

Defending the U.S. Homeland against a Nuclear-Armed China

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The United States' Cold War and post-9/11 approaches to homeland defense are inadequate to counter the threat of China's rapidly escalating nuclear capacity, while U.S. missile defenses—optimized for a limited ballistic missile strike by a rogue nation—are insufficient against a nuclear-armed peer adversary. The emergence of hypersonics complicates U.S. missile defense even further. This paper will weigh the current state of U.S. homeland defense against the rapid rise of China, specifically, its expanding capability and capacity for a nuclear strike against the U.S. homeland. Through the lenses of technology, innovation, and policy this paper will pay particular attention to the sufficiency of the current Ground-based Midcourse Defense (GMD) system, the efficacy of boost-phase defenses against a peer China with a very different geography, and the suitability of existing roles and responsibilities of key stakeholders in order to expand the menu of options available to decision-makers. While the United States has foregone decades of military modernization to wage a twenty-year global counter-insurgency campaign, China has accelerated its own modernization. It is capable of regional nuclear strikes now, and soon will be able to deliver a nuclear attack at intercontinental ranges. As the commander of U.S. Strategic Command testified before the Senate Armed Services Committee, China is “no longer a ‘lesser included case’ of the pacing nuclear threat, Russia” and must be deterred differently (Richards, 2021).

Method

Primary and Secondary Research Questions

The primary research questions center on vulnerabilities: What are the vulnerabilities of the United States' historical and existing homeland defense enterprise, and what are the perceived vulnerabilities of China's nuclear enterprise? Answers to these questions will help

focus technology, innovation, and policy options to reduce or eliminate U.S. vulnerabilities and exploit China's vulnerabilities to U.S. advantage. Secondary research questions examine the problem in greater detail: What are the policy, technological, geographic, and other limitations associated with ground-based midcourse defense and boost phase defense against a nuclear-armed China? Conversely, what are their advantages? How can we leverage them against a different, more capable rival? Are existing U.S. military authorities, processes, roles, and responsibilities sufficient to address the threat, or are they outdated and require revision? What options exist "left of launch" to encourage restraint, deny perceived benefits of nuclear attack, or as a last resort, impose costs? In the development of homeland defenses, how can the United States accelerate the delivery of capabilities? Related, how can the United States affect the tempo of China's rapid development of nuclear capability?

Research Design and Approach

The Team will perform a SWOT analysis to weigh the strengths, weaknesses, opportunities, and threats associated with the United States' traditional and existing approaches to homeland defense against the strengths, weaknesses, opportunities and threats associated with China's rapidly escalating nuclear capacity. The Team's research will consider national and military strategies, Department of Defense policies and other issuances, Congressional testimony, case studies and reports, online resources and databases, and scholarly articles. The Team will conduct interviews with senior leaders and experts at key stakeholder organizations and will leverage its unique geographical dispersion to conduct site visits to locations germane to the problem, specifically Vandenberg Space Force Base, California; Clear Space Force Station, Alaska; and Fort Greely, Alaska. The Team will synthesize its findings and develop options to address the problem statement scoped through the lenses of technology, innovation, and policy.

Literature Review

Open-source materials such as annual combatant commander testimony before the U.S. Congress describe the current state of U.S. homeland defenses and Chinese nuclear capacity. The 2021 testimonies of General Glen VanHerck, Commander, U.S. Northern Command; and Admiral Charles Richard, Commander, U.S. Strategic Command, are noteworthy in their characterization of the problem. General VanHerck asserts the United States is behind and its reliance on legacy systems is insufficient: “Advanced systems posing threats to the homeland have already been fielded in large numbers, and our defensive capabilities have not kept pace with the threat” (VanHerck, 2021). Admiral Richards describes China’s nuclear capabilities and its conventional and other threats to the U.S. nuclear triad and delivers a sobering assessment of the aging U.S. nuclear stockpile and supporting infrastructure. Regarding plutonium pit production, alone, “our adversaries produce new pits in modern facilities at a rate many times greater than 80 per year; while most of our stockpile depends on pits that are, on average, over 50 years old and well past their design life” (Richards, 2021).

