The Institute for Foreign Policy Analysis

National Security Update

The 2019 Missile Defense Review: Strengths and Weaknesses

This *IFPA National Security Update* examines the Trump Administration's Missile Defense Review (MDR) and subsequent budget requests, including the key findings of the MDR, a net assessment of its strengths and weaknesses, positive elements and shortcomings.

Key Conclusions and Findings

- The Missile Defense Review contains several positive elements and significant contributions to U.S. missile defense policy and programs. It also has weaknesses, particularly when viewed in the context of the Trump Administration's Fiscal Year (FY) 2020 defense budget requests for missile defense programs and systems.

The MDR: Its Strengths

- The recognition that a comprehensive approach to prevent/defeat missile attacks is required through a mix of deterrence, active missile defense (in *all* phases of a missile's flight), passive missile defense, and attack operations including left-of-launch kinetic and cyber operations.

- Defense of the U.S. homeland is the highest priority of the missile defense program. Current homeland defenses will be strengthened, and advanced missile defense capabilities developed to counter emerging/future threats.

- The acknowledgement that in the emerging security environment the United States must focus not just on defeating *ballistic* missiles but also on defending against all types of missile threats, to include advanced long-range cruise missiles and hypersonic missiles.

- The space domain will play an increasingly important role in U.S. missile defense planning and operations. To exploit this domain, the MDR supports the development of a Space-Sensor Layer (SSL) for more effective detection and tracking of missile launches and for cueing and kill assessment of both ballistic and hypersonic missiles.

- The MDR underscores the need to develop boost-phase intercept (BPI) capabilities which would greatly increase the effectiveness of U.S. missile defenses. The Missile Defense Agency will conduct a 6-month analysis to determine the feasibility of developing/fielding a space-based-intercept architecture with boost-phase defense. The Defense Department will also explore the utilization of the F-35 aircraft with a kinetic interceptor as a near-term BPI option.

- The call for increased coordination, cooperation, data sharing, and alignment of programs among all U.S. missile defense stakeholders to enhance current capabilities and to develop and field new missile defense systems rapidly.

- Increasing the integration of U.S. and allied missile defense assets to improve interoperability and afford greater protection capabilities. This includes encouraging allies/partners to buy U.S. missile defense systems to facilitate integration/interoperability.

- The need to develop/deploy missile defense technologies and systems rapidly by streamlining the current cumbersome DOD acquisition policies and incorporating the best practices and technologies developed in the commercial/private sector.

- The initiation of tests in 2020 to ascertain the capability of the U.S. Navy's Standard Missile-3 IIA interceptor missile to defend against ICBMs. A positive outcome in these tests could have significant implications for the ability of the United States to defend against longer-range ballistic missiles from any source, including Russia and China. If feasible the timeline for these tests should be advanced.

- The statement in the MDR that the United States will not accept any limitations on the development, acquisition, and fielding of missile defense capabilities to protect the U.S. homeland, forward deployed U.S. forces, or allies.

The MDR and Subsequent Budget Requests: Weaknesses, Disconnects, and Priorities Moving Forward

- The gap between the priority given to the Space-Sensor Layer in the MDR and the actual funding it received in the Administration's FY2020 defense budget request. The SSL is a critical requirement for effective missile defense to stay ahead of the threat. The Defense Department needs to move forward much more rapidly with an SSL to track, target, and discriminate current missile threats as well as the emerging hypersonic missile threat.

- Given the advantages boost-phase intercept affords the defender, the United States should fast track a near-term BPI capability using the existing sensor and battle management and communications capabilities of the F-35 aircraft and equipping it with an upgraded/modified or new interceptor missile that together can detect, track, and intercept ballistic missiles in the boost phase.

- The MDR acknowledges that space-based interceptors (SBIs) would provide greater defense coverage in all phases of a ballistic missile's flight. Consequently, the Defense Department should include *Brilliant Pebbles* in its 6-month study of SBI concepts and options. The *Brilliant Pebbles* concept was based on a proven operational capability that underwent several scientific and engineering reviews in the 1989-90 timeframe. A vigorous cost evaluation in 1989 put the cost of a constellation of 1000 *Brilliant Pebbles* at $11 billion spread over a twenty-year span; adjusted for inflation this would be $23.09 billion today. Its cost could be even less now – and its operational capabilities greater – given the range of technological and cost-saving advances made in the defense industry, but especially in the commercial sector, since 1989. Michael Griffin, Undersecretary of Defense for Research and Engineering, has stated that several previous cost estimates for an SBI network have been unrealistic and highly inflated and that such a network is technically feasible and affordable. A 21st-century *Brilliant Pebbles*

architecture would provide defense against electromagnetic pulse (EMP) attacks, bolster deterrence by denial, increase escalation control options for U.S. decision makers, and help reverse the offense/defense cost-exchange ratio currently favoring the offense.

- The Multi-Object Kill Vehicle program, which would provide the ability to engage several warheads from one interceptor, should be accelerated and receive additional funding (only $14 million was requested in the FY2020 defense budget).

