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U.S. Homeland Missile Defense: Charting A Different Course*

Dr. Peppino DeBiaso
Dr. DeBiaso served in a number of positions in the Department of Defense including as the Director of the Office of Missile Defense Policy from 2000-2021. He is currently Adjunct Professor in Missouri State University's Defense and Strategic Studies Graduate School in Fairfax, Virginia and a Senior Associate (non-resident) at the Center for Strategic and International Studies in Washington D.C.

Ambassador Robert Joseph
Ambassador Joseph is a Senior Scholar at the National Institute for Public Policy. From 2005-2007, he served as Under Secretary of State for Arms Control and International Security and Special Envoy for Nonproliferation. Previously, he was Special Assistant to the President and Senior Director for Proliferation Strategy, Counterproliferation and Homeland Defense at the National Security Council.

Introduction

The United States is approaching a crossroads on homeland missile defense. As a result of rapid progress by nuclear-armed adversaries, missile threats capable of holding American cities hostage will soon outpace U.S. planned missile defense programs and capabilities. If the United States is to halt its growing vulnerability to missile attack, it must decide soon how to adapt its missile defense posture to account for new technologies, advanced capabilities and a deteriorating strategic environment.

There is growing unease about the ability of the homeland missile defense "program of record," focused on the development of a single new interceptor, to stay ahead of the rogue state ICBM threat from North Korea and, in the likely near future, Iran. In the case of the former, the threat is expanding faster than anticipated. Given the likely decade long

development of the Next Generation Interceptor (NGI), this threat will almost certainly create a window of vulnerability by 2030. Equally important, the current missile defense program lacks the technology and capability development efforts that could contribute to countering the rising danger of coercive threats from Russia and China, as witnessed by Moscow's warnings that it is prepared to use nuclear weapons in its war on Ukraine to prevent defeat and the more oblique but still clear threats by Beijing to employ nuclear weapons in a Taiwan conflict.[1] The threat of such limited nuclear use, occurring below the threshold of large-scale attacks, is calculated to persuade U.S. leaders that the risks of responding to aggression are not worth the costs, including the prospect of further escalation.

This article focuses on the next five years and beyond, identifying areas where the United States should reorient its missile defenses to ensure the protection of the nation from both rogue state missile attack and peer state coercive threats.

An Erratic Post-Cold War Legacy

The foundation of today's approach to missile defense was set more than twenty years ago when President Bush withdrew the United States from the ABM Treaty and began deploying in 2004 the Ground-Based Mid-Course Defense system (GMD) with ground-based interceptors (GBIs) in Alaska and California. The goal was to field a system to defend against a small number ("handfuls") of missiles from rogue states.

Every successive administration stated its commitment to "stay ahead" of the rogue state threat to prevent an attack on American soil, but none has taken the measures needed to do so:

- All have failed to implement "spiral development" – that is, incorporating new technologies on a systematic and continual basis -- to stay ahead of the threat.
- All have failed to invest meaningfully in advanced technology development required to adapt the homeland defense posture to evolving threats.
- All have adopted a policy of intentionally designing GMD to avoid any capability to defend against Russian and Chinese attacks – even limited attacks -- on the U.S. homeland. This policy has all but eliminated the pursuit of new and innovative technology and capability pathways.

Shifting Threat and Geopolitical Context

Today's security environment is undergoing a disruptive transformation characterized by rogue and peer state opponents increasing the numbers and sophistication of existing missile systems, adding new types of missiles, and incorporating these weapons into their strategies for confrontation with the United States.

One pacing trend is North Korea. Its ballistic missile arsenal is growing in numbers and sophistication, far beyond projections.[2] In 2023 alone, North Korea conducted five flight tests

of different ICBMs, including a new solid-propellant road-mobile ICBM. Once fielded, these new missiles will represent a major advancement in the threat as their mobility will make them much harder to locate and destroy "left of launch." In turn, their improved survivability will place even greater reliance on the ability to intercept these missiles "right of launch." Accompanying this growth in missile capabilities is an equally rapid increase in the North's nuclear weapons arsenal, which may approach some 200 weapons by the end of the decade.[3]

A second pacing trend is Iran, a virtual nuclear weapon state today, reportedly with the ability to produce several nuclear bomb's worth of fissile material in a matter of weeks.[4] Possessing the largest missile force in the Middle East and learning from its space launch vehicle program which it is using to advance its ICBM efforts, the Iranian long-range nuclear missile threat will arise quickly when the regime takes the political decision to field the system. Its partnerships with North Korea and Russia leave little doubt that Tehran, like Pyongyang and Moscow, will seek to acquire the ability to hold American cities hostage.

