The Missile Defense Review: Insufficient for Complex and Integrated Attack

The 2018 *National Defense Strategy* calls renewed strategic competition with major powers the central challenge of our time. The 2019 *Missile Defense Review* (MDR) represents the Trump administration's attempt to adapt US missile defense policy, posture, and programs to this challenge. Upon the document's public release in January 2019, President Trump stated that it marked "a new era" for missile defense. Unfortunately, actions within the review fall short of meeting both current and emerging threats, particularly with respect to layering and integration. Much remains to be done before that new era of missile defense can begin.[1]

Countering missile threats from major powers like Russia and China is no small undertaking. In the words of Acting Secretary of Defense Patrick Shanahan, "the scale a nd urgency of change required to renew our conventional and missile defense overmatch must not be underestimated."[2] Indeed, reorienting US missile defenses to contend with renewed great power competition is a comparatively greater task than that facing the field of nuclear deterrence.[3] Although the 2018 *Nuclear Posture Review* differs from its predecessor in describing Russian and Chinese capabilities and intent, in the end it recommends only two modest supplements to the inherited program of record.[4] The relative conservatism of such changes reflects that US nuclear forces have always been tailored not only to major powers like Russia and China but also to past policies as a hedge against geopolitical change.

By contrast, the United States has for a quarter century been pushing active defenses against longer missiles apart from any explicit connection to Russia and China. Despite a few caveats in the 2010 *Ballistic Missile Defense Review* and some programs to defend against antiship missiles, the focus across the Bush and Obama administrations was on limited ballistic missile threats from rogue states.[5] Changing US policy, posture, and programs to counter missile threats from major powers will require more than a few modest supplements.

Although the MDR begins an important new conversation and indicates the nature of what kinds of adaptation are required, the review and the 2020 defense budget submission lack the necessary scale and urgency

of change to adequately contribute to deterrence and defense goals in relation to Russia and China. The MDR has considerable continuity with the past program of record when a greater degree of redirection is needed. Apart from a handful of incremental improvements to current missile defense elements, more discussion of space-based assets, and some studies on countering hypersonic glide vehicles, the administration's post-MDR program of record remains focused on ballistic missile threats.[6] The MDR furthermore does not address significant portions of the 17-element tasking posed by Congress for a missile defeat review in the National Defense Authorization Act of 2017. Other shortcomings include insufficient attention to survivability, integration, air defense layering, and mobility. As of now, the MDR and the administration's subsequent budget proposals are ill-suited to the challenge of sophisticated aerial and missile attack from major powers and therefore misaligned with the current *National Defense Strategy*.

Beginning the Conversation

The MDR contains several salutary themes and concepts necessary to start a conversation about adapting missile defenses to great power competition. These include the contributions of missile defense to broader deterrence and defense goals, offense-defense integration, the stabilizing character of defenses, the importance of the space domain, and the need for flexibility and adaptability. Perhaps the most foundational section of the MDR is that devoted to the diverse roles for missile defense. Active and passive defenses contribute to deterrence, assurance, diplomacy, protection in the event of deterrence failure, and freedom of maneuver for military operations. By creating options and raising the threshold of successful attack, missile defenses contribute to stability.

This fulsome discussion of the roles for missile defense builds upon past observations in formal policy documents. The 2010 *Ballistic Missile Defense Review*, for instance, noted that "US missile defenses are critical to strengthening regional deterrence."[7] NATO's 2010 Strategic Concept made missile defense a core alliance mission, and its 2012 "Deterrence and Defence Posture Review" called for an "appropriate mix of nuclear, conventional, and missile defence capabilities."[8] The 2019 MDR goes further, stating that "missile defense systems constitute a cornerstone of our efforts to deter a missile attack from a rogue state on the US and make a clear contribution to our alliances."[9] Elevating it to "cornerstone" status appears to be a deliberate contrast with past declarations that the ABM Treaty's prohibitions were a "cornerstone of strategic stability."[10]

The MDR also emphasizes the value of the space domain for the missile defense mission.[11] The single most important recommendation of the MDR is its endorsement of a space-based sensor layer to provide birth-to-death tracking and discrimination of both ballistic missiles, which spend most of their time outside the atmosphere, and hypersonic glide vehicles, which can skim across it. The MDR also initiates a six-month study of space-based interceptors, backed up by some modest funding in the 2020 budget request.

