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Hypersonic Weapons and Escalation Control in East Asia

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Abstract

Hypersonic weapons, which can achieve speeds over five times faster than the speed of sound (Mach 5), are the latest version of precision-guided munitions (PGM) that are part of the larger family of long-range strike weapons systems. In the United States, hypersonic weapons are pursued in the context of the conventional prompt global strike (CPGS) programs that are most commonly defined by officials as the ones pursuing the technology of "high-precision conventional weapons capable of striking a target anywhere in the world within one hour's time."[1] Hypersonic weapons have been a reason for concern, especially after the two Chinese tests in January and August 2014.[2] However, outside the United States, nations pursue hypersonic technology in secrecy; therefore, we have little information regarding the stage of development the Russians or Chinese have achieved. Nevertheless, what became evident from the short period that separated the two Chinese tests is the emphasis given to a rapid-paced development and the strategic value of the new weapon for China.[3]

While effectiveness is still questionable, long-range, high-precision weapons that travel at extremely high speeds are a promising new technology states pursue. Shorter-range hypersonic weapons appear to be a more feasible technology, while global-range weapons are a goal that is still far from being reached. Nevertheless, states invest heavily in both variants, and it appears operational capability is only a question of time. That said, our theoretical understanding regarding state decisions to adopt hypersonic weapons and the impact of such systems on state behavior, escalatory dynamics, and systemic power distribution needs to be deepened.[4]

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This article offers theoretical debates that inform the discussion, first by analyzing the evolution and rationale for US and Chinese hypersonic weapons. Secondly, the analysis seeks to understand the escalatory dynamics of hypersonic weapons in a conflict scenario in East Asia with a focus on the US-China relationship.

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Evolution and Rationale of Hypersonic Weapons

Hypersonic weapons diffusion appears to have started as a technology to increase US security against terrorist threats. However, perceptions over its offensive and first strike potential increased other states' fears over the implications of the new technology at the systemic level. Put differently, perceptions of the new weapons' impact on the nature of future systemic outcomes (offense or defense dominance) motivate states to adopt or reject an innovation in pursuit of security rather than power maximization.[5] To support this theoretical suggestion one must first look at the rationale behind the development of hypersonic weapons in the United States and China. Second, one must investigate the link between the development of CPGS and ballistic missile defense (BMD) in the US and Chinese fears of an American disarming preemptive strike, which ultimately led to the Chinese decision of developing hypersonic weapons.

US Evolution: From Counterterrorism to Anti-Access/Area Denial

Investments in hypersonic-weapons technology took place in the context of the Pentagon's CPGS agenda, which in its beginning was ballistic technology-dominated. After Congress refused funding for CPGS options that follow a ballistic trajectory, the Pentagon finally dropped the ballistic-technology focus. China and Russia expressed fears of warhead ambiguity and the destabilizing effects from the initiation of the program.[6] Russian and Chinese concerns were predicated on the fact that ballistic trajectories created ambiguities regarding the nature of the warhead (nuclear or conventional) carried by the delivery system.[7] Moreover, the weapons development would have been restricted by the

provisions of the Intermediate-Range Nuclear Forces Treaty and Strategic Arms Reduction Treaty. With regard to CPGS missions, the following section explains the versatile strategic importance of the program that allows for the shift of emphasis from counterterrorism and counterproliferation missions during the George W. Bush administration to survivability and penetrability in anti-access and area-denial (A2/AD) operational environments during the Obama administration.

The idea of developing a CPGS emerged in the 1970s from a RAND report and survived until the beginning of the twenty-first century. RAND recommendations suggested the mating of conventional warheads to nuclear delivery systems such as intercontinental ballistic missiles (ICBM).[8] The idea gained more traction after the end of the Cold War, providing the opportunity to capitalize on existing missile systems to create new capabilities that remain within the conventional scope. At the strategic level, the fall of the Berlin Wall marked the transition from the first to the second nuclear age—or the passing from the third wave of deterrence to the fourth.[9] Ushering in the second nuclear age presented the United States with new challenges that traditional deterrence based on mutual assured destruction could not necessarily tackle. In other words, US nuclear threats would not be credible against smaller powers—mainly rogue states and terrorist organizations—due to the disproportional nature of the threat. The United States needed the range and speed of ballistic technology with more accuracy and maneuverability but less destructibility. This requirement created the foundation of the Pentagon's support for CPGS during the Bush and Obama administrations and the subsequent turn to hypersonic weapons that offer all of the above-mentioned strategic options.