The third pacing trend is the prospect of Russian and Chinese limited coercive nuclear threats. Both countries are developing strategies for confrontation that include the threat of limited nuclear escalation. Moscow's nuclear signaling over Ukraine, underpinned by its doctrine of employing limited nuclear force early, and Beijing's threats of nuclear use in a Taiwan crisis, create tighter linkages between regional conflicts involving those states, and nuclear coercive threats to the U.S. homeland.

If these threats are to be reliably countered, U.S. missile defense policy and posture will need to be altered. If not, the result will be the progressive obsolescence of U.S. defenses and an inability to deter enemies and protect the nation against missile threats.

Prospective Measures to Align Missile Defenses to the New Security Environment

There are two interrelated lines of effort to consider to align the defense of the U.S. homeland with the fundamental changes in the security environment described above. The first is to identify a set of relatively *quick fixes* that can be taken over the next several years to strengthen the U.S. ability to defeat missile threats from North Korea and potentially Iran. The second is to identify *follow-on measures* that could provide a capability to defend against the evolving missile arsenal of rogue adversaries while also denying Russia and China confidence that they could blackmail the United States by threatening limited nuclear strikes.

Under these circumstances, missile defenses could fortify deterrence, in concert with nuclear forces, by undermining the confidence of adversaries that they could readily achieve the political and military objectives of a limited attack. For rogues, this lack of confidence may convince the leadership that the risk of a failed attack, combined with the certainty of U.S. retaliation, outweighs any potential gain. For peers, sowing unpredictability and doubt into their planning for limited attack could compel the leadership to choose either to back away from a decision to escalate hostilities or to increase the attack size to a level that would resemble a much larger attack with the attendant risk of escalation to a strategic nuclear exchange.

For purposes of this assessment, the high end of "limited" ballistic missile threats is defined as up to 200 warheads delivered on no more than 20 long-range ballistic missiles. The capability to defend against ballistic missile attacks up to this size could provide protection against: (1) any likely full-scale North Korean attack; (2) any likely full-scale near simultaneous attack by North Korea and Iran; (3) coercive strikes by Russia or China acting alone; and (4) coordinated coercive attacks by Russia and China acting together.

Quick Fixes

There are a number of early steps that can be taken to help ensure that the GMD system retains its ability to counter emerging threats while hedging against the development risks inherent in current plans for the new interceptor.

First, the United States should maintain its extant GBI interceptor inventory, which continues to provide protection benefits. The ability of GBIs to defeat ICBMs is improving as they are integrated with newer and more capable sensors such as the Long-Range Discrimination Radar (LRDR) in Alaska. Additionally, the GBI's ability to intercept more capable ICBMs will be further enhanced as the Space Force builds out its Proliferated Warfighter Space Architecture later in the decade that will provide persistent global detection, warning, and precision tracking of advanced missile threats.

Second, while MDA is making some upgrades to GBIs, these are limited to maintaining the reliability of certain components for the older and less capable GBI configurations. A more beneficial approach would be to upgrade all 44 GBI kill vehicles to the latest configuration. Doing so would extend the role of GBI in support of homeland defense well beyond 2030.

Third, DoD should reassess the requirement for an additional interceptor site on the East Coast. It has long been recognized that a third GBI site would provide additional time, or battlespace, beyond the Ft. Greely and Vandenberg sites, equating to more "shot opportunities" for GBIs to defeat potential Iranian (as well as North Korean) ICBM launches on the United States.

Lastly, the United States could upgrade the sea-based SM-3 IIA missile to serve as an "underlayer" to the GMD system, which could provide dozens of additional interceptors to augment the protection of the homeland. In 2020, DoD successfully tested a modified SM-3 IIA demonstrating the feasibility of destroying an ICBM.