Debating Strategic Stability

In terms of the relationship of missile defenses to the strategic nuclear forces of Russia and China, the MDR represents considerable continuity with the past. The current *National Security Strategy* states that "enhanced missile defense is not intended to undermine strategic stability or disrupt longstanding strategic relationships with Russia or China."[12] The MDR likewise specifies that "the United States relies on deterrence to protect against large and technically sophisticated Russian and Chinese intercontinental ballistic missile threats to the US homeland."[13] At the same time, the MDR avoids explicit use of the phrase "strategic stability" and declines to disavow the utility that active defenses might have for strengthening strategic deterrence.

The collective conclusion of the *National Security Strategy*, the *National Defense Strategy*, and the MDR is that the United States will ambitiously pursue active and passive missile defenses, in conjunction with attack operations, to counter regional missiles from any source, including Russia, China, North Korea, and Iran. Although the MDR does not use the phrase, one might call this an effort to defend against "nonstrategic" Russian and Chinese missiles, although if such missiles are nuclear-armed the line between strategic and nonstrategic would be difficult to draw.

Much public debate about the MDR thus far has been characterized by two competing narratives about the future attempt to counter strategic attack. One camp sees the MDR as not going far enough to alter the role of missile defense in relation to strategic nuclear attack, noting the absence of programmatic movement on space-based interceptors. Another camp interprets the MDR's extended essay about the utility of space-based defenses as the harbinger of radical change, and thus expects the United States will do too much.[14]

Both sets of criticisms are distinct, however, from a simpler point about nonstrategic missile threats from Russia and China. Putting aside the decision to rely on deterrence to counter Russian and Chinese ICBMs, the

MDR falls short of its own terms by failing to pursue concrete actions to adequately contend with complex regional missile threats well below the strategic level. At least in principle, both the MDR and the other strategy documents seem to endorse a vision of robust theater missile defenses. But neither the MDR nor the president's 2020 budget are adequate to this task.

Not Just about Ballistic Missiles Anymore

For two decades, the specter of rogue state ballistic missile threats has largely driven the missile defense policy conversation. That conversation now needs to change both in terms of the actors and the variety of threats. In the MDR's preface, Acting Defense Secretary Patrick Shanahan notes that "military superiority is not a birthright." America's onetime monopoly on precision strike capabilities has faded, and all aspects of military operations must adjust accordingly. American power projection is not uniquely challenged by ballistic missile attack, as one might have said in the 1990s. Nor is today's threat best defined by reference to the appearance of, say, hypersonic glide vehicles, advanced cruise missiles, or any category of delivery systems, however novel. The defining characteristic of the current and emerging threat is instead from what is known as complex and integrated attacks from across a broad spectrum of air and missile threats.

Missiles of various kinds play an outsized role in the current and emerging operational context, and in particular antiaccess and area-denial strategies. At the MDR's rollout event, Shanahan pointedly remarked that the United States faces a rather missile-rich environment. Missile threats, he said, are "growing disproportionately to other capabilities. Writ large, the rest of the world is not developing new fighter and bomber aircraft; they are developing missiles."[15] The 2019 review's most visible change from the 2010 *Ballistic Missile Defense Review* is the removal of "ballistic" from its title. The MDR catalogues numerous cruise missiles and hypersonic glide vehicle programs of Russia, China, North Korea, and Iran—both those fielded and in development—and also discusses adversary air and missile defense systems.

The mission of countering maneuvering glide vehicles requires new overhead sensors not merely for launch detection but also for continuous tracking. Due to the curvature of the earth, the tracking mission can only be done from above. Unfortunately, the budget submitted for fiscal year 2020 allocates limited funding to a space sensor layer, calling into question whether the Trump administration plans to field it anytime in the foreseeable future.[16]

A new missile age of sorts has begun to emerge, one characterized by an increased global supply and demand for a spectrum of increasingly capable air and missile delivery systems and the means to counter them.[17] This spectrum includes guided rockets, artillery, and mortars; unmanned aerial vehicles (UAV); a range of land attack and antiship ballistic and cruise missiles; increasingly maneuverable ballistic missile reentry vehicles; hypersonic glide vehicles; antisatellite weapons; and active air and missile defense interceptors. In short, this spectrum comprises all aspects of altitude, speed, propulsion type, range, and mission.[18] The challenge of dealing with this spectrum lies not with the diversity or the sophistication of any one of these categories, however, but with imaginative operational concepts for their lethal combination.