Starting from the Bush administration, in 2003 the Pentagon gave flesh and bones to the CPGS idea. The program sought to provide the president with the ability to decide and order strikes on a global scale that could reach their target in less than an hour. Such an option would decrease reliance on US forward-based forces and avoid concerns about US casualties due to the enemy's air defenses.[10] US Strategic Command (USSTRATCOM) established its Joint Functional Component Command for Global Strike (JFCC-GS) in 2006 with the following mission statement:

> JFCC-GS is designed to optimize planning, execution and force management for the assigned missions of deterring attacks against the United States, its ter-

ritories, possessions and bases . . . it provides integrated global strike capabilities to deter and dissuade threats and when directed defeat adversaries through decisive joint global kinetic and non-kinetic combat effects.[11]

Table 1. Key Differences between the three technological approaches for conventional hypersonic long-range strike

	Terminally Guided Ballistic Missiles	Boost-Glide Weapons	Hypersonic Cruise Missiles
Maximum Range	Intercontinental	Global	Regional
Mid-Course Maneuverability	Zero	High	High
Terminal Maneuverability	Limited or very limited	Medium or High	Medium or High
Ballistic over the Majority of Trajectory	Yes	No	No

(*Modified from* James M. Acton, *Silver Bullet: Asking the Right Questions about Conventional Prompt Global Strike* [Washington, DC: Carnegie Endowment for International Peace, 2013], 36.)

The Bush administration's more nuanced approach to post–Cold War volatile threats led to a new triad aimed at reducing the role of nuclear weapons in US defense policy. The new triad consisted of nonnuclear strike options, a strong industrial base, and more investments in missile defenses.[12] The 2006 *Quadrennial Defense Review* (*QDR*) takes the notion further, proposing a more tailored deterrence that can remedy the "one-size-fits-all" traditional approach in an effort to respond to threats coming from terrorists, nonstate actors, and rogue states.[13] In the words of the report

> Consistent with the New Triad priorities developed during the 2001 Nuclear Posture Review, the force will include a wider range of non-kinetic and conventional strike capabilities, while maintaining a robust nuclear deterrent, which remains a keystone of U.S. national power. The force will also include integrated ballistic and cruise missile defenses, and a responsive infrastructure. These capabilities will be supported by a robust and responsive National Command and Control System, advanced intelligence, adaptive planning systems and an ability to maintain access to validated, high-quality information for timely situational awareness. Non-kinetic capabilities will be able to achieve some effects that currently require kinetic weapons. The Department will fight with and against computer networks as it would other weapon systems. For prompt global strike, capabilities will be available to attack fixed, hard and deeply buried, mobile and relocatable targets with improved accuracy anywhere in the world promptly upon the President's order.[14]

The prompt strike justification was further founded upon the main conclusions of the National Research Council's Committee on Conventional Prompt Global Strike Capability report, which determined that long-range options such as bombers or aircraft carriers could take hours for deployment depending on their station point.[15] At the time, only ballistic nuclear-tipped missiles could be used in a prompt manner. However, the high destructibility of these weapons made them undesirable. Hence, the administration committed itself to looking at options that would enhance the conventional arsenal, offering faster, more accurate, and more usable options—or in other words, hypersonic boost-glide vehicles and cruise missiles.[16]

No administration explicitly articulated the missions of CPGS. The program's versatile and multifaceted operational potential allows for funding requests without specifically advocating a concrete mission the weapons system can serve. Nevertheless, it is logical to argue that it was mainly the strategic environment that dictated strategic thinking regarding CPGS missions in each period. During the Bush administration, CPGS was primarily directed toward counterterrorism operations targeting counterproliferation efforts or gatherings of terrorists. Conventional long-range, prompt strikes can more effectively deter terrorists, since the US threat is more capable and materially implementable (deterrence by denial). With regard to rogue states, CPGS can offer feasible preemptive options that will prevent the adversary from being able to use its forces. Moreover, CPGS reinforces deterrence by punishment, given that once the target has been located and identified, conventional strikes can hit it. The new term that arose from this strategic thinking is coined "counternuclear" strikes, as it is broader than counterforce since it instead targets nuclear warheads; command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) systems; and production and storage facilities.[17] Finally, CPGS, after the Chinese antisatellite (ASAT) test in 2007, was also considered as a plausible option for use against missile strikes that aim to degrade the US C4ISR systems (decapitation strategies) and therefore cripple the American war effort.[18]

The Obama administration continued the policy as it was articulated in the *QDR*s of 2001 and 2006 with further investments in BMD and CPGS. However, the focus appears to be shifting from time-urgent and pop-up targets to missions that require high survivability of weapons

that need to travel in environments where access is denied. Hence, the 2010 *QDR* talks about possible combat scenarios in theaters of operations characterized by A2/AD components:

> U.S. forces must be able to deter, defend against, and defeat aggression by potentially hostile nation-states. This capability is fundamental to the nation's ability to protect its interests and to provide security in key regions. Anti-access strategies seek to deny outside countries the ability to project power into a region, thereby allowing aggression or other destabilizing actions to be conducted by the anti-access power. Without dominant U.S. capabilities to project power, the integrity of U.S. alliances and security partnerships could be called into question, reducing U.S. security and influence and increasing the possibility of conflict.[19]