- The MDR acknowledges that defense of the U.S. homeland is the highest priority and that both Russia and China are modernizing their strategic nuclear forces and developing additional capabilities including advanced cruise and hypersonic missiles. The United States will continue to rely exclusively on its nuclear forces to deter nuclear strikes against the U.S. homeland. The failure to include missile defenses as an integral element of U.S. deterrence policy to counter China and Russia is a major failing of the MDR, especially in an era of great power competition. Our goal should be to have the means to deter the escalation of regional conflicts to the great power level.

    - U.S. deterrence requires at *all* levels escalatory options based on punishment and denial, retaliation and defense. The MDR stops short of endorsing such strategic logic although it does recommend the strengthening U.S. theater missile defenses. This is puzzling because the Review sets forth the logic and rationale of missile defense and the role it can and must play in deterrence and escalation control and then goes on to state that the United States must boost its regional missile defense capabilities against Russia and China because of the increased potential for conflict with them in the European and Pacific regions, respectively.

    - The United States must apply that same compelling logic to the mission of defending against Russian/Chinese attacks on the U.S. homeland and correct this inconsistency in its deterrence policy by declaring that our missile defenses will be configured and deployed to counter the threats to the U.S. homeland presented by both Russia and China.

Introduction and Overview of the Missile Defense Review

Originally expected to be released in 2018, the MDR was finally unveiled by President Trump at the Pentagon on January 17, 2019.[i] It is the first comprehensive analysis of U.S. missile defenses since the 2010 Review undertaken by the Obama Administration. It represents the culmination of an 18-month evaluation by the Defense Department of the current global offensive missile threat together with its recommended missile defense strategy, policy, and guidance for related weapons technologies and programs.

The MDR sets forth a view of the strategic environment and outlines a comprehensive approach to prevent and defeat adversary missile attacks through deterrence, active and passive missile defense, and attack operations. The MDR does not include budget figures for the programs/plans it describes. Funding details for many of the missile defense initiatives were revealed in the Trump Administration's FY2020 defense budget request sent to Capitol Hill on March 11, 2019. (As noted above, and to be detailed in a coming section, the FY2020 budget

request does not appear to reflect some of the priorities highlighted in the MDR, particularly the Space-Sensor Layer).

In summary, the key features of the 2019 MDR include: defense of the U.S. homeland as the top priority; missile defenses must stay ahead of future threats; missile defense is an integral part of U.S. deterrent strategy providing decision makers additional options for escalation control during crises/conflicts; nuclear deterrence will be relied upon to protect against Russia and China ballistic missiles targeting the U.S. homeland; U.S. regional missile defenses will protect forward-deployed U.S. forces and allies/partners; and the United States must work more closely with allies and partners to integrate and make more interoperable their respective missile defense systems.

Underlining the fact that the space domain is increasingly essential for U.S. missile-defense operations, the MDR also states that DOD needs to pursue new concepts and technologies, such as space-based sensors and boost-phase intercept systems, including space-based interceptors, to stay ahead of growing threats. Progress on the overall U.S. missile defense architecture will require major changes to the traditional acquisition processes to enable fielding new systems more quickly.[ii]

Positive Features of the MDR

The MDR sets out several important constructive features such as updates and sensible adjustments to U.S. missile defense strategy, mission focus, integration of missile defense capabilities within the United States and as practical, with U.S. allies and partners. Specifically, the positive elements outlined in the MDR include:

A Comprehensive Approach to New and Evolving Threats and Homeland Defense is the Top Priority

The MDR charts a wide-ranging plan to prevent and defeat adversary missile attacks through a blend of deterrence, active missile defense in every phase of a missile's flight profile, including the boost phase (more below), passive missile defense, and attack operations including left-of-launch kinetic and cyber operations (i.e., destroying/crippling a threat missile before it is launched).

As part of this plan, the MDR states that protecting the U.S. homeland is the highest priority of the missile defense program. Current homeland defenses will be improved, and their numbers increased. For example, 20 additional ground-based interceptors (GBIs) will be deployed in Alaska as part of the Ground-based Midcourse Defense (GMD) system protecting the United States against the threat of an ICBM attack from rogue states such as North Korea and potentially Iran. This will bring the total of GBIs to 64 (60 in Alaska and 4 in California). In addition, advanced missile defense capabilities will be developed to counter emerging/future threats (more below).

The Review also acknowledges that in the emerging security environment the United States must focus on defending against *all* types of missile threats to include advanced long-range cruise and hypersonic missiles and not just ballistic missiles (this was the reason for the change of the document's title from the Ballistic Missile Defense Review to the Missile Defense Review).

In large part, the proliferation of cruise missiles and the development of both advanced sea- and air-launched cruise missiles and hypersonic missiles by China and Russia necessitated this change. Hypersonic missiles pose a unique problem because they can reach speeds exceeding Mach 5 and maneuver in or just above the atmosphere making their detection and tracking extremely difficult. This is a primary reason why the United States needs to develop and field a Space-Sensor Layer as described immediately below.