United States Code and U.S. Government policy establish the roles and responsibilities of the principal U.S. military stakeholders in a nuclear conflict involving China. The National Security Act of 1947 and Title 10, U.S. Code provide a basis for establishing the Unified Commands. Written by the Department of Defense, but signed by the President of the United States, the Unified Command Plan (UCP) prescribes the areas of responsibility (AOR), responsibilities, and missions for the commanders of those unified commands. Department of Defense Directive 5100.01, *Functions of the Department of Defense and its Major Components*, elaborates upon those responsibilities and, like the UCP, sets forth responsibilities common to all combatant commands (CCMD) and those specific to individual combatant commands. A nuclear

conflict with China will involve all combatant commands; however, five of these 11 commands are particularly relevant to the problem: U.S. Northern Command, U.S. Indo-Pacific Command, U.S. Strategic Command, U.S. Cyber Command, and U.S. Space Command. The Missile Defense Advocacy Alliance's spring, 2022 report challenges the missile defense responsibilities assigned to these commands and other DoD components, and asserts now—like so many times in the history of U.S. missile defense—is the time to revisit these responsibilities if we are to counter and outpace an evolved and rapidly escalating China threat (MDAA, 2022).

Technical studies and online resources such as the Joint Ballistic Missile Defense Training and Education Center (JBTEC), the Defense Technical Information Center (DTIC), and organizational websites provide baseline information on the capabilities and limitations of the GMD system and existing boost-phase defenses. Past Ballistic Missile Defense Review Reports and recent academic panels such as the 2022 American Physical Society's Panel on Public Affairs continue to chronicle the threats and challenges of U.S. ballistic missile defense. The forthcoming Nuclear Posture Review (NPR), Missile Defense Review (MDR), and Space Strategic Review (SSR); and the 2022 National Defense and Military Strategies also will address existing U.S. missile defense capabilities and limitations against a Chinese nuclear threat.

Findings: Adversary Comparison of Strengths, Weaknesses, Opportunities, and Threats China's Growing Nuclear Capacity

The DoD 2021 report to Congress titled "Military and Security Developments Involving the People's Republic of China" states, "the PRC's strategy aims to achieve 'the great rejuvenation of the Chinese nation' by 2049 to match or surpass U.S. global influence and power" (p. 9). According to the report, to achieve these milestones, one of China's primary goals is to modernize, diversify, and expand its nuclear forces over the next decade. China is investing

in technology and innovation to expand the number of its land-, sea-, and air-based nuclear delivery platforms and constructing infrastructure necessary to support the expansion of its nuclear forces. With these investments China has possibly already established a nascent “nuclear triad”. The report predicts the accelerating pace of the PRC’s nuclear expansion may enable it to have up to 700 deliverable nuclear warheads by 2027, and at least 1,000 warheads by 2030, exceeding the pace and size that the U.S. Department of Defense previously projected (p. 110).

Strengths

The People’s Liberation Army Rocket Force (PLARF) organizes, mans, trains, and equips the PRC’s strategic land-based nuclear and conventional missile forces and associated support forces and missile bases. The PLARF fields a variety of conventional mobile ground-launched short-, medium-, and intermediate-range ballistic missiles and ground-launched cruise missiles. In 2020, the PLARF launched more than 250 ballistic missiles for testing and training. This was more than the rest of the world combined (DoD, p. 78).

The PRC’s current intercontinental ballistic missile (ICBM) arsenal consists of approximately 100 ICBMs, including fixed and mobile launchers capable of launching single and multiple reentry vehicles. China has commenced building three solid-fueled ICBM silo fields, which will contain hundreds of new ICBM silos. The number of warheads on the PRC’s land-based ICBMs capable of threatening the United States is expected to grow to 200 in the next five years. The CSS-10 Mod 2 (DF-31A), with a range in excess of 11,000 km, can reach most locations within the United States (Tirpak, 2021).

In 2020, China fielded its first operational hypersonic weapons system, the DF-17 hypersonic glide vehicle capable medium-range ballistic missile. The *Financial Times* reported a Chinese test of a hypersonic glide vehicle launched from a rocket in low-Earth orbit that could

theoretically evade U.S. missile defense systems (Sevastopulo, 2021). These advances suggest China might be able to arm a hypersonic vehicle with a nuclear warhead and launch a surprise nuclear attack on the United States.

China's sea based platforms include the PLAN's nuclear missile submarine fleet of six boats, each of which can carry 12 CSS-N-14 (JL-2) sea-launched ballistic missiles (Tirpak, 2021). The current range limitations of the JL-2 will require the sub to operate in areas north and east of Hawaii if the PRC is to target the east coast of the United States.