The Obama administration goes so far as to advocate for the development of a family of long-range systems at the heart of which lies the CPGS program. The Pentagon has undertaken a study on the "combination of joint persistent surveillance, electronic warfare, and precision-attack capabilities, including both penetrating platforms and stand-off weapons whose results will inform the FY12–17 defense program."[20] Setting aside the austere fiscal environment, from the long-range family of systems, hypersonic versions of CPGS appear to be the fastest and most survivable option with no need of forward deployment. It becomes obvious that especially after hypersonic weapons survived sequestration and their plethora of testing failures notwithstanding, US civilian and military circles appear to be deeply invested in the further development of these systems. Any doubt regarding further funding of the program evaporated after the Chinese tests in January and August 2014, which confirmed the pursuit of similar systems by a US peer competitor. Congressmen Buck McKeon (R-CA), Randy Forbes (R-VA), and Mike Rogers (R-AL) expressed their concern in a letter stating that "other competitor nations push toward military parity with the United States." Following the Chinese testing, Congress prioritized hypersonic weapons programs, with raises in funding and testing.[21] In fact, Congress allocated $70.7 million for FY15, specifically supporting the Army's Advanced Hypersonic Weapon (AHW).[22]

US CPGS and Hypersonic Weapons Programs

Hypersonic weapons technology has been around for decades. Nevertheless, research was far from reaching the level of maturity that would allow experts to see a possibility of initial operational capability in the

near future. After a number of successful tests of shorter range hypersonic weapons such as the Army's AHW, recent developments have raised optimism.

With a range of 8,000 km, AHW was initially funded as the risk mitigation program of the Hypersonic Technology Vehicle (HTV), which has a range as great as 17,000 km.[23] However, after the AHW proved successful in testing—which was not the case for HTV—Congress decided to direct funding toward AHW and lessen support for HTV. The advantage of AHW is its already tested technology, the Sandia Winged Energetic Reentry Vehicle Experiment, which renders the system a technologically more feasible solution—albeit with a shorter range.[24] Both boost-glide vehicles, AHW and HTV, might be used in tandem with the Conventional Strike Missile (CSM) as their launch booster. For now the CSM is capitalizing upon retired ICBMs like the Peacekeeper—calling their updated version the Minotaur IV.[25] Other possible alternative launch boosters might be the ArcLight Missile which is a vertical launch system deployed on surface combatants and attack submarines, while the administration has also requested more research on the so-called Sea Strike or Submarine-Launched Intermediate-Range Conventional Strike Missile.[26] The main justification for investments in new hypersonic technologies stems from the US rebalancing effort toward the Asia Pacific and the highly contestable operational environment characterized by the Chinese A2/AD capabilities.

The United States also pursues a number of hypersonic cruise missile technology options. Research started in the 1950s within the context of developing a hypersonic space plane that can reach space. The program has been unsuccessful so far, and attention has shifted to the development of hypersonic cruise missiles and aircraft instead.[27] Hypersonic cruise weapons rely on scramjet engines and are "an unmanned, self-propelled vehicle that sustains flight through the use of aerodynamic lift over most of its flight path." In contrast to cruise weapons, boost-glide vehicles are not self-propelled but glide "unpowered to the target after release from the booster," as Thomas Scheber and Kurt Guthe explain.[28] So far, the main programs that have received funding are the National Aeronautics and Space Administration's X-43A (Mach 6.8) and the US Air Force's (USAF) and the Defense Advanced Research Projects Agency's X-51A WaveRider programs—the latter of which can fly at Mach 5 for longer periods.[29]

Interestingly, boost-glide vehicles and hypersonic cruise missiles are funded by different programs, possibly because of their differences in range and technologies. Therefore, there seems to be no specific thinking or planning to use hypersonic cruise missile technology for CPGS missions, even though logically that would be a feasible idea in regional scenarios where cruise range would not be a problem.[30] Although concrete plans have not yet been announced given the preliminary stage of research and development and political and strategic considerations, the use of hypersonic cruise missiles for counterterrorism operations or high survivability and penetrability in A2/AD operational environments appears to be attractive in regional conflict scenarios.

Chinese Hypersonic Weapons Evolution

In late 2010, the Chinese test of the DF-21D antiship ballistic missile (ASBM), with a maneuverable warhead and range at around 1,500 km, took most US experts and high echelon officers by surprise. Scholars even characterized the missile as the game changer that will have profound consequences on the regional strategic and diplomatic dynamics.[31] Apart from the missile's evident mission to target aircraft carriers and defeat regional BMD, the missile is of great importance, constituting China's stepping stone from a ballistic technology to a hypersonic weapon and a CPGS capability. As the most insightful work of the topic states

> ASBM and subsequent strategic strike programs entail four phases. The first phase will involve fielding of a rudimentary 1,700 to 2,000 km range ASBM by the end of the 11th Five Year Plan in 2010. A second phase, scheduled for completion by the end of the 12th Five Year Plan in 2015, would incorporate sophisticated aerodynamic maneuvering capability that would not only enhance a missile's ability to penetrate missile defenses, but also extend its range. The third phase would end with the fielding of a boost-glide missile [助推–滑翔式导弹] capable of intercontinental strikes by 2020. A final capability, deployed before 2025, would be a hypersonic cruise vehicle for global operations.[32]

China's tests of its WU-14 hypersonic glide vehicle (HGV) in January and August 2014 follow the lines of development as described by Mark Stokes in the above excerpt. The tests confirmed the country's determination to develop hypersonic weapons. Scholars who follow modernization of the Chinese armed forces stressed China's commitment to hypersonic technology given the short period separating the two tests.[33]

Judging from the tests, the launch booster is a Chinese ICBM and the payload hypersonic vehicle managed to travel at Mach 10 for a couple of minutes.[34] Some have speculated that the Chinese HGV will first be used as a theater-range weapon with possible range extensions in the future that might stretch as far as intercontinental and later global ranges.