The Space Domain: Sensors, Interceptors, and Boost-Phase Defense

The MDR correctly points out that U.S. dependence on space to support the missile defense mission will continue to grow, playing an increasingly important role in U.S. missile defense planning and operations. Exploiting the space domain provides "a missile defense posture that is more effective, resilient and adaptable to known and unanticipated threats."[iii] For example, to defend against rogue states (defined as North Korea and Iran) and support other identified missile defense roles, the MDR states that "U.S. missile defenses will require the examination and possible fielding of advanced technologies to provide greater efficiencies for U.S. active missile defense capabilities, including space-based sensors and boost-phase defense capabilities."[iv]

The MDR states that a Space-Sensor Layer or SSL "can monitor, detect and track missile launches from locations almost anywhere on the globe – they enjoy a measure of flexibility of movement that is unimpeded by the constraints that geographic limitations impose on terrestrial sensors."[v] The SSL architecture would provide birth-to-death tracking, discrimination, and fire-control data and kill assessment for ballistic missiles and the burgeoning Russian and Chinese hypersonic missile threats.[vi]

The MDR emphasizes that achieving a boost-phase intercept (BPI) capability would significantly augment the effectiveness of U.S. missile defenses. BPI allows a series of highly desirable outcomes: relative ease of interdiction because the ballistic missile is moving slowly and producing an enormous infra-red signature facilitating detection and targeting; the missile has not released its warheads/decoys; all or most of the debris from the intercepted missile would fall back on the territory of the launching nation; and it would lessen the defense burden on U.S. midcourse- and terminal-phase missile defense systems.

As a result of the "significant advantages of space-basing for sensors, and potentially interceptors, particularly for boost-phase defense," the Missile Defense Agency will assess the feasibility and cost for the development and fielding of a space-based missile intercept layer with boost-phase intercept capabilities and provide study findings to Michael Griffin, Undersecretary of Defense for Research and Engineering (USDR&E), and John Rood, Under Secretary of Defense for Policy (USDP) within six months following the release of the MDR. Similarly, to explore near-term BPI options, the Defense Department will conduct a 6-month study to examine the use of the fifth-generation F-35 stealth fighter outfitted with either a new or an upgraded/modified existing missile for both the regional and homeland defense mission.

A More Coordinated Approach Among U.S. Missile Defense Stakeholders and Allies/Partners

The MDR highlights the need to increase coordination, cooperation, data sharing, and alignment of programs among all U.S. missile defense stakeholders to enhance current capabilities and to develop and field new missile defense systems rapidly.

This orientation is reflected in the statement by David J. Trachtenberg, Deputy Under Secretary of Defense for Policy (DUSDP) regarding the need for a cultural shift in the Defense Department, military services, and intelligence community to "exploit the capabilities that we have to try to see how we can bring them all together in a coherent whole in order to deal with the anti-access and area-denial strategy that our adversaries and potential adversaries are developing."[vii]

Likewise, the MDR emphasizes the need to augment integration of U.S. and allied missile defense assets to improve interoperability and afford greater protection capabilities. It states that DOD will strengthen regional missile defenses in Europe, the Middle East, and the Indo-Pacific region, and encourage allies/partners to assume greater responsibility for defense against missile attacks. In addition, the Defense Department will deploy interoperable missile defenses and, if feasible, integrate them with the missile defenses of our allies/partners to augment capabilities against ballistic and cruise missile attacks.

The MDR also states that the United States will encourage allies to purchase U.S. missile defense systems such as the *Patriot* and THAAD, and in the case of Japan, *Aegis* Ashore. One of the many reasons the United States is adamantly opposed to the sale of the Russian S-400 missile defense system to NATO-member Turkey is that it would be dangerously unwise to integrate the S-400 into U.S. and Alliance missile defense (i.e., *Patriot* and *Aegis* Ashore) and battle management systems. Russia could place spying devices or "bugs" within the S-400 to collect information about NATO's missile defense network and operations and/or possibly degrade the system's performance.

The need to augment integration of U.S./ally missile defenses and promote interoperability was discussed in detail by USDP Rood, USDR&E Griffin, and Lt. General Samuel Greaves, Director, Missile Defense Agency (MDA), at a press briefing following the MDR's release.[viii]

Fielding Missile Defense Systems Faster and at Less Cost

The United States must develop and field missile defense technologies and systems far more rapidly by streamlining current DOD acquisition policies, learning from failure and rapidly adjusting, and incorporating the best practices and technologies developed in the commercial/private sector. This is key theme running throughout the MDR.

USDR&E Griffin is a key proponent of speeding the development and acquisition of defense systems within the Defense Department and this is a primary goal of the recently established Space Development Agency (SDA). It was created in part because current DOD procurement organizations have been slow, or unable, to leverage/incorporate technologies from the commercial sector and apply them to military space systems in a timely fashion. The SDA will focus on joint experimentation, prototyping, and accelerated fielding of space capabilities (e.g., the Space-Sensor Layer). It is also hoped that the SDA will help eliminate/reduce the duplication of space technology developed by different segments of the military space enterprise.

Testing the Standard Missile Interceptor Against ICBMs

Another positive feature in the MDR is the initiation of tests in 2020 to ascertain the capability of the U.S. Navy's Standard Missile (SM)-3 IIA interceptor missile to defend against ICBMs. A positive outcome could have significant implications for the ability of the United States to defend against longer-range ballistic missiles from any source.

If proved capable against ICBMs, the SM-3 IIA deployed in an *Aegis* Ashore configuration could support the homeland defense mission and possibly serve as a low-cost option for an East Coast missile defense site to strengthen our ability to counter North Korean and possible Iranian ICBMs. If deployed in larger numbers, SM-3 IIAs capable of intercepting ICBMs could, together with U.S. GBIs based in Alaska and California , form the basis for a limited defense of the U.S. homeland against Russian and Chinese ballistic missiles. Given that SM-3 IIAs are less expensive than the GBIs, they would also help reduce the existing unfavorable offense/defense cost-exchange ratio that currently favors the offense (more below).