Rather than being limited to any one category of air or missile type, complex and integrated attack is the use of any or all these various delivery systems and platforms simultaneously or in sequence, mixing and matching them to lethal effect. Aerial attacks from all directions would furthermore be coordinated with cyber operations, electronic warfare, and other forms of nonkinetic attack—some of which may even be managed from additional aerial or missile airframes. The MDR notes that potential adversaries are "integrating offensive missiles ever more thoroughly into their coercive threats, military exercises, and war planning."[19] Missiles are said to have a "prominent role" in China's modernization plans and to be "a critical enabler of Russia's coercive escalation strategy."

Such operational integration has been on display for years. In the summer of 2017, US forces discovered a North Korean UAV that crashed into a tree. Aboard was a camera used to surveil the Terminal High Altitude Area Defense (THAAD) missile defense battery stationed in South Korea. If that UAV had instead carried an explosive device and flown into the face of the single radar on which the THAAD battery depends, the THAAD capability on the peninsula could have been effectively eliminated. Iran has used unmanned platforms to provide battle damage assessment and potentially relay targeting coordinates for ballistic missile strikes.[20] Even nonstate actors like Yemen's Houthi militants brag about using UAVs to target Patriot radars in the Yemen missile war.[21] If North Korea and Iran can innovate and employ a combined arms approach for air and missile platforms, the capability of Russia and China to do so is likely much greater. Russia has used UAVs in Ukraine and Syria to provide time-sensitive targeting data for both artillery and missile strikes. Joint and combined US forces face a more complex and contested aerial

threat environment than ever before. Adaptations to missile defense operations must presuppose nothing less.

Unmet Metrics of Sufficiency

The central metric of sufficiency for US integrated air and missile defense (IAMD) should be how well it relates to the threat of complex, integrated air and missile attack. With respect to countering regional missile threats from major powers, the MDR's adaptation of US missile defenses falls short in terms of four criteria: survivability, integration, air defense layering, and mobility. These characteristics represent some basic standards against which to judge the sufficiency of missile defense efforts relative to the threat from major powers and therefore MDR's alignment with the *National Defense Strategy*. Adaptation to better meet these criteria will be critical for missile defense to contribute meaningfully to US and allied defense goals.

Survivability

In the face of complex and integrated attack, today's Ballistic Missile Defense System (BMDS) is all too susceptible to suppression. Survivability figures prominently in the *Nuclear Posture Review*, but it is almost absent from the MDR. A form of the word appears seven times in the MDR, of which three refer to missile defense elements: once regarding past improvements to the survivability of Patriot radars in the face of jamming and twice to describing the Aegis Combat System as survivable. These three references, however, are limited to past actions. Even while noting that North Korea is making its own missiles more survivable, the MDR does not make a single recommendation to improve the survivability of today's active missile defenses. By contrast, the new Army vision for air and missile defense is quite blunt: "The most stressing threat is a complex, integrated attack incorporating multiple threat capabilities in a well-coordinated and synchronized attack. These attacks include off-axis approaches for [cruise missile] and lethal [unmanned aerial systems] to neutralize our defensive capabilities and attack our critical assets."[22]

Had the MDR grappled more with the challenge to air superiority, it might have applied the *National Defense Strategy*'s recommendation for forces that "can deploy, survive, operate, maneuver, and regenerate in all domains while under attack" and the further recommendation of "transitioning from large, centralized, unhardened infrastructure to smaller, dispersed, resilient, adaptive basing."[23] Although not specified in the MDR, the Pentagon's reported

focus on a proliferated low earth orbit (pLEO) architecture for the space sensor layer represents one important effort to achieve resilience—complicating an adversary's targeting problem through numbers and redundancy.[24] The MDR would have done well to consider how other active missile defense elements could themselves be more distributed, mobile, and survivable in the face of adversary surveillance and targeting.

The references to the Aegis system point to a path not taken. The latest baseline of the Aegis Combat System contains a layered air and missile defense system in a single platform. Although not the only solution, the deployment of some form of Aegis Ashore capabilities could relieve the stress on Aegis ships to defend forward bases. Existing Aegis Ashore facilities to support the European Phased Adaptive Approach (EPAA) could evolve to include air defenses, or the EPAA could be adapted to add Aegis-based or other forms of air defense at other locations.

Instead, despite all that has happened with Russia in the past decade, the MDR does not adjust the EPAA to contend with Russian aerial threats. The MDR has a follow-on study about operationalizing the test Aegis Ashore site to protect Hawaii from ballistic missile threats but no such study for possible Aegis air defense deployments for Pearl Harbor or Guam. In its pursuit of multi-mission Aegis Ashore sites for both air and missile defense, Japan may soon overtake the United States.