The leap to a global power-projection capability for China will be of paramount importance. However, political factors and the role China chooses to play in the future will determine whether or not China will in fact embrace such a goal. Speculation on China's goal to move toward power projection skyrocketed after the country's effort to refurbish a Ukrainian aircraft carrier, the maiden voyage of which took place in November 2013. Concerns were rather ungrounded, given the carrier's limited potential and need for years of training and exercising to operate a carrier strike group (CSG) effectively. Hence, before China develops highly capable and operational CSGs, the nation's aircraft carrier, the *Liaoning*, will only be a political symbol for military diplomacy in the region. While Chinese power-projection goals are important in the long-term theater operations, A2/AD strategies might make a more feasible option, offering greater potential for success. Within that context, hypersonic weapons might in fact offer a very promising option.[35] Their low and flat trajectories make the weapons less vulnerable to BMD than ballistic technology versions (DF-21D). At the same time, China is also developing hypersonic cruise missiles with scramjet engines that can be launched independently and make a very good fit in the context of A2/AD operational objectives.[36]

Impact of US CPGS Development on Chinese Military Modernization: Seeking to Match US Capabilities

US policies and investments in BMD and CPGS, even though not directly linked to Chinese capabilities, created gaps in perceptions and exacerbated fears about US intentions to contain China.[37] According to Chinese experts, a few main reasons lurking behind Chinese concerns were the traditionally small size of its nuclear arsenal and that arsenal's questionable second-strike capability.[38]

In more detail, Chinese leaders have embraced the doctrine of *yī diǎn* (a little bit) from the beginning of the country's nuclear program. Chairman Mao Tse-tung believed China should have a little bit of nuclear

weapons, maintain those weapons a little bit, and make those weapons a little bit better.[39] Mao believed China should exercise great restraint and never get into an arms race with another country. Many scholars argue that while lack of resources was the main reason for constraint in the 1960s, the country now has the option of developing a more powerful nuclear arsenal but has decided not to do so. However, the Chinese doctrine of minimum deterrence is one predicated upon the flexibility of the force, the size of which can vary depending on the threat it seeks to offset. Recent Chinese modernization of its nuclear arsenal lends credence to assumptions of acute Chinese fears that mainly stem from American investments in BMD and CPGS as well as the US refusal to abandon its first-use policy.[40] In fact, for the first time, China has linked its nuclear arsenal's posture, size, and development to another country's capabilities—that of the United States.

Specifically, Chinese experts talk about the scenario of China being subject to American coercion, a concern that is mainly due to US nuclear superiority, which—married to BMD and CPGS—puts at risk Chinese retaliatory capability.[41] The United States, through numerous consultations and track-two dialogues, tried to communicate the details of each program's development to assuage Chinese fears. Most US documents also refer to the development of both BMD and CPGS at small numbers, aiming at reassuring China and Russia, since a small development was deemed unthreatening to both arsenals.[42] Russia's robust nuclear arsenal did not leave space for a weak deterrence, especially provided the questionable effectiveness of current BMD systems.[43] China, on the other hand, felt deeply influenced by US actions, expressing fears regarding the survivability of its nuclear forces in the scenario of a disarming first strike.[44] Chinese fears were reinforced with the Missile Defense Act of 1999 under which Congress started funding BMD projects. The final blow came when the Bush administration unilaterally withdrew from the Anti-Ballistic Missile Treaty in 2002.

The main concerns, therefore, pertained to land-based weapons, which Chinese pundits and officials deemed especially threatened. Chinese missiles tend to be mainly liquid-fueled, with long periods of preparation before launch. Thus, American BMD and CPGS developments threaten to render the small Chinese arsenal ineffective, pushing China to build a larger force. Wu Chunsi states that missile defense makes China's "no-first-use" doctrine increasingly difficult to maintain because it

gives the United States a double advantage in both offensive first-strike capability and credible defensive capability. To ensure its retaliatory capability, China proceeded with a high-scale modernization of its arsenal. Even though the details of the program are unknown, experts assume that China has been both enhancing and modernizing its forces.[45] The aim of the modernization is to increase survivability, reliability, safety, and penetrability.[46] The objective is to maintain a limited but effective second-strike capability to deter first strikes.[47] The two ways of assuring the aims of the program is mobility of the delivery systems and concealing those systems in underground tunnels in which detection is difficult even with space satellites.[48] Within this context, the Second Artillery Corps (SAC) has been investing in more reliable and fast solid-fueled, road-mobile ICBMs—the DF-31 and DF-31A.[49]

To further reinforce survivability and retaliatory strike capability, China began developing an undersea deterrent, building of *Xia*-class submersible ship ballistic missile nuclear (SSBN) system and later the more capable *Jin*-class SSBN.[50] The *Jin*-class SSBN can carry JL-2 submarine-launched ballistic missiles, the upgraded version of the JL-1 that was carried by the *Xia*-class SSBNs.[51] The main objective behind undersea deterrence is to achieve less detection of submarines and more assured penetrability for the SSBN-launched missiles.[52] With an undersea deterrent and an enhanced and more survivable land-based nuclear arsenal, China should feel more secure in terms of its retaliatory strike capabilities. In other words, the strategic stability between the United States and China appears to be strengthened. However, Chinese officers' and scholars' concerns of a disarming first strike seem to be unabated, with talk about the certainty of uncertainty of a Chinese second strike that serves as deterrence instead of a secured retaliation stance.[53]