No Limitations/Restrictions on the Development and Fielding of U.S. Missile Defense Systems

One of the most important statements in the MDR is that the United States will not accept any limitations on the development, acquisition, and fielding of missile defense capabilities to protect the U.S. homeland, forward deployed U.S. forces, or allies. This statement underscores the fact that the United States will never again subject itself to the type of missile defense restraints it endured for approximately thirty years under the 1972 ABM Treaty.

MDR Weaknesses, Budget Disconnects, and Missile Defense Priorities Moving Forward

The MDR has a number of weaknesses, and in the context of the Trump Administration's FY2020 defense budget request submitted to Congress on March 11, 2019, disparities exist between the language and priorities described in the MDR and the limited funding they received in the FY2020 budget request. Notable disconnects and weaknesses include the funding level for the Space-Sensor Layer, insufficient emphasis on the need to develop near-term boost-phase intercept capabilities, and U.S. deterrence policy toward Russia and China.

The Space-Sensor Layer

A key disparity exists between the apparent priority given to the SSL in the MDR and the actual funding it received in the Administration's FY2020 defense budget request. Several comments by senior defense officials after the MDR was released reinforced the importance of the SSL. For example, in testimony before the Senate Armed Services Committee, MDA Director Lt. Gen. Greaves stated that "Space provides the critical vantage point necessary to address rapidly advancing threats across multiple regions of interest and the only vantage point for global persistence to address Warfighter requirements. A space-based sensor layer consisting of two separate constellations, one for tracking and discriminating ballistic missiles and one for tracking dim ballistic targets and hypersonic missiles, would enable the United States to use interceptor inventory more efficiently and effectively to counter a broad array of threats. Integrated space and terrestrial sensors for tracking, discriminating, cueing and targeting ballistic missile threats can improve missile defense architecture performance and robustness."[ix]

However, as noted in a recent CSIS report, "the 2020 budget's pace, level, and location of funding is inadequate to develop and field space sensors anytime in the foreseeable future."[x] Moreover, apart from the parsimonious funding it received, moving forward with the SSL may be further compounded by the fact that responsibility for its development is being transferred from the Missile Defense Agency to the new Space Development Agency established on March 12, 2019.[xi]

The Trump Administration's call for a new Space Force, coupled with the establishment of the SDA and the U.S. Space Command, has created confusion/resistance in existing agencies and organizations within the U.S. space bureaucracy – as well as in Congress – about the roles and various space-related responsibilities including the development and acquisition of the SSL. Unless this situation is sorted out, the result will likely be cost growth and unnecessary delays in fielding the SSL.

Boost Intercept Options and Correcting the Offensive/Defensive Cost-Ratio

The United States should accelerate development of viable, near-term BPI options such as the F-35 aircraft. The MDR states that the sensor system of the F-35 "can detect the infrared signature of a boosting missile and its computers can identify the threatening missile's location … transmit tracking data to the Joint Force for network centric warfighting." It goes on to note that the F-35 could be equipped with "a new or modified interceptor capable of shooting down adversary ballistic missiles in their boost phase and could be surged rapidly to hotspots to strengthen U.S. active defense capabilities and attack operations."[xii] DOD is also pursuing the development of directed energy weapons (DEWs) to be outfitted on a remotely piloted vehicle (RPV) for the boost-phase-intercept (BPI) mission.

As noted in the previous section, the MDR states that the U.S. Air Force and MDA will conduct a 6-month study on "how best to integrate the F-35, including its sensor suite, into the BMDS [Ballistic Missile Defense System] for both regional and homeland defense."[xiii] The timeline of this study, like many of the dozen or so studies called for in the MDR, likely means that substantial funding for a modified or new interceptor missile would not become available at least until the FY2021 defense budget cycle.

Given the many advantages BPI offers, the MDR and FY2020 budget request do not place enough priority on the development/fielding of near-term BPI capabilities. In particular, the Air Force and MDA should focus on an accelerated program to enable F-35 to conduct detection, tracking, and cueing to intercept a ballistic missile, ideally with an upgrade/modification to an existing missile. An F-35 with a kinetic interceptor missile could be deployed much sooner than an RPV outfitted with a DEW.

In a panel discussion responding to a question about the F-35 several weeks after the MDR's release, DUSDP Trachtenberg stated that using the aircraft for missile defense "doesn't mean that all our F-35s are going to be exclusively devoted to the missile defense mission, any more than giving all of our *Aegis* ships a missile defense capability – which is where we are seeking to go here – means that they are all going to be exclusively devoted to a missile defense mission."[xiv]

The F-35 would represent a significant Air Force contribution to the missile defense mission but, like *Aegis* missile defense ships, would also be able to conduct its other core, non-missile defense responsibilities. DUSDP Trachtenberg's statement reflects a growing realization within the Office of the Secretary of Defense, and cited in an earlier section of this Update, regarding the need to integrate existing capabilities, no matter in what agency or military service they may reside, to support the ballistic missile mission.