China's air based platforms include the PLAAF's H-6N bomber, equipped with an air-to-air refueling probe for greater range, and recessed fuselage modifications for external carriage of an air launched ballistic missile (ALBM) believed to be nuclear capable (Tirpak, 2021).

China also enjoys several strengths of a general nature, which it can leverage in any conflict with the United States. As described in the U.S. Intelligence Community's February, 2022 *Annual Threat Assessment*, these include: an ability to combine its growing military power with economic, diplomatic, and technological clout; a growing number of air, naval, and maritime law enforcement platforms in the South China Sea; the far-reaching and aggressive Belt and Road Initiative (BRI), which is expanding China's regional and international presence; substantial space and counterspace systems and an increasing ability to integrate these services; a growing crewed and un-crewed on-orbit and lunar presence; and cyber capabilities that present "the broadest, most active, and persistent cyber espionage threat to U.S. Government and private sector networks" (p. 6-8). One final strength bears noting as it is material to the problem: China's geography. Many of China's critical systems—including counterspace systems and a growing number of missile silos—are situated deep within its borders. This presents distinct time-distance and access, basing, overflight (ABO) challenges to U.S. efforts to defeat them.

Weaknesses

Despite the accelerating pace of China's global nuclear expansion in the areas of technology and innovation, weaknesses and vulnerabilities remain in the areas of policy, doctrine, arsenal size, military readiness, and joint operations command and control.

The Chinese government stated in its report, *China's National Defense in the New Era*, "China is always committed to a nuclear policy of no first use of nuclear weapons at any time and under any circumstances" (p. 9). Additionally, the PRC's nuclear weapons policy prioritizes the maintenance of a nuclear force able to survive a first strike and respond with sufficient strength to conduct multiple rounds of counterstrike. The PLA would probably avoid a protracted series of nuclear exchanges against a superior adversary like the United States. The PRC is increasing its capacity to produce and separate plutonium by constructing fast breeder reactors and reprocessing facilities; however, even at 1,000 nuclear warheads, China is not poised to achieve parity with the United States' 3,750 warheads (Tirpak, 2021).

The 2021 DoD report to Congress observes,

PRC's leaders have identified enhancing the combat readiness of the armed forces as an important element of developing the PRC's military strength. However, some PRC media outlets have noted shortcomings in the military's training and education systems that reportedly left some commanders inadequately prepared for modern warfare. The military has not experienced combat in decades nor fought with its current suite of capabilities and new organizational structures (p. 57).

At the operational level, the DoD report further questions the PLA's ability to integrate joint forces, so essential for success in a modern war:

The lack of updated doctrine raises questions about how the PLA would practically implement joint command and control required to win future wars...PLA joint operations tend to be limited to the strategic level due to the challenges of commanding and communicating with disparate forces from different Services and combat arms (p. 56).

Finally, the DoD report notes the PRC lacks an overseas logistics and basing infrastructure to project and sustain military power at greater distances. A global PLA military logistics network and PLA military facilities could both interfere with U.S. military operations and support offensive operations against the United States (p. 148-149).

Opportunities

Strategically, there are a number of opportunities China could leverage for advantage against the United States. The U.S. Intelligence Community's 2022 Annual Threat Assessment observes the CCP perceives information operations (IO) benefits in criticizing the United States for its withdrawal from Afghanistan and for racial tensions in the United States (p. 6). A divisive U.S. society, generally, and a society enamored of foreign-produced consumer goods, and cyber-susceptible social media platforms are other opportunities ripe for Chinese exploitation. Finally, the ongoing Russia-Ukraine conflict presents compelling opportunities for China. Russia needs a friend and China could reap the benefits of Russian fossil fuel and agricultural exports. Moreover, China benefits if the conflict descends into war with the United States and its western Allies or sets conditions for a new Cold War and the United States is unable to extricate itself or diminish its European commitments and finally realize the strategic pivot to China the forthcoming national strategies prescribe.

