the Future of Deterrence," NATO Defense College, June 2020, 30, <https://www.jstor.org/stable/resrep25147.9>.

DF-21 medium-range ballistic missile and the DF-26 intermediate-range ballistic missile.<sup>53</sup> Both of these weapons can carry either conventional or nuclear warheads.<sup>54</sup> Similarly, Russia uses the SS-21 and SS-26 short-range ballistic missiles as well as several cruise missiles that are all dual-use.<sup>55</sup> In addition to these land-based weapons, China and Russia operate long-range bombers capable of employing both conventional and nuclear weapons.<sup>56</sup> Claiming that the proliferation of weapons such as the DF-ZF and Avangard represent a destabilizing influence on strategic balance ignores the status quo. If China and Russia already field a significant number of dual-use systems, adding one more does not change strategic stability.

Dual-use hypersonic weapons do *not* threaten strategic stability after launch because the U.S. is incentivized to retaliate only after the weapons' effects are known. Early in the Cold War nuclear arms race between the U.S. and the Soviet Union, leaders needed to be ready to respond to a nuclear attack based solely on missile warning. Waiting to act until after the weapons had impacted threatened the nation's ability to retaliate.<sup>57</sup> However, today's U.S. nuclear triad is resilient to attack for the reasons discussed in the preceding section. With confidence that a robust second-strike capability will be available and profound uncertainty in proportionality, the U.S. is incentivized to attempt its best defense and assess the damage before counter-attack. The former commander of U.S. Strategic Command has acknowledged as much. General John Hyten confirmed that in the event of a potential incoming nuclear attack on the United States, his

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<sup>53</sup> Christopher J. Mihal, "Understanding the People's Liberation Army Rocket Force: Strategy, Armament, and Disposition," *Army University Press*, September 2021, <https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/China-Reader-Special-Edition-September-2021/Mihal-PLA-Rocket-Force/>.

<sup>54</sup> Ashish Dangwal, "Russia Says All Missile Units Rearmed With Nuke-Capable 'Modern and Unique' SS-26 Stone Tactical Missile System," *Eurasian Times*, 4 May 2023, <https://eurasianimes.com/ussia-re-arms-all-its-missile-units-with-modern-and-unique-iskander/>.

<sup>55</sup> Dangwal, "Russia Says All Missile Units Rearmed With Nuke-Capable 'Modern and Unique' SS-26 Stone Tactical Missile System."

<sup>56</sup> Acton, "Is it a Nuke?," 19.

<sup>57</sup> Gilbert, "When Should We Care About New Technology in the Nuclear Domain?," 2.

advice to the President would be to delay retaliation until the weapons had reached their targets or been intercepted.<sup>58</sup> “If we do have to respond, we want to respond in kind and not further escalate the conflict out of control.”<sup>59</sup> With a plan to fully assess proportionality before retaliating, dual-use weapons do *not* present a risk to strategic stability.

## CONCLUSION

This paper has addressed the three principal concerns of those who think nuclear hypersonic weapons are strategically destabilizing for the relationship between China, Russia, and the United States. In fact, the unique capabilities of these weapons do not alter the status quo. This finding has important implications for US senior leaders considering how best to defend America’s interests at home and abroad. Unsurprisingly, new threats invoke fear and compel a response. For the US to ignore hypersonic capabilities would certainly be folly as they will play an important role in future great power conflicts. However, the best response for the moment is to remain calm rather than become mired in a hypersonic arms race that does not serve US national interests.

The 19th-century novelist, Josiah Gilbert Holland, penned the phrase, “Calmness is the cradle of power.”<sup>60</sup> He intended his words as advice for young Americans. However, today they serve as a helpful guide for how the United States can retain its power in the face of modern threats.

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<sup>58</sup> Amanda Macias, “Here’s What the U.S. Should do if Russia Launches a Nuclear Attack, According to the Top American Nuclear Commander,” *CNBC*, 21 Mar 2018, <https://www.cnbc.com/2018/03/21/heres-what-us-should-do-if-russia-launched-nuclear-attack-gen-hyten.html>.

<sup>59</sup> Macias, “Here’s What the U.S. Should do if Russia Launches a Nuclear Attack”

<sup>60</sup> Josiah Gilbert Holland, *Titcomb’s Letters to Young People, Single and Married* (New York: Charles Scribner Press, 1858).

## BIBLIOGRAPHY

- Acton, James M. "Is it a Nuke?: Pre-launch Ambiguity and Inadvertent Escalation," Carnegie Endowment for International Peace, January 2020,  
<https://carnegieendowment.org/2020/04/09/is-it-nuke-pre-launch-ambiguity-and-inadvertent-escalation-pub-81446>.
- Bernstein, Paul, and Harrison Menke. "Russia's Hypersonic Weapons," *Georgetown Journal of International Affairs*, 12 December 2019, <https://gjia.georgetown.edu/2019/12/12/russias-hypersonic-weapons/>.
- Cone, Paige P. "Assessing the Influence of Hypersonic Weapons on Deterrence," *United States Air Force Center for Strategic Deterrence Studies, Future Warfare Series*, no. 59 (June 2019).
- Dangwal, Ashish. "Russia Says All Missile Units Rearmed With Nuke-Capable 'Modern and Unique' SS-26 Stone Tactical Missile System," *Eurasian Times*, 4 May 2023,  
<https://eurasianimes.com/ussia-re-arms-all-its-missile-units-with-modern-and-unique-iskander/>.
- Davenport, Kelsey. "Nuclear Weapons: Who Has What at a Glance," *Arms Control Association*, January 2022, <https://www.armscontrol.org/factsheets/Nuclearweaponswhohaswhat>.
- Dial, Jonathan P., Rebecca Nortz, Brandon D. Jay, and James B. Johnson. "HYPERsonic Missiles: The Path of Temptation," *Wild Blue Yonder Online Journal*, 15 July 2022,  
<https://www.airuniversity.af.edu/Wild-Blue-Yonder/Article-Display/Article/3063666/hypersonic-missiles-the-path-of-temptation/>.