Besides active force protection for fixed assets, the path to survivability lies with the fundamentals of passive defense: deception, dispersal, and distribution.[25] The MDR acknowledges that "DoD efforts to reduce vulnerability to regional missile strikes will also include investments in the passive defense elements of hardening, dispersal, deception, redundancy, and enhanced resilience of bases, logistics, and other key facilities and functions."[26] This reference to generic DOD efforts, however, applies to bases, logistics, and facilities. The MDR seemingly does not endorse hardening, dispersal, deception, redundancy, and enhanced resilience of active missile defense elements themselves.

Integration

Another prominent theme in the MDR is integration, references to which appear no less than 76 times in the document. Integration has become one of the Pentagon's common buzzwords, but "to integrate" simply means "to make whole." The specific meaning of integration for air and missile defense therefore depends on what is being combined or incorporated and what kind of new whole those things create.

Most of the MDR's references to integration concern what might be called synchronizing active defenses with attack operations, marking a degree of interest in operational maturity and a welcome shift from the past practice of describing active missile defenses as "purely defensive." A secondary usage is integrating active and passive defenses. A third use is its general relation to diplomacy. The review mentions neither the deepest kind of integration, integrated fire control, nor several current programs of record, namely the US Army's Integrated Air and Missile Defense Battle Command System (IBCS) and the US Navy's Naval Integrated Fire Control–Counter Air (NIFC-CA) concept.

Both the IBCS and NIFC-CA seek to create fire control quality networks for information sharing among various elements—the "any sensor, best shooter" concept. Although further integration has long been an aspiration, currently fielded air and missile defense systems all too often operate in stovepipes and do not pass information of sufficient quality to coordinate engagements. To advance joint integration more broadly, the National Defense Strategy Commission recently endorsed the idea of a Pentagon-wide official with authority to advance missile defense integration and interoperability.[27]

Although the MDR touts the need for integration, it fails to lay out concrete goals or the path by which further integration can be achieved. Nor does it encourage the integration of joint air and missile defense–related assets of the several military services. Indeed, it specifically lacks the five- and ten-year milestones for integration and interoperability improvements as required by Congress.[28]

Air Defense

One aspect of integration almost entirely absent from the MDR is also one of the most urgent: active and passive air defense. Integrated air and missile defense includes active defense, passive defense, and attack operations to counter both air and missile threats. The MDR refers to IAMD as something advanced by the Joint Staff and pursued by other nations, but it does not seem to itself embrace the IAMD concept. Without air defense, the MDR's approach to integration seems more akin to what US Strategic Command (USSTRATCOM) calls "integrated missile defense."[29] This concept differs from that of integrated *air* and missile defense found in recent Joint Staff doctrinal publications and in the services' development of new operational concepts, particularly multidomain operations, distributed maritime operations, and multidomain command and control.[30] The near absence of air defense in the MDR stands in contrast to

the character of the threat and the asymmetric character of complex and integrated attack.

Today's missile defense architecture relies on some assets without adequate force protection from aerial threats. The Aegis Ashore site in Romania, for instance, cannot defend itself from so much as a helicopter attack. The entire EPAA architecture is in turn almost entirely dependent on a single TPY-2 radar based in Turkey. These resources exemplify what USSTRATCOM commander Gen John Hyten calls "big, fat, juicy targets."[31] If critical nodes in the missile defense kill chain are not themselves protected from aerial attack, the BMDS will be suppressed. When asked about the MDR's lack of attention to air defense, senior officials have said that it is up to geographic combatant commanders to provide air defense for BMDS elements.[32] But such commanders cannot magically defend the small handful of fixed, energy-emanating, ground-based radars upon which the BMDS depends, nor can they immediately create the means to defend against UAVs, cruise missiles, fixed- and rotary-wing aircraft, artillery, or other aerial threats. It is incumbent on a policy document to lay out the need to protect the BMDS from asymmetric air attack, thus driving the requirements for capabilities that could then be developed and delivered to the combatant commanders.

Another important component of the *Missile Defense Review* should have been the provision of defenses for both the homeland and regional forces against the high-end asymmetric aerial threat from cruise missiles and other aerodynamic vehicles. The only cruise missile defense plan described by the MDR is a preexisting, three-phase effort for the US national capital region. This initiative is important, but cruise missiles threaten US forward-deployed forces around the world, too. Neither the MDR nor the 2020 budget submission move forward at the speed of relevance on either a space sensor layer or new interceptor development, both of which will be necessary to defeat hypersonic glide vehicles.