Threats

From China's perspective, the United States' cultivation of allies and partners on its periphery (India, Mongolia, Japan, Republic of Korea, Taiwan, Vietnam, etc.) and decades-long activity in Afghanistan likely contribute to a feeling of encirclement. China likely perceives the United States' military posture activities such as the U.S. Marine Corps' repositioning in the western Pacific (and transformation toward a leaner, more expeditionary amphibious force), as well as basing and other agreements with Australia and other Southeast Asian nations as encroachment on China's traditional sphere of influence. China also distrusts U.S. space intentions and fears U.S. space domain dominance. Other threats to China include a loss of international and regional goodwill due to heavy-handed, unfair, and coercive BRI activities; unfavorable demographics; unsustainable double-digit growth necessary to realize China's modernization goals; loss of foreign investor confidence; global ill-will ascribed to China as the origin of the COVID pandemic; a Taiwanese population that has increasingly distanced itself from mainland China; and a sense that time is running out for the aging Xi Jinping to realize his vision for national rejuvenation.

U.S. Homeland Defenses

Strengths

Although its systems are optimized today for a limited ballistic missile threat from a rogue nation, the United States' ballistic missile defense architecture is a strength. Through decades of innovation, experimentation, policy discourse, and strategic thought, the United States today has an entire enterprise dedicated to missile defense. This enterprise includes, but is not limited to: joint and Service doctrine, operational concepts, ally and partner integration, ranges and testing facilities, units and organizations at all levels of war and within every Armed Service, training and education programs and facilities, human capital in terms of career fields

and specialties devoted to missile defense, command and control and fire control systems and procedures, rules of engagement, sensor networks, and proven capabilities to detect, track and defeat a ballistic missile in flight.

Site visits to three key nodes in U.S. ballistic defense and discussions with leaders and practitioners at these nodes highlight the capabilities and limitations of the existing system and suggest areas for improvement if the United States is to defeat a Chinese nuclear threat. In addition to visiting the Ground-based Interceptor (GBI) field at Vandenberg Space Force Base (SFB), California, a member of the capstone team visited Clear Space Force Station (SFS), Alaska and Fort Greely, Alaska. Together with the Sea-based X-Band Radar (SBX), these four nodes and COBRA DANE, an early warning asset located in a remote region of the Aleutian Islands, contribute to early warning detection, tracking, and mid-course engagement in the event of a ballistic missile attack against the U.S. homeland.

Discussions at Clear SFS with 13th Space Warning Squadron (SWS), 213th SWS, and on-site MDA representatives on 31 March 2022 reveal that while the current Upgraded Early Warning Radar (UEWR) is a highly capable system, it does have its limitations. Several UEWR systems stationed throughout the northern hemisphere, as well as space-based assets, contribute to a network of early warning information and help enhance the fidelity of target tracks. The newly designed and implemented Long Range Discrimination Radar (LRDR) will drastically improve the capabilities of the existing UEWR system and allow for greater fidelity during target acquisition, identification, and tracking. This data must be distributed to U.S. forces and allies at speeds greater than U.S. adversaries can process their own ballistic missile data. COBRA DANE, LRDR, and SBX are technological solutions that enable increased decision space for

senior decision makers, as demonstrated to GS&D team members during a simulation of a missile launch/detection event.

While Clear SFS and COBRA DANE are associated with detection and tracking, Fort Greely focuses squarely on response to, and defeat of a BMD event. GS&D team members toured the Fort Greely complex on 14 April 2022 and received briefings with the resident MDA team, garrison command, and 49th Missile Defense Battalion (MDB). Like Vandenberg SFB, Fort Greely is one level in a layered defense of the homeland. The 49th MDB commands an arsenal of GBIs. These GBIs are ideally suited for the midcourse defense segment, but less ideal for either boost phase or terminal phase interception of a ballistic missile. Discussions with Fort Greely leaders illuminated some of the challenges inherent in missile defense against a more capable adversary such as China.

The United States also enjoys several strengths of a general nature, which China lacks. These include a robust network of allies and partners; global access, basing, and overflight agreements; significant and recent joint operational experience; well-established nuclear triad; respect for international law and rules of responsible behavior; and a professional, educated, all-volunteer force.

Weaknesses

The United States' existing missile defense architecture is not an absolute solution to the increasingly complex calculus presented by China's rapid increase in ballistic missile capacity and hypersonic capability. Time, distance, offense-defense asymmetries, and authorities are four of the most vexing problems the United States must overcome.