Part of the confusion regarding the robustness of strategic stability is due to Chinese deliberate strategic ambiguity about its nuclear arsenal. Another part of the confusion can be attributed to Chinese fears, which skyrocketed after Pres. Barack Obama's Prague speech and the 2010 *Nuclear Posture Review* (*NPR*). The Chinese understood America's decreasing reliance on nuclear weapons as being tantamount to a greater reliance on conventional weapons—especially CPGS—where the United States enjoys an undeniable superiority.[54] Thus, the Chinese regard President Obama's vision for a nuclear-free world as a trap that aims at containing China's rise to power. This thinking is indicative of the Chinese un-

derstanding regarding the utility of their nuclear arsenal, which mainly serves countercoercion purposes.[55] Another role China assigns to its arsenal is conventional deterrence to prevent US conventional forces from surgically striking C4ISR centers. In a possible crisis scenario with the conventionally superior United States, China will likely try to blur the nuclear threshold through strategies that "leave something to chance," as is further explained below.[56] Integrating options of hypersonic weapons into the US and Chinese operational doctrines, in tandem with perceptions on the utility of nuclear weapons and the offensive nature of hypersonic weapons, creates very dangerous escalatory dynamics in the western Pacific.

What Lies Ahead: Integrating Hypersonic Weapons into Operational Doctrine and Escalatory Dynamics

In China, strategic thought has been highly tailored to doctrines and tactics that target superior enemies. The ultimate strategic objective behind the strategy has changed. Whereas in the past, fighting would take place for survival (against the Kuomintang, Japanese, and Soviets), in the contemporary era, fighting against a superior enemy would probably take place to achieve other objectives at the expense of less powerful states. The current strategic situation calls for a strategy against a superior enemy that looks at holding the adversary's forces outside the theater of operations while China can achieve its objectives against minor enemies.[57]

China's fast-paced modernization took place mainly after the Taiwan incident of 1995–96, whereas modernization of the nuclear arsenal started several years before that. Chinese conventional strategies are directed "at interdicting the geostrategic umbilicals that connect the United States to its Asian allies."[58] The idea is that China needs to prevent the United States from bringing rearward reinforcement to its allies, while Chinese forces overwhelm the nation's inferior regional adversaries. As former US Pacific Command commander ADM Robert Willard explained, "China's rapid and comprehensive transformation of its armed forces is affecting regional military balances and holds implications beyond the Asia-Pacific region. Of particular concern is that elements of China's military modernization appear designed to challenge our freedom of action in the region."[59] Chinese conventional modern-

ization aims to protect Chinese interests in its maritime periphery. Nevertheless, for the first time, such strategies create the conditions for US-Chinese friction to take place, increasing the chance for conventional engagement with the United States.

The A2/AD strategy consists of a wide range of diverse capabilities that aim to raise the cost of entering the theater of operations for the intervening power. As Vincent Alcazar states, A2/AD is a wicked problem for the United States mainly because of its strategic implications that have both military and nonmilitary aspects; inadequate access, curtailed freedom of action, and eroded influence.[60] For China, the SAC lies at the heart of the strategy, with the new addition of that unit's DF-21D ASBM—the so called "aircraft carrier killer." Mines, quiet diesel-electric submarines for brown and green water, modernized over-the-horizon radars, and intelligence, surveillance, and reconnaissance that can detect and target mobile military systems as they operate at long distance from the Chinese coast all combine to create a no-go zone for the adversary. This strategy is based on the Chinese approach that puts emphasis on information dominance, intelligence, and manipulating perceptions. Information dominance translates into a high dependence of modern militaries on information flow for the conduct of operations. Disruption of the information flow can result in the collapse of command and control (C2), leaving no coordination on the battlefield. Modern forces need to be prepared to fight in degraded environments where computer networks might be plagued by viruses.

The general objective behind the war effort is not the absolute destruction of the enemy or disarmament but rather the creation of conditions conducive to the achievement of the desired political outcome. The war, as thus conceived, is short and rapid-paced. A2/AD strategies or active defense (in Chinese parlance) are better implemented through the element of surprise and seizing the initiative early through key points and well-targeted strikes.[61] In other words, the strategic rationale is to avoid confrontation with the superior adversary directly while achieving the political objectives the war effort pursues. Instead of direct confrontation, China seeks to target vulnerable points through attacking adversary bases, transportation, logistics, and C4ISR centers.[62] Roger Cliff, in his testimony before the House Armed Services Committee, explained the six Chinese warfighting principles under that nation's general strategy of A2/AD or counterintervention, as the Chinese call it. Conflated, the six

principles ask for seizing the initiative before the enemy does, launching surprise attacks, conducting preemptive strikes while avoiding direct confrontation, carrying out key-point strikes, and concentrating Chinese force's best capabilities to attack the vital targets early in a conflict.[63]