Frustration with the joint force's lack of cruise missile defense led Congress to require an interim near-term capability, prompting the Army to request funding for Iron Dome.[33] But in its global role, the United States will face more sophisticated threats than those confronted by many of our allies. These lower-tier air defense efforts must be further encouraged. Given that the MDR initiates 12 follow-on studies, there might have been room for at least one on integrating air defense with missile defense and another for the protection of BMDS elements from asymmetric or nonballistic attack.

Further illustrating the MDR's lack of attention to air defense is its omission of the Army's Maneuver Short-Range Air Defense (M-SHORAD) and IBCS programs as well as the services' current kinetic- and directed-energy efforts for countering UAVs. A broad policy document like the MDR could have highlighted such capabilities and looked to coordinate services' efforts rather than leaving individual branches to address stand-alone stovepipe problems. Without an air defense layer against cruise missiles and UAVs, missile defenses will not be "comprehensive."

Mobility

Better transportability and mobility are also critical in the current strategic environment. The MDR's emphasis on the desirability of mobility echoes a similar discussion in the 2001 *Nuclear Posture Review* as well as the *National Defense Strategy*'s theme of dynamic force employment. The problem with the MDR's discussion, however, is that it touts a characteristic that does not really exist. Apart from Patriot launchers and Aegis ships, the rest of the BMDS is not actually that mobile. THAAD batteries, TPY-2s, and numerous other elements supporting the Ground-based Midcourse Defense (GMD) system for the homeland are largely in concrete or not quickly transportable. Assets like the Sea-Based X-Band (SBX) radar can take a long time to move across the Pacific Ocean.

Moreover, what sounds like mobility on paper often turns out to be rigidity in practice. Many of those Patriot batteries do not move around much, limited by political commitments and confined to the defense of high-value fixed sites such as airfields or ports. Multi-mission Aegis destroyers equipped with ballistic missile defense capabilities are to some extent tethered to the defense of islands or other defended assets.[34] The longer-ranged Standard Missile-3 IIA interceptor, improved launch-on-remote and engage-on-remote capability, and the MDR's ambitious plan to equip the full fleet of Aegis destroyers with ballistic missile defense capability will help alleviate some of the strain and thereby enhance Aegis mobility.

Adm Phil Davidson, commander of Indo-Pacific Command, recently testified that "in this day and age, if it is fixed on the planet, it is dead."[35] Similar reasoning must also be applied to BMDS elements. Precisely because our adversaries have broken the past monopoly on precision strike, the missile defense enterprise will require increased mobility, deception, distribution, and protection. More imaginative concepts for networked, dispersed elements and a roadmap toward enhanced interceptor and sensor mobility could have been pursued. Airborne sensor assets, for

instance, could create options that are lower emitting, unpredictable in their location, and more survivable. The Missile Defense Agency currently uses UAV-mounted multispectral balls to monitor intercept tests and is exploring the utility of laser-based sensors for missile tracking. The 2010 *Ballistic Missile Defense Review* likewise planned for a UAV-based airborne infrared (ABIR) sensor to support the EPAA. Despite their mobility and survivability benefits, such systems are not discussed in the MDR. The MDR does, however, endorse integrating the F-35 sensor suite into the BMDS to permit the opportunistic detection and tracking of missile launches. Continued evolution of the missile defense sensor architecture should include exploration of more mobile, lower-emitting, and more survivable sensors.

Waiting for the New Era

At the rollout ceremony for the MDR, President Trump stated that "the United States cannot simply build more of the same or make only incremental improvements."[36] With a few exceptions, however, the recommendations of both the MDR and the 2020 budget submission remain largely incremental or more of the same program of record preexisting the *National Defense Strategy*. Together, they signal that the administration does not intend to undertake the scale and urgency of change necessary to adapt missile defenses to the challenge of great power competition—at least not anytime soon.

The 2019 MDR significantly expands the operational concept for missile defense, but it does not answer the impending needs of the developing threat environment. Although well-enough suited to limited ballistic missile threats from North Korea and Iran, the missile defense posture and programs envisioned by the MDR are insufficient to contend with the full range of complex and integrated attacks by Russia or China. Today's air and missile defense systems contain insufficient layering and integration and too many single points of failure. To better contribute to regional deterrence and defense goals envisioned by the *National Defense Strategy*, US missile defenses will require improved survivability, integration, air defense, and mobility. In the absence of such change, the new era of missile defense will have to wait. SSQ

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Notes

1. The author thanks fellow CSIS Missile Defense Project team members Wes Rumbaugh, Ian Williams, and Shaan Shaikh for their comments on and contributions to this article.

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