Time-distance factors are inextricably linked and directly impact response time and decision space. Paraphrasing a USNORTHCOM senior leader during an interview with GS&D

participants on 21 January 2022, in many instances the United States and its adversaries have access to the same information, but whomever can share it faster has the advantage. Responding to the hypersonic concern, the NORAD/USNORTHCOM Director for Strategy, Plans, and Policy, Rear Admiral Dan Cheever noted the difficulty in tracking hypersonics is not much different than the previously identified concern of tracking low-flying supersonic cruise missiles; the end result is the same: late detection of the threat and reduced response time and decision space (Cheever, 2022). Site-visits highlighted the need for a more reliable and resilient communications network among several key BMD players; however, the longer the communication chain, the longer the decision process, and the more difficult it becomes to act within the adversary's own Observe, Orient, Decide, and Act (OODA) loop.

Location and proximity to the threat also must be considered when selecting the best defense. Consider the map at Figure 1, below:



Figure 1: DF-41 Range from Silos in Northwestern China to the Continental United States (The Economist, 2022)

Figure 1 illustrates the geo-political and technological disadvantages the United States faces if it is to defeat a Chinese nuclear land-based ballistic missile attack. The geography of boost-phase defense against China is very different from the geography of boost-phase defense against North Korea, where the United States can position maritime missile defense assets in the Sea of Japan. China's ICBM silos are deep inside its land borders, and in the boost phase, its missiles would fly mostly over land, negating the use of U.S. maritime assets such as Aegis equipped with SM-3 or SM-6 missiles. For land-based missile defense, the only U.S. partner over which Chinese ICBMs would fly during the boost phase is Mongolia. Given the economic coercion China applied toward the Republic of Korea—a far more capable and resilient partner—when the United States repositioned THAAD in that country, it is unlikely Mongolia would accept deployment of Patriot, THAAD, or other ground based capabilities on its territory.

Offense-defense asymmetry is a third consideration. The U.S. magazine of GBIs is small. According to Brigadier General Brian Davis, Director of USINDOPACOM's China Strategic Focus Group, China is actively working to overcome our missile defenses. "China will always have advantage of quantity to scale; it is high and is increasing" (Davis, 2022). This complicates U.S. shot doctrine. When launching a finite resource at an inbound ballistic missile or salvo of missiles, at what point do defense systems become saturated and lose their effectiveness? It only takes one "leaker" missile to slip through U.S. defenses and cause irreparable damage to U.S. infrastructure and perceptions of homeland defense and resiliency.

Authorities are a fourth shortcoming in the United States' approach to missile defense. There is no "definiteness of purpose". Violating Unity of Command as a principle of war, authorities for missile defense are diffuse and shared among several combatant commanders across multiple domains and AORs. Commander, USNORTHCOM is one of these commanders,

responsible for planning, organizing, and, as directed, executing homeland defense operations within the USNORTHCOM AOR in concert with missions performed by the Commander, North American Aerospace Defense Command (NORAD). The NORTHCOM commander is responsible for ballistic missile defense in his AOR, while the NORAD Commander (traditionally the same person) is responsible for air and cruise missile defense within his area of operations (UCP, 2021). Ballistic, hypersonic, and even cruise missiles often cross multiple AORs travelling at different speeds and transiting different domains. The United States does not have an integrated system or a single entity responsible for the overall tracking and transfer of responsibility while the vehicle maneuvers across the globe. The vehicle is AOR-agnostic; therefore reliance on the AOR commander should be minimalized as best as possible.

Other weaknesses which the United States must address are an aging nuclear enterprise, including its stockpiles and human capital; an inability to test its nuclear and certain other systems outside a virtual, artificial environment; a Joint Force outfitted for 20+ years of counter-insurgency operations; and domestic social and physical infrastructure (including power generation and power projection) vulnerable to Chinese cyber intrusions, misinformation, espionage, and information warfare.