DUSDP Trachtenberg's comments may also reflect a concern that some military services may not be fully committed to the missile defense mission. For example, the Chief of Naval Operations Admiral John Richardson made known that he wants to stop the standing ballistic missile defense patrols of the U.S. Navy's *Aegis* ships. He stated that "You have to be in a tiny little box to have a chance at intercepting that incoming missile. So, we have six ships that could go anywhere in the world, at flank speed, in a tiny little box, defending land." Admiral Richardson's preference is to transfer the mission to shore-based assets.[xv] In this context, and given the DUSDP's remarks, concern may also exist about the willingness of the U.S. Air Force to embrace a missile defense mission for the F-35, its premier fighter.

The MDR also directs the MDA to conduct a 6-month study of the feasibility of developing and fielding space-based interceptors. It will evaluate both the operational and cost effectiveness of space-based interceptor technologies when compared to other missile defense systems based on land, sea, and in the air. A space-based intercept (SBI) layer represents the most promising approach to boost-phase intercept and defending wider areas in the early stages of an enemy missile launch. This, as noted earlier, is one of the positive features of the MDR.

However, if that study is to be comprehensive, thorough, and examine the most promising SBI options, MDA should evaluate the *Brilliant Pebbles* space-intercept concept as a key part of its assessment. This concept was developed during the Reagan Administration within the Strategic Defense Initiative Organization or SDIO but was never brought to fruition. *Brilliant Pebbles* consisted of a constellation of 1,000 interceptors that combined their own early-warning and tracking capability with high maneuverability to engage attacking ballistic missiles in all phases of their flight trajectory. This concept was based on a robust, operational capability that survived numerous scientific and engineering peer reviews in the 1989-90 timeframe, including by some groups that were hostile to the idea of missile defense in general, and space-based defenses in particular.

After a vigorous evaluation, the cost of *Brilliant Pebbles* was determined to be $11 billion in 1989 dollars, or $23.09 billion in 2019 dollars, spread over a twenty-year life-cycle. That averages out to $1.15 billion per annum, a pittance in today's defense spending calculations. The $23.09 billion price tag of *Brilliant Pebble*s could be even less – and operational effectiveness and capabilities greater – today because of technological advances realized in the commercial and defense sectors since *Brilliant Pebbles* was originally envisioned. This includes the growing availability and use of low-cost, commercial off-the-shelf products, components, and technologies together with the plummeting costs for space launch now available. *Brilliant Pebbles* was cancelled by the Clinton Administration for political reasons that had nothing to do with the proven capabilities and affordable costs of the program.[xvi]

USDR&E Griffin, who served as the Deputy of Technology at SDIO in the mid-1980s when the *Brilliant Pebbles* program was under development, is on record as saying that deploying both

sensors and interceptors in space is "relatively easy, technically feasible, and reasonably affordable."[xvii] At a recent Capitol Hill event he elaborated further on the affordability of an SBI architecture and the wrong-headed and outlandishly pricey cost estimates for an SBI network cited by some critics of space basing. Griffin stated that "I get tired of hearing how it would cost $100-or-more billion to put up a space-based interceptor layer. The entire cost of a system with 1,000 SBIs could come in at about $20 billion. He added that "We've paid a lot more [for other technologies] and gotten a lot less in the Defense Department over the years."[xviii]

An SBI architecture based on *Brilliant Pebbles* would provide defense in every stage of a missile's flight profile, including most importantly in the boost phase; enhance U.S. deterrence policy by providing deterrence by denial, i.e., the capability to defend/protect crucial targets; augment the escalation control options of U.S. decision makers; and support other critical U.S. national-security missions. A 21st-century *Brilliant Pebbles* missile defense architecture would also help radically alter the offense-defense cost-exchange dynamic that now significantly favors the offense.[xix]

Moreover, such an SBI network would provide the optimal protection against a nuclear electromagnetic pulse (EMP) attack. Underscoring the importance of addressing the EMP threat and the devastation that such an attack would cause the United States, on March 26, 2019 President Trump signed an Executive Order on EMP designed to develop "sustainable, efficient, and cost-effective approaches to improving the Nation's resilience to the effects of EMPs." The Executive Order calls for a "whole-of-government approach" and wisely puts the White House in charge of managing the preparedness of the United States against naturally-occurring or man-made EMP events.[xx]

The Multi-Object Kill Vehicle

Another shortcoming/disconnect in the MDR and FY2020 defense budget request is the fact that the Multi-Object Kill Vehicle (MOKV) only received $14 million in the Missile Defense Agency's budget, an amount that barely keeps the program alive. The MOKV is a next-generation kinetic kill vehicle for the ground-based interceptors deployed in Alaska and California which would increase the ability to engage ICBM warheads, decoys, and countermeasures using a single interceptor.

The MOKV would help decrease the offense/defense cost-exchange disparity which now greatly favors the offense. The paltry $14 million funding level (MDA's overall budget request for FY2020 was $9.43 billion) is in part a result of repeated cuts to the program by Capitol Hill appropriators. In its unfunded priorities list required to be provided to Congress, MDA included $49 million for the MOKV. The Administration and MDA need to make a better case in Congress regarding the importance of the MOKV.