Follow On Measures

While the above measures offer options to remedy shortfalls in the current posture against rogue threats, they are likely insufficient to undermine calculations in Moscow and Beijing over possible limited nuclear use. The ability to defeat such strikes on the homeland would erode the credibility to threaten such strikes in the first instance. There are a range of initiatives that could provide future decision makers options to counter Russian and Chinese coercive threats. These include both sensor and advanced intercept capabilities.

As the United States reshapes its broader military space architecture, it has an opportunity to create a more resilient foundation for sensors to augment the effectiveness of today's missile defenses while also supporting advanced systems to defeat more complex future threats. Defeating advanced rogue state as well as limited peer missile threats requires precise tracking and discrimination. The Space Force's plan to build satellites to track ballistic and hypersonic missiles from medium earth orbit offers for the first time the ability for persistent tracking of complex threats.[5] Regarding development of space sensors that can distinguish warheads from decoys in the mid-course phase of flight, there currently are no significant programs underway beyond minor experiments to test sensors on unmanned aerial vehicles (UAVs). Efforts to develop a discrimination space sensor (DSS) have suffered from a chronic lack of funding and sustained program support over the past ten years. For this to change, DoD must treat the issue of discrimination as an essential component of the missile defense mission to counter more complex threats and develop a durable R&D program focused on maturing DSS technology over the next decade.

As part of a transition beyond the legacy of a missile defense sensor architecture based largely on the surface of the earth, the United States also should consider leveraging airborne platforms to provide an additional layer of sensors to track missiles, including in the boost/ascent phase of flight. For example, over the next decade, the United States and its allies will field several thousand 5th generation tactical fighters like the F-35 that possess sensors capable of detecting and tracking the infrared signatures of boosting missiles at extended ranges. Furthermore, MDA has tested sensors on UAVs to track boosting missiles; and DoD is investigating the use of drones to track hypersonic weapons.[6] These and similar efforts need to be brought to fruition and integrated into the sensor network supporting global missile defense operations.

Beyond sensors, it will be necessary to identify a framework with different mixes of interceptor technologies and systems. Significant progress is being made outside of MDA in the development of autonomous airborne platforms which show promise in support of the missile defense mission. These platforms are demonstrating the ability to operate with extended range and endurance across multiple regions and at altitudes beyond the reach of enemy air defenses. At the same time, there are advances occurring in new kinetic interceptors and directed energy weapons to counter hostile missiles. For example, despite only modest funding, defensive hypersonic missile systems that could support a UAV boost phase mission are beginning to mature. DARPA has been supporting efforts to develop a new hypersonic interceptor prototype as part of its *Glide Breaker* program to engage the high-speed boost glide weapons China and Russia are building. MDA is also conducting similar work through its Glide Phase Intercept technology program. Innovative application of autonomous airborne platforms combined with emerging high speed and long-range hypersonic interceptors offer the prospect of a new boost/ascent-phase layer capable of thinning out adversary missile salvos.

High energy laser technologies for air and cruise missile defense also have advanced in recent years despite the lack of attention they have received within MDA. The Services are

currently developing lasers to destroy airbreathing missile threats that could support both regional and homeland cruise missile defense missions. The Army, for example, is testing a 300-kilowatt range ground-based laser system on mobile platforms while the Air Force is examining high energy laser systems on tactical aircraft to destroy surface-to-air and air-to-air missiles. The recent progress occurring in the area of compact high energy lasers is also beginning to drive the technology base towards more powerful lasers in the megawatt class needed to counter incoming ballistic missiles.

Over the next decade the development of space-based defenses provides the most promising path to achieving a mix of cost-effective capabilities that can be scaled to defeat the emerging complex missile threats from rogue and peer states. Simply expanding current programs will not be effective in the long term. Space is unique in its ability to provide global persistent protection against a broad range of missile threats. In this context, a space layer of sensors and interceptors can work synergistically with land- and sea-based defenses to create an effective multi-domain layered defense to disrupt the offensive attack planning calculus of U.S. rivals. Much has changed since the United States last examined space-based kill capabilities in a homeland defense architecture. For example, marked progress has been made in crucial areas underpinning space-based kinetic energy (KE) interceptors, including precise sensor tracking, micro processing capability, space communication networks, miniaturization of satellite components, artificial intelligence to support the operation of large satellite constellations, and substantially reduced space launch costs.