Opportunities

Current global events and trends present opportunities the United States can exploit to its advantage. The Russia-Ukraine conflict may have awakened the American public to the modern, nuclear-equipped, post-terrorist, state threats which have grown while the United States was focused on its Middle Eastern wars. Related, western response to Russia's aggression presents an opportunity to similarly vilify China should it remain one of Russia's staunchest supporters. Growing Russia-China alignment is another opportunity to explore. Russia's eastern Russians

decry Moscow's misunderstanding of Chinese intentions in the Far East and Russians generally resent the shift in "big brother" status from Russia to China (Davis, 2022). The end of the Global War on Terror presents an opportunity finally to address the U.S. military's deferred modernization priorities. A burgeoning commercial space sector presents opportunities to revitalize the U.S. national security space sector. Domestic COVID exhaustion and general societal and economic disruption present IO opportunities to emphasize the pandemic's origin and even if naturally-occurring, should expose the dangers and far-reaching impacts of state- or non-state biological weapons capabilities. Finally, China's own missteps are areas to expose: economic reforms are failing, growth is slowing, the Chinese population is aging, and heavy-handed BRI initiatives diminish China's regional and international goodwill (Rosen, 2022).

Threats

In addition to the threats highlighted by China's expanding nuclear capacity and capability, the United States must consider a number of geo-strategic factors which pose risks to U.S. homeland defense. China has demonstrated its disrespect for territorial sovereignty in the South China Sea and South Asia. As it solidifies itself as the dominant partner in the Russia-China relationship—and especially if Russia's standing is further diminished by a disastrous Ukraine war—might China pursue territorial ambitions in northeast Asia, thereby gaining favorable proximity to the United States' homeland missile defenses? Perhaps more urgently, China finds itself in a "Dangerous Decade" during which time is running out for President Xi to realize his goals. Xi himself is aging, the Taiwanese population's perception of itself is changing and unlikely to reverse (they are increasingly distancing themselves from China), and China's military capabilities have grown and now exist while the United States has yet to realize its deferred modernization goals. In the end, "It is all about Taiwan...everything is tied to national

rejuvenation and modernization” (Davis, 2022). If Xi believes he is running out of time, the United States may be brought into a conflict for which its missile defenses are unprepared.

Recommendations

Technology and Innovation

Boost phase based missile defense—attacking an enemy missile when most vulnerable—may sound like an elegant solution to the growing missile threat from China; however, it also is one of the most expensive options, both economically and politically.

Terrestrial Based Boost Phased Missile Defense

The first option for prosecuting a missile defense threat in the boost phase is to use an air breathing interceptor or directed energy. This type of intercept would be performed by sea, air or land based platforms. According to an American Physical Society study completed in early 2022, these terrestrial based boost-phase intercept platforms would need to be deployed within 400 to 1,000 kilometers of the projected intercept point—well within areas where dominance of the domain (air or sea) would be required have an effective intercept against China (American Physical Society, 2022).

With increased use of unmanned aerial vehicles, the risk calculus for today's militaries is not the same as it was 20 years ago. In many situations, tomorrow's military may be able to deploy and sustain a terrestrial based boost phase defense without risk to a pilot. The DoD's demotion of “legacy systems” in order to prioritize modernization may present opportunities to repurpose some legacy systems as expendable “attritable” systems matched with artificial intelligence to confuse and overwhelm Chinese defenses, and perhaps attack Chinese missile systems at their origin if not during their boost-phase flight. The United States also should purposely pursue new low-cost attritable systems to achieve the same effects. However, a

terrestrial boost phase—or earlier in the kill chain—intercept requires an intercept mechanism (i.e., laser, directed energy, kinetic kill vehicle) in close proximity to a launch, leaving little to no decision making time for leadership. This is unlikely given China's favorable geography and numerous launch platforms and locations, many of which are situated deep within its borders.

To address the challenges of offense-defense asymmetry and shot doctrine, in addition to the development and proliferation of low-cost, attritable systems, the United States should examine novel weapons systems, such as directed energy (i.e. THEL or THEL-like systems) as a departure from a finite kinetic response option (e.g., SM-3, GBI, PAC-3). A planned Next Generation Interceptor (NGI) platform is predicted to further increase probability of intercept and aid in shot-doctrine reliability.

Space Based Boost Phase Missile Defense

The 2019 United States Department of Defense Missile Defense Review (MDR) highlighted the importance of space in missile defense which will provide “a missile defense posture that is more effective, resilient, and adaptable to known and unanticipated threats” (DoD, 2019). The MDR also discussed the use of space based interceptors against threats in the boost phase, typically the first one to five minutes of flight, before complicated countermeasures can be deployed. The 2019 MDR listed the ability to develop, test and deploy an effective space based interceptor which would reduce the necessity for ground based interceptors.