The MDR and Deterrence Policy: Homeland Defense Against Russia and China

In introducing the MDR at the Pentagon in January 2019, President Trump stated that "Defense of the U.S. homeland is the highest priority."[xxi] The MDR also reflects the primary conclusion of the 2017 National Security Strategy, the 2018 National Defense Strategy, and the 2018 Nuclear Posture Review, that "great-power competition" with Russia and China is now the gravest threat facing the United States.

The Review contains considerable detail about the Russian and Chinese ballistic missile modernization programs, the increasing numbers and sophistication of their missile defense systems, the counterspace/anti-satellite (ASAT) activities of both nations, the sale of some of these capabilities – particularly missile defense systems – to other nations (e.g., the Russian sale of the S-400 to Turkey, China, and India; and 13 other nations have reportedly expressed interest in purchasing the S-400 from Russia),[xxii] and the need to increase U.S. and allied missile defenses.

Throughout the document, the MDR underscores the importance of missile defense and the numerous contributions it provides to U.S. security, setting forth the compelling rationale, logic, and role missile defenses play in reinforcing deterrence, enhancing stability, providing protection should deterrence break down, and offering U.S. decision makers additional escalatory control options in a crisis/conflict situation.

For example, the first paragraph of the MDR states that "Missile defense is an essential component of U.S. national security and defense strategies. It contributes to the deterrence of adversary aggression and the assurance of allies and partners. It also strengthens U.S. diplomacy, protects against missile attacks to limit damage, supports U.S. military operations if deterrence fails, hedges against future uncertainties and risks, and helps to preserve U.S. and allied freedom of action to meet and defeat the regional aggression of potential adversaries."[xxiii]

In a section of the MDR entitled *U.S. Homeland Defense* is the following statement: "Defending the U.S. homeland against missile attack helps to … provide US leaders with the position of strength to engage adversaries and project power in support of national objectives."[xxiv] However, the document goes on to state that this rationale applies only to defense of the United States against rogue states such as North Korea and Iran, not to Russia and China even though those two nations pose the greatest nuclear threat to the United States. To dissuade Russia and China from launching nuclear strikes against the U.S. homeland, the MDR states that the United States will rely solely on the threat of retaliation with its offensive nuclear forces.

Paradoxically, the MDR calls for bolstering U.S. regional missile defenses against both Russia and China because of the increasing "capability and capacity of their regional offensive missile inventories" which "if left unaddressed, would significantly undermine the U.S. ability to deter aggression and assure allies" in the European and Pacific theaters, respectively.[xxv] If a conflict with either of these adversaries did occur at the regional level, the United States would possess more flexibility and a broader range of escalatory options if the U.S. homeland were protected with robust missile defenses specifically designed to address a Russian or Chinese nuclear strike. Our objective should be to have the means to deter the escalation of regional conflicts to the great power level. U.S. deterrence requires at *all* levels escalatory options based on punishment and denial, retaliation and defense.

From a strategic perspective, not including missile defenses as an integral element of U.S. deterrence policy to protect the U.S. homeland against nuclear attacks by Russia and China – and which four Trump Administration security documents have declared as representing the gravest threats now confronting the United States – is a major failing of the MDR and conflicts with the language used throughout the document about the central and beneficial role missile defenses play in U.S. security strategy. The MDR correctly identifies the logic and rationale of

missile defense but fails to apply such logic to countering nuclear attacks on the U.S. homeland by Russia and China.

This represents a conspicuous shortcoming in the Administration's thinking on deterrence policy and the critical role missile defenses can, and should play, in escalation control against our two primary adversaries. U.S. deterrence policy should be modified to declare that our missile defenses will henceforth be configured and deployed to counter the growing variety of threats to the U.S. homeland presented by both Russia and China.

Conclusions

The Missile Defense Review sets forth a number of productive features that will enhance U.S. missile defense capabilities, but it also, especially when examined in the light of the Trump Administration's FY2020 missile defense budget requests, contains shortcomings and inconsistencies.

Positive Components of the MDR

The recognition that a comprehensive approach to prevent/defeat missile attacks is required through a mix of deterrence, active missile defense (in *all* phases of a missile's flight), passive missile defense, and attack operations including left-of-launch kinetic and cyber operations.

Declaring that defense of the U.S. homeland is the highest priority of the missile defense program. Current homeland defenses will be strengthened, and advanced missile defense capabilities developed to counter emerging/future threats.

The acknowledgement that in the emerging security environment the United States must focus on defending against *all* types of missile threats, to include advanced long-range cruise and hypersonic missiles, and not just ballistic missiles.

The space domain plays an increasingly important role in U.S. missile defense planning and operations. The MDR supports the development of a Space-Sensor Layer for more effective detection and tracking of missile launches and for cueing and kill assessment of both ballistic and hypersonic missiles.

The United States needs to develop/field boost-phase intercept capabilities which would greatly increase the effectiveness of U.S. missile defenses. DOD will undertake a 6-month analysis to assess the viability of a space-based-intercept architecture with boost-phase defense. DOD will also study the feasibility of using the F-35 aircraft equipped with a kinetic interceptor as a near-term BPI option.

Increased coordination, cooperation, data sharing, and alignment of programs among all U.S. missile defense stakeholders are required to enhance current capabilities and to develop and field new missile defense systems rapidly. Likewise, more must be done to increase the integration of U.S. and allied missile defense assets to improve interoperability and afford greater protection capabilities in the regional context. Allies and partners will be encouraged to buy U.S. missile defense systems to meet these goals.