Of course, any serious consideration of space defenses will be opposed by those who have long argued that such weapons will lead to a "destabilizing militarization of space." However, space is already an arena marked by expanding Chinese and Russian counterspace activities to degrade U.S. military operations. The strategic context of space defenses has thoroughly shifted over the past decade. As a senior official responsible for space policy in the Pentagon has recently remarked, "space is essential to how we compete and fight in every domain."[7] Just as the United States is adapting and reshaping its broader space strategy, it must also overcome self-imposed and obsolescent policy barriers denying it access to the unique benefits a space defense could make to not only deterring but defeating limited nuclear missile attacks.[8]

Conclusion

If the United States is to defend against the growing danger of nuclear missile threats, it must reject decades-old policies and legacy requirements currently underpinning homeland missile defense. To this end, it should be prepared to re-focus its approach to missile defense along a path that ensures, not an impenetrable shield, but rather an effective capability to protect the nation against long-range missiles from both rogue states and peer state coercive missile threats.

*This *Information Series* is adapted from a longer article by the authors that will be published in a forthcoming issue of National Institute's online *Journal of Policy & Strategy*.

[1] Alexander Khrebet, "Russia's Medvedev threatens to nuke US, UK, Germany, Ukraine if Russia loses occupied territories," *Kyiv Independent*, February 18, 2024, available at https://www.msn.com/en-us/news/world/russia-s-medvedev-threatens-to-nuke-us-uk-germany-ukraine-if-russia-loses-occupied-territories/ar-BB1itM67. Also see Matthew Kroenig, "Deliberate nuclear use in a war over Taiwan: Scenarios and considerations for the United States," Atlantic Council, September 2023, available at https://www.atlanticcouncil.org/wp-content/uploads/2023/10/Kroenig-Deliberate-Nuclear-Use-in-a-War-over-Taiwan.pdf.

[2] John Grady, "NORTHCOM: U.S. Needs New Ballistic Missile Interceptor by 2028 to Keep Pace with North Korea," *USNI News*, March 25, 2022, available at https://news.usni.org/2022/03/25/northcom-u-s-needs-new-ballistic-missile-interceptor-by-2028-to-keep-pace-with-north-korea.

[3] Bruce W. Bennett, Kang Choi, Myong-Hyun Go, Bruce E. Bechtol, Jr., Jiyoung Park, Bruce Klingner, Du-Hyeogn Cha, *Countering the Risks of North Korean Nuclear Weapons,* RAND Corporation, April 2021, available at https://www.rand.org/content/dam/rand/pubs/perspectives/PEA1000/PEA1015-1/RAND_PEA1015-1.pdf.

[4] One recent assessment concludes that Iran possesses sufficient weapons-grade uranium to construct its first nuclear weapon within a week and a total of six within a month. See "The Iran Threat Geiger Counter: Reaching Extreme Danger," Institute for Science and International Security, February 2024, available at https://isis-online.org/uploads/isis-reports/documents/Iran_Threat_Geiger_Counter_February_2024_FINAL.pdf.

[5] Steve Lambakis, "Moving U.S. Tracking Sensors to Space," *Information Series No. 575* (Fairfax, VA: National Institute Press, February 12, 2024), available at https://nipp.org/information_series/steve-lambakis-moving-u-s-tracking-sensors-to-space-no-575-february-12-2024/.

[6] Courtney Albon, "'SkyRange' uncrewed aircraft to speed hypersonic testing by 2024," *C4ISRNET*, September 16, 2022, available at https://www.c4isrnet.com/unmanned/2022/09/16/skyrange-uncrewed-aircraft-to-speed-hypersonic-testing-by-2024/.

[7] Remarks by John F. Plumb, Assistant Secretary of Defense for Space Policy, cited in David Vergun, "Official Details Space-Based Threats and U.S. Countermeasures," *DOD News*, 26 April 2023, available at https://www.defense.gov/News/News-Stories/Article/Article/3375577/official-details-space-based-threats-and-us-countermeasures/.

[8] See for example, *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States*, October 2023, available at https://www.ida.org/-/media/feature/publications/a/am/americas-strategic-posture/strategic-posture-commission-report.ashx. The Bipartisan Commission found that the U.S. "must look at new approaches to achieving U.S. missile defense goals, including the use of space-based and directed energy capabilities, as simply scaling up current programs is not likely to be effective" (p. 67).

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