From the Chinese perspective, hypersonic weapons reinforce deterrence through the credible threat of targeting US vessels or even bases as far away as Guam in the event of a horizontal escalation. In the long term, China might seek to expand its power projection beyond its immediate periphery. If so, hypersonic weapons could threaten to keep US forces even further away from the Yellow Sea, South China Sea, and East China Sea. The most probable justification behind a possible deployment and use of Chinese hypersonic weapons is related to the effort by China to match US capabilities as a deterrent against American coercion and surgical strikes against Chinese C4ISR.[64] Nevertheless, the Chinese face the same dilemma: any strike against US bases or vessels will irrevocably provide the basis for a US decision to escalate, something China would prefer to avoid as much as the United States would.

Turning to the US strategy, we know the nation embraces a warfighting capability aimed at countering an enemy's A2/AD strategy by penetrating defenses and eliminating targets in the interior.[65] The idea is to destroy the source of the enemy's firepower while degrading its C4ISR. The saturation of the enemy's defenses through coordinated strikes by the US Navy and USAF would allow aircraft and submarines to strike land-based missile systems and C2 centers. Hypersonic weapons hold a great potential in a contested environment, given their survivability against enemy's defenses and the low risk of striking while remaining outside the theater of operations. The Air-Sea Battle (ASB) Concept is intended to inject significant uncertainty into the calculations of adversaries, ideally so conflict does not occur in the first place. This objective of deterring the enemy from initiating acts of aggression is laudable, but it is worth considering escalation management. While ASB is still a work in progress and its future is unclear, some have noted the escalatory dynamics that lurk within the concept itself.[66] Should deterrence collapse, it is important to keep the conflict as limited as possible, so starting a conflict at the upper end of the escalation ladder would seem to be flawed strategic thinking.

Hypersonic weapons appear to be what both sides are after in terms of seizing the initiative and surgical targeting of key points that lie at the

heart of the adversary's war effort. Surprise at the tactical level as well as preemption in case of an ASAT strike appear to be feasible missions for hypersonic weapons, which could be aimed at crippling the enemy's C4ISR systems. Thus, hypersonic weapons could be a valuable addition in both A2/AD and counter-A2/AD strategies. In the first option, these systems' long ranges help the United States avoid entering the contested zone. Strikes from outside the theater of operations would risk no cost for US forces. For the second strategy, counterintervention missions could be executed with success with hypersonic weapons—the accuracy and speed of which add another layer to the Chinese strategy of keeping US forces outside the theater of operations in accordance with the "using the land to control the sea" concept Andrew S. Erickson and David D. Yang stressed in 2009.[67] The development of the DF-21D ASBM, with its maneuverable warhead, as one of the first stages of a hypersonic weapon reinforces this assumption.[68]

In this context, both parties appear to have embraced an equally offensive operational thinking that opts for deliberate escalation from some initial level "to gain advantage, to preempt, to avoid defeat, to signal an adversary about its own intentions and motivations, or to penalize an adversary for some previous action."[69] The strategy would be based on firm ground if the East Asian context did not lend itself to what Herman Kahn calls "two-sided escalation situations," where one party sees value in escalating if the other side would not counter the rise.[70] In a conflict scenario involving two peer competitors and nuclear powers, it is reasonable to assume that both states would be able to reply by ascending the escalation ladder. In other words, no state can sufficiently claim to be capable of achieving escalation dominance where it can credibly negate its adversary's efforts of escalating further as a response to previous actions. No matter how big the preemptive blow is, China cannot hope to prevent additional US forces from engaging, and the same is the case for US strikes. Hypersonic weapons, thanks to their highly flexible nature, can be used for both preemptive and retaliatory purposes and, as explained above, facilitate considerably the execution of such escalatory moves for both parties. Their use and escalatory dynamics, however, cannot be judged in a political vacuum. Thus, the following section looks at the juncture between force posture and crisis stability, while taking into consideration the nature of political objectives sought.

The Use of Hypersonic Weapons in a Conflict Scenario in East Asia: Is a Military Victory Worth Escalation?

Within the operational context described above, the use of hypersonic weapons by both powers is a double-edged sword. From the US perspective, long-range weapons are the enablers or linchpin of any operational plan the armed forces might embrace given the high cost of entering into the adversary's envelope. The main contribution of hypersonic weapons is, therefore, lower cost of implementing surgical strikes against the adversary's critical nodes (C4ISR). Lower cost, high survivability, and accuracy make hypersonic weapons a viable political decision in a conflict scenario. In fact, as mentioned above, targeting C2 centers was one of the weapons' first missions during the Bush administration. The counternuclear mission was directed against rogue states' nuclear weapons, but those same weapons can also be used against states' C2 centers that manage conventional weapons systems. In other words, in A2/AD operational environments, long-range weapons that can be fired from outside the enemy's envelope will acquire further strategic value. Dan Blumenthal explained the concept very succinctly, "the U.S. Air Force and Navy will probably have to 'shoot the archer' rather than the arrow to stop or thin out a missile barrage."[71] The idea goes back to theorists such as B. H. Liddell Hart and his "Strategy of Indirect Approach" or, more precisely, John Warden's "Industrial Web Theory."[72]