The need to develop/deploy missile defense technologies and systems rapidly by streamlining the current cumbersome DOD acquisition policies and to incorporate the best practices and technologies developed in the commercial/private sector. This is a major objective of USDR&E Griffin and was one of the primary reasons for the recent creation of the Space Development Agency within DOD.

Testing in 2020 to ascertain the capability of the U.S. Navy's Standard Missile-3 IIA interceptor missile to defend against ICBMs is important and if feasible, should be accelerated. A positive outcome in these tests could have significant implications for the ability of the United States to defend in a more cost-effective manner against longer-range ballistic missiles from any source, including Russia and China.

The statement in the MDR that the United States will not accept any limitations on the development, acquisition, and fielding of missile defense capabilities to protect the U.S. homeland, forward deployed U.S. forces, or allies is extremely important. It underscores the fact that the United States will not be handcuffed again with an ABM-like Treaty that precludes/restricts U.S. defenses against current and future missile threats.

MDR Shortcomings and Priorities Going Forward

The gap between the priority given to the Space-Sensor Layer in the MDR and the actual funding it received in the Administration's FY2020 defense budget request. The SSL is a critical requirement for effective missile defenses and our ability to stay ahead of the advancing threat. After the release of the MDR, several senior defense officials including MDA Director Greaves and USDR&E Griffin touted the importance of an SSL in the U.S. missile defense architecture, particularly to detect and track the burgeoning hypersonic threat. Undersecretary Griffin has stated that the cost of an SSL is both technically feasible and affordable. The Trump Administration needs to move forward much more rapidly with an SSL – and increase its funding – to track, target, and discriminate current missile threats as well as emerging ones such as hypersonic missiles.

Boost-phase intercept affords the defender many benefits including easy detection, missile destruction before warhead(s)/decoys are released, the debris will fall back on the nation that launched the ballistic missile, and reduction in the offensive/defensive cost-exchange gap that favors the offense. Given the advantages BPI could provide, the United States should accelerate fielding the F-35 aircraft with the capability to detect, track, and intercept (with a kinetic missile) ballistic missiles in the boost phase.

Space-based interceptors would provide significantly increased defense coverage and intercept capabilities in all phases of a ballistic missile's flight including in the boost phase. In the 6-month study on space-based interceptors called for in the MDR, the Missile Defense Agency should evaluate the *Brilliant Pebbles* program as part of its analysis of a viable, and cost-effective SBI architecture. In 2019 dollars, a constellation of 1000 Brilliant Pebbles would cost $23.09 billion spread over a twenty-year period. The cost of a 21st-century *Brilliant Pebbles* program could be less – and its capabilities greater – given the advancements in the commercial sector in computing technologies, miniaturization, and reduced launch costs. USDR&E Griffin believes an SBI layer is both technically achievable and affordable. A 21st-century *Brilliant Pebbles* network would provide defense against EMP attacks, bolster

deterrence by denial, expand escalation control options, and help reverse the offense/defense cost-exchange ratio that now favors the offense.

The Multi-Object Kill Vehicle program should be accelerated and receive additional funding (it is slated for only $14 million in FY2020 funding). The MOKV would provide the ability to engage several warheads from one interceptor and help U.S. missile defenses to stay ahead of the proliferating missile threat as well as contribute to a reduction in the offense-defense cost-exchange ratio that now favors the offensive.

The deterrence of Russian/Chinese nuclear strikes on the U.S. homeland should not rest exclusively on the threat of retaliation by U.S. nuclear forces as stated in the MDR. Not including missile defenses as an integral element of U.S. deterrence policy to protect the U.S. homeland in an era of great power competition and against the largest nuclear arsenals facing the United States is a key failing of the MDR. It conflicts with the language used throughout the document about the central and beneficial role missile defenses play in U.S. security strategy and in escalation control to provide U.S. decision makers with a broader range of options during a crisis/conflict.

Our goal should be to have the means to deter the escalation of regional conflicts to the great power level. U.S. deterrence requires escalatory options at *all* levels based on punishment and denial, retaliation and defense. The MDR correctly identifies the logic and rationale of missile defense – and even states the need to bolster U.S. missile defenses against potential conflict with Russia and China in a regional context – but fails to apply that logic to countering nuclear attacks on the U.S. homeland by those two adversaries. U.S. deterrence policy should be amended to include robust missile defenses to deter such attacks by Russia and China.

Endnotes

[i] *The 2019 Missile Defense Review*, The White House, January 17, 2019. See https://www.defense.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-Review/The%202019%20MDR_Executive%20Summary.pdf.
[ii] For a quick summary of the MDR see "Fact Sheet: The Missile Defense Review," *U.S. Department of Defense*, January 17, 2019 at https://www.defense.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-Review/MDR-Fact-Sheet-15-Jan-2019-UPDATED.pdf.
[iii] *The 2019 Missile Defense Review*, p. XI.
[iv] Ibid. p. 30.
[v] Ibid. p. 36.
[vi] "Next steps for the Pentagon's new space sensors for missile defense," by Sandra Erwin, *SpaceNews*, January 21, 2019. See https://spacenews.com/next-steps-for-the-pentagons-new-space-sensors-for-missile-defense/.
[vii] "The 2019 Missile Defense Review: What's Next?"