Politically, deploying a space based missile defense interceptor system is a significant risk and challenge to American administrations. Although not specifically prohibited by the 1967 Outer Space Treaty, deploying weapons to space has not been within an acceptable risk framework due to the international implications of such a move. Deploying a space based

interceptor for boost phase would be a first step in the weaponization of space, for which there may be little to no appetite politically.

Although space based assets are the cornerstone for numerous national security applications, none of these assets are designed for either a kinetic or directed energy intercept of a missile. Developing, testing, deploying and sustaining a spaced based weapons system would likely drive costs to an unacceptable level and would take a significant investment across numerous administrations. In the 2022 American Physical Society study, scientists concluded it would take 1,600 space based interceptors to ensure one is available to intercept a rapid salvo of four launches from North Korea. Coupled with an inability to service and maintain an on orbit interceptor the costs may prove to be prohibitively expensive.

Policy

At the strategic level, the United States should leverage American and international public opinion to marginalize China and diminish its influence and stature by exposing its weaknesses and exploiting the opportunities and threats presented in this paper. China's rise is not inevitable and its economic and other shortfalls and the "headwinds" it faces should be communicated widely (Rosen, 2022). The United States should continue to expose China's heavy-handed, one-sided dealings with the international community as it pursues its BRI initiatives, especially with "fence-sitter" states. The United States should amplify China's multi-faceted support to Russia in its widely-rejected Ukraine war, and expose the seam that exists between Moscow's and eastern Russians' perception of the Russia-China relationship. The United States should seize upon the unity it has found in NATO's response to the Russia-Ukraine war and cultivate—against China—the same rejection of nuclear-armed, state territorial aggression which has grown toward Russia. The United States should do so with its NATO

partners, but also with its Asian partners. Finally, and however unlikely, if the Russia-Ukraine war results in Russian regime change and something akin to détente with the west, the impacts to China would be disastrous and may bring China to the negotiating table (Davis, 2022). The United States and its western Allies should leverage this opportunity to even further isolate China on the world stage.

At the operational level, the United States must examine once again its authorities for global missile defense. The United States must develop a system and assign a single entity to oversee the defense and development of new architecture to answer these threats. Endorsing the findings of the Missile Defense Advocacy Alliance's 2022 report,

MDA should be made as efficient and agile as possible to ensure it develops, acquires, and fields the system architecture required to prepare for existing and emerging hypersonic threats. MDA is the lead system architect for MD across all domains and should be fully resourced and authorized to rapidly and efficiently develop and acquire MD systems to defend against ballistic missiles, hypersonic glide missiles, and complex hypersonic and long-range land-attack cruise missiles (MDAA, 2022).

The Missile Defense Agency is the correct agency to tackle this problem. The lessons learned and tactics, techniques, and procedures it develops can be applied across all domains and AORs. The MDA is not vested with the myriad responsibilities assigned to the combatant commanders and enjoys a singular focus to develop solutions to the problems of missile defense.

Similarly, the United States needs a single entity to coordinate, across the DoD enterprise, the implementation of the technological and other solutions MDA develops. The 2022 MDAA report suggests,

USSPACECOM should have lead responsibility for synchronizing the operational MD efforts of the geographic and functional [sic] CCMDs, to include adjudicating issues related to operational cooperation between the CCMDs on MD. USSPACECOM would replace USSTRATCOM in this role. These authorities should be reflected in the next UCP revision. USSPACECOM should be responsible for the MD early-warning and battlespace awareness mission. USSPACECOM should replace USSTRATCOM in command of the Joint Functional Component Command for Integrated Missile Defense (JFCC-IMD) (MDAA, 2022).

The re-established USSPACECOM should be the sole synchronizer to enable all combatant commands to be effective in their missile defense operations and activities as they relate to the U.S. homeland.

Conclusion

The United States is behind and its defenses, authorities, posture, and infrastructure are ill-suited to deter or defeat a Chinese nuclear attack on the U.S. Homeland enabled and supported by operations and activities in all domains. Solutions must be multi-faceted and consider the full spectrum of conflict, all domains, the entire Chinese nuclear “kill chain”, and the complete depth of the anticipated 21st century battlefield—from the enemy’s homeland to our own. Diplomacy and deterrence alone will not work, nor will the most exquisite engineering. Decision-makers demand options that integrate policy, technology, and innovation.

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