Nevertheless, in any conflict scenario, US civilian leaders need to keep a very clear link between political objectives and military goals, which, in the case of China, will be neither decisive victory nor regime change.[73] Even though there is a general tendency for military planners to opt for direct escalatory strategies, in a US-China conflict scenario, such predetermined and rigid strategy paths might have deleterious consequences, forcing both parties into a highly escalatory conflict that could otherwise be avoided.[74] Put differently, both the Joint Operational Access Concept and Air-Sea Battle concept seem to place the emphasis on a war-fighting concept that seeks to prevent the adversary from escalating instead of influencing its decision to escalate. In other words, military thinking so far has been dominated by the use of brute force, as Schelling would call it, instead of coercive force that leaves the final choice to the opponent.[75] The latter would be more expedient in a regional conflict scenario where the United States faces a nuclear force while at the same time the objec-

tive at stake does not justify an all-out war effort. That said, any anti-A2/AD strategy must borrow more from a crisis-stability scenario rather than a purely war-fighting one, given that deterrence will be an important part of the war effort. Such an approach comes in tandem with an emphasis on the notion of escalation management to reinforce stability rather than escalation dominance or control, which could come with destabilizing effects.

A RAND report defines crisis stability as the degree to which mutual deterrence between dangerous adversaries can hold in a confrontation.[76] Crisis management, therefore, is more about deterrence rather than direct confrontation, which makes long-range systems—especially hypersonics—essential parts of crisis management, given that such systems can be brought to bear instantly. The same report assesses the contribution of a wide range of weapons systems to crisis stability based on their levels of flexibility, responsiveness, and capabilities for signaling along with surprise attack. Even though hypersonic weapons are not directly addressed, the report finds that conventionally loaded ballistic missiles are particularly escalation-prone. The finding is based upon their fast deployment and launch capacity that leaves no time for signaling and exacerbates fears of surprise attack.[77] Given 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.

The deliberate escalation thesis is further questioned when nuclear and conventional C2 centers are not separated but function under the same command. In this case, the escalatory, transitional levels from a conventional conflict to a nuclear, inadvertent escalation are blurred. Put differently, nuclear strategy becomes part of conventional fighting through the notion of inadvertent escalation. It is no accident that experts have named hypersonic strike capacity as the capability the United States might never be able to use.[78] The concern is mainly due to the notions of target indistinguishability, which is reinforced by the weak and blurred firebreaks between conventional and nuclear deterrence in Chinese strategic thinking.[79] Thomas Christensen, based on his reading of the *Science of Second Artillery Campaigns*, concludes that China's use of nuclear weapons is not confined to a deterrent force versus only nuclear strikes but also conventional ones. He calls this concept "double deterrence."[80] China capitalizes on the SAC's very powerful control of both conventional and nuclear delivery systems. After having stud-

ied American campaigns in both Iraq (1991) and Kosovo (1999), the Chinese are very familiar with the idea of surgical strikes that aim to harm the adversary's source of power or enablers of operations.[81] The control of both conventional and nuclear delivery systems deliberately aims at deterring conventional strikes—the great escalatory dynamics of which the adversary should acknowledge before using such systems. In other words, target distinguishability concerns should prevent the United States from targeting the missiles of the SAC, given that China might be left with the impression of a preemptive strike on the country's nuclear arsenal.[82] The strategic idea pertains to what Barry Posen calls inadvertent escalation. However, this appears to be "manufactured" by China through the strategic location of nuclear weapons close to C2 centers or any other valuable targets for which neutralization would be prioritized within the context of surgical strikes.[83] Using Thomas Christensen's words, "Jervis's 'threat that leaves something to chance' requires a slippery slope between conventional and nuclear warfare . . . without the stronger conventional and nuclear power simply choosing to attack with its nuclear weapons."[84]

After having matched political objectives to military goals, one could conclude that targeting the archer might hide serious escalatory dynamics and paradoxically end up being an obstacle to a successful US intervention rather than an enabler. Hypersonic weapons might appear to lower the cost for such operations initially, but one needs to account for possible responses coming from the adversary. The assumption is couched in the eventuality of escalatory steps coming from the adversary that will threaten to raise the cost of the military effort to levels disproportionate to the political objectives sought. In other words, operational plans and strategic doctrines create the boundaries within which political choices take place. In cases where the military effort seeks to protect political objectives of limited nature, as is the case in the western Pacific, any decision to follow an escalatory approach against a nuclear enemy needs to be further examined and assessed based on its political rationale. As Michael Kraig and Leon Perkowski have advocated, the three main concepts that should be the drivers of US force posture and employment are summarized as strategic accommodation, protracted crises, and limited geopolitical goals.[85] Seen through this spectrum, an operational doctrine based on a force posture that leads to a quick total victory through the application of overwhelming force can be mis-

matched to the limited political objectives the doctrine seeks to secure. If military plans cannot strike the right balance between inaction and a risky, escalatory option, inaction may well be the better choice—even though it fails to safeguard US interests.