Gilbert, Matt. "When Should We Care About New Technology in the Nuclear Domain?:"

Assessing Emerging Technologies Impacts on Stability," *Sandia National Laboratories*,  
<https://www.osti.gov/servlets/purl/1826457>.

Goodreads, "Joseph Stalin Quotes," <https://www.goodreads.com/quotes/795954-quantity-has-a-quality-all-its-own>.

Harris, Bryant. "China Surpasses U.S. in Number of ICBM Launchers," *Defense News*, 7  
February 2023, <https://www.defensenews.com/congress/2023/02/07/china-surpasses-us-in-number-of-icbm-launchers/>.

Holland, Josiah G. *Titcomb's Letters to Young People, Single and Married* (New York: Charles  
Scribner Press, 1858).

Ives, Mike. "In Pictures: China's National Day Parade Features Pomp and Artillery," *New York  
Times*, 1 October 2019, <https://www.nytimes.com/2019/10/01/world/asia/china-national-day-parade.html>.

Klare, Michael T. "An Arms Race in Speed," *Arms Control Today*, vol 49, no 5, June 2019,  
<https://www.jstor.org/stable/26755134>.

Kramer, Corinne. "U.S. Hypersonic Weapons and Alternatives," *Congressional Budget Office*,  
<https://www.cbo.gov/publication/58255>.

Kuhns, Ryan. "U.S. Options for Nuclear Deterrence in the Hypersonic Era," *Center for Strategic  
and International Studies*, January 2019, <http://www.jstor.com/stable/resrep22545.11>.

Lee, Carrie A. "Hypersonic Missiles, Strategic Stability, and the Future of Deterrence," NATO  
Defense College, June 2020, <https://www.jstor.org/stable/resrep25147.9>.

Macias, Amanda. "Here's What the U.S. Should do if Russia Launches a Nuclear Attack,  
According to the Top American Nuclear Commander," *CNBC*, 21 Mar 2018,

<https://www.cnbc.com/2018/03/21/heres-what-us-should-do-if-russia-launched-nuclear-attack-gen-hyten.html>.

McCall, Stephen M. "Defense Primer: Ballistic Missile Defense," *Congressional Research Service*, 23 November 2022, <https://crsreports.congress.gov/product/details?prodcode=IF10541>.

Mihal, Christopher J. "Understanding the People's Liberation Army Rocket Force: Strategy, Armament, and Disposition," *Army University Press*, September 2021, <https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/China-Reader-Special-Edition-September-2021/Mihal-PLA-Rocket-Force/>.

Missile Defense Agency, "Fact Sheet: Ground Based Midcourse Defense," 15 December 2022, <https://www.mda.mil/system/gmd.html>.

Missile Defense Project, "Space-based Infrared System (SBIRS)," *Missile Threat*, Center for Strategic and International Studies, August 11, 2016, last modified July 26, 2021, <https://missilethreat.csis.org/defsys/sbirs/>.

Missile Defense Project, "Standard Missile-3 (SM-3)," *Missile Threat*, Center for Strategic and International Studies, June 14, 2016, last modified March 9, 2023, <https://missilethreat.csis.org/defsys/sm-3/>.

Nuclear Threat Initiative, "China Submarine Capabilities," *Submarine Proliferation Resource Collection*, 6 March 2023, <https://www.nti.org/analysis/articles/china-submarine-capabilities/>.

Reny, Stephen. "Nuclear-Armed Hypersonic Weapons and Nuclear Deterrence," *Strategic Studies Quarterly*, March 2020, vol 14, no 4, <https://www.jstor.org/stable/26956152#>.

- Sayler, Kelley M. "Hypersonic Weapons: Background and Issues for Congress," *Congressional Research Service*, 13 February 2023,  
<https://crsreports.congress.gov/product/details?prodcode=R45811>.
- Shelling, Thomas. *Arms and Influence* (New Haven: Yale University Press, 1966).
- Sugden, Bruce M. "Analyzing the Potential Disruptive Effects of Hypersonic Missiles on Strategy and Joint Warfighting," *Joint Forces Quarterly*, March 2022,  
<https://ndupress.ndu.edu/Media/News/News-Article-View/Article/2884204/analyzing-the-potential-disruptive-effects-of-hypersonic-missiles-on-strategy-a/>.
- U.S. Department of Defense, "America's Nuclear Triad," accessed 20 April 2023,  
<https://www.defense.gov/Multimedia/Experience/Americas-Nuclear-Triad/>.
- U.S. Secretary of Defense, *National Defense Strategy of the United States of America: Missile Defense Review* (Washington, DC: White House, 2022).
- Washburn, Emily. "Russia Has the Most Nuclear Weapons in the World – Here Are the Other Countries With the Largest Nuclear Arsenals," *Forbes*, 24 February 2023,  
<https://www.forbes.com/sites/emilywashburn/2023/02/24/russia-has-the-most-nuclear-weapons-in-the-world-here-are-the-other-countries-with-the-largest-nuclear-arsenals/?sh=485984ba9300>.
- Zhao, Tong. "What Are the Aims of U.S. Missile Defense?," *Carnegie-Tsinghua Center for Global Policy*, 29 June 2020, <https://carnegieendowment.org/2020/06/29/what-are-aims-of-u.s.-missile-defense-pub-82123>.