Based on the aforementioned, hypersonic weapons' operational role must be assessed not only on their contribution to achieving military objectives but also escalatory potential. The suggestion draws substance from both powers' interest in avoiding escalation while at the same time using coercion to achieve their objective before deescalation becomes an imperative. Put differently, given that both countries would prefer not to cross the Rubicon, the actual or threatened use of hypersonic weapons needs to be integrated into operational doctrine that is more influenced by crisis-stability elements instead of a war-fighting mentality that aims to defeat the adversary. Such an approach must progress along the lines of a degraded application of force married to signaling and diplomatic negotiations. A degraded application of force would initially capitalize on the use of platforms that signal resolve and could be discernible by the adversary—such as surface vessels and aircraft—married to what Kraig and Perkowski call "strategic denial" at the military level and "persistent denial" at the operational level. The concept the two authors suggest encompasses the "ability to credibly and capably impose negative costs without dramatically escalating the political stakes involved," which would facilitate negotiations and subsequently deescalation.[86] The main idea is to be able to negate any benefits the adversary aims to reap at each escalatory level while at the same time projecting a similar capability for higher levels of escalation in an effort to dissuade further intensity. Hypersonic weapons should not be part of the initial plans because both sides will want to assuage fears of surprise attacks that could irrevocably harm diplomatic negotiations and pave the way for uncontrolled escalation. Civilian control needs to be robust, and it is within this context that a degraded strategy can prioritize long-term political objectives over short-term military goals. Options that offer irrevocable damage without leaving room for signaling or adjusting according to diplomatic processes must be relegated to the final stages of the conflict provided deescalation is not achieved.

Conclusion

As far as interstate relations go, the role of new technologies—with special regard to technology adoption—has great impact on escalatory dynamics in East Asia. With regard to the former, the development of long-range, fast, and accurate weapons systems has the potential of changing offensive and defensive dynamics, rendering a first strike easier, while lowering the cost of deep surgical strikes on the adversary's territory. Such a systemic change has direct implications for each country's operational doctrines and, consequently, for the protection of their political objectives. The development of hypersonic weapons in the United States within the context of the CPGS program was created with a high focus on counterterrorism and rogue states. The program's operational objectives and missions, as such evolved, resulted in a higher emphasis on A2/AD environments. The missions of CPGS are influenced by systemic dynamics and threat perceptions in the United States as they are reflected in official documents such as the *QDR* and *NPR*. However, China's threat perceptions and reactions to US investments in both BMD and CPGS show that Chinese nuclear modernization is linked to American development of BMDs in tandem with CPGS options. While China's modernization of the country's nuclear arsenal is an attempt to assure second-strike capability in the event of a disarming first strike—a capability highly reinforced by CPGS—Chinese pursuit of hypersonic weapons is mostly part of its conventional A2/AD strategy. Global power projection might appear to be a legitimate goal to pursue in the future depending on political considerations. In the short to medium term, China has been focusing on development of weapons systems that enable regional power projection. Within this context, hypersonic weapons can achieve operational goals that will reinforce China's multiple layers of A2/AD strategies.

China's A2/AD strategy notwithstanding, enhancing the nation's nuclear arsenal would make one think strategic stability is reinforced. Paradoxically, this does not seem to be the case, due to China's deliberate hyphenation of the conventional to nuclear level of escalation. The Chinese strategy is predicated upon ensuring freedom of maneuver and action for its forces along with preventing the United States from using its own power projection over Chinese territory. Along these lines, the Chinese SAC has developed the concept of dual deterrence, which regards nuclear forces as capable of deterring both nuclear and conven-

tional conflicts through reinforcing the already problematic dynamic of target indistinguishability. In other words, the SAC suggests a strategy that manufactures the eventuality of an inadvertent escalation through keeping both conventional and nuclear missiles under the same command. China creates a slippery slope for the United States, with the aim of deterring American forces from intervening due to high probability of escalation, unpredictability, or even uncontrollability of conflict dynamics. The result of the Chinese strategy in tandem with the possibility of US surgical strikes of C2 centers within the context of the ASB concept creates highly escalatory potential of every conflict scenario in East Asia.

Finally, many journalists have already called the hypersonic weapons diffusion an arms race between the United States and China. Whether this is true or not will be judged in the future, given that it is still too early to say with certainty if this is the case. Nevertheless, one could argue more easily that at least the potential for an arms race is present. Arms-race potential, married to acute threat perceptions and blurred escalatory thresholds, make the region an especially daunting place to manage future US-China friction. SSQ

Notes

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82. Bunn and Manzo, "Conventional Prompt Global Strike;" Twomey, "Asia's Complex Strategic Environment;" and Christensen "Meaning of the Nuclear Evolution," 476–78.

83. In "Meaning of the Nuclear Evolution," Thomas Christensen calls this the slippery slope. For the idea of inadvertent escalation, see Barry Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks* (Ithaca, NY: Cornell University Press, 2013).

84. Christensen, "Meaning of the Nuclear Evolution," 140.

85. Michael Kraig and Leon Perkowski, "Shaping Air and Sea Power for the 'Asia Pivot': Military Planning to Support Limited Geopolitical Objectives," *Strategic Studies Quarterly* 7, no. 2 (Summer 2013): 114–36.

86. Ibid., 121.

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