[viii] "Transcript of Department of Defense Off-Camera Press Briefing on the 2019 Missile Defense Review: Under Secretary of Defense for Policy John C. Rood; Under Secretary of Defense for Research and Engineering Michael D. Griffin; Missile Defense Agency Director U.S. Air Force Lt. Gen. Samuel A. Greaves; Colonel Rob Manning, Director, Defense Press Operations," *U.S. Department of Defense*, January 17, 2019. See https://dod.defense.gov/News/Transcripts/Transcript-View/Article/1734967/department-of-defense-off-camera-press-briefing-on-the-2019-missile-defense-rev/.

[ix] "Statement of Lieutenant General Samuel A. Greaves, USAF Director, Missile Defense Agency Before the Senate Armed Services Committee Subcommittee on Strategic Forces," April 3, 2019. See https://www.armed-services.senate.gov/imo/media/doc/Greaves_04-03-19.pdf.

[x] "Masterpiece Theater: Missed Opportunities for Missile Defense in the 2020 Budget," by Thomas Karako and Wes Rumbaugh, *CSIS*, March 2019. See https://csis-prod.s3.amazonaws.com/s3fs-public/publication/190329_Missile_Defense_2020.pdf.

[xi] "Pentagon officially stands up Space Development Agency, names first director," by Aaron Mehta and Valerie Insinna, *DefenseNews*, March 13, 2019. See https://www.defensenews.com/space/2019/03/13/pentagon-officially-stands-up-space-development-agency-names-first-director/?utm_source=Sailthru&utm_medium=email&utm_campaign=ebb%2014.03.19&utm_term=Editorial%20-%20Early%20Bird%20Brief.

[xii] *The 2019 Missile Defense Review*, p. 55.

[xiii] Ibid. p. 55.

[xiv] "The 2019 Missile Defense Review: What's Next?" See https://csis-prod.s3.amazonaws.com/s3fs-public/event/190205_Missile_Defense_Review.pdf.

[xv] "The US Navy is fed up with ballistic missile defense patrols," by David B. Larter, *DefenseNews*, June 16, 2018. See https://www.defensenews.com/naval/2018/06/16/the-us-navy-is-fed-up-with-ballistic-missile-defense-patrols/?utm_source=Sailthru&utm_medium=email&utm_campaign=ebb%2018.06.18&utm_term=Editorial%20-%20Early%20Bird%20Brief.

[xvi] For a more in-depth look examination of the *Brilliant Pebbles* program see *Missile Defense, the Space Relationship, and the Twenty-first Century*, The Independent Working Group, January 2009 at http://www.ifpa.org/pdf/IWG2009.pdf.

[xvii] "Space-Based Missile Defense Can Be Done: DoD R&D Chief Griffin," by Sydney J. Freedberg Jr., *Breaking News*, August 08, 2018. See https://breakingdefense.com/2018/08/space-based-missile-defense-is-doable-dod-rd-chief-griffin/?utm_source=Sailthru&utm_medium=email&utm_campaign=ebb%2010.08.18&utm_term=Editorial%20-%20Early%20Bird%20Brief.

[xviii] "SPECIAL REPORT: Pentagon Reexamining Space-Based Interceptors," by Jon Harper, *NationalDefense*, April 22, 2019. See http://www.nationaldefensemagazine.org/articles/2019/4/22/special-report-pentagon-reexamining-space-based-interceptors.

[xix] "Space-Based Interceptors: The Price Is Right!," by Henry F. Cooper, *Newsmax*, April 23, 2019. See https://www.newsmax.com/henryfcooper/brilliant-pebbles-price-estimate-space-defense/2019/04/23/id/912964/.

[xx] "Executive Order On Coordinating National Resilience to Electromagnetic Pulses," *The White House*, March 26, 2019. See https://www.whitehouse.gov/presidential-actions/executive-order-coordinating-national-resilience-electromagnetic-pulses/.

[xxi] "Remarks by President Trump and Vice President Pence Announcing the Missile Defense Review," *The White House*, January 17, 2019. See https://www.whitehouse.gov/briefings-statements/remarks-president-trump-vice-president-pence-announcing-missile-defense-review/.

[xxii] "At least 13 countries are interested in buying a Russian missile system instead of platforms made by US companies, despite the threat of sanctions," by Amanda Macias, *CNBC*, November 15, 2018. See

https://www.cnbc.com/2018/11/14/countries-interested-in-buying-russian-missile-system-despite-us-sanction-threats.html.

[xxiii] *The 2019 Missile Defense Review*, p. 2.

[xxiv] Ibid. p. 41.

[xxv] Ibid. p. 46.

The Institute for Foreign Policy Analysis

http://www.ifpa.org

Robert L. Pfaltzgraff, Jr., President

RLP@ifpa.org

Jack Kelly, Senior Staff

kell@ifpa.org

April 25, 2019 Report

The Institute for Foreign Policy Analysis, Inc. (IFPA) develops innovative strategies for new security challenges. IFPA conducts studies and produces reports, briefings, and publications. We also organize seminars and conferences. IFPA's products and services help government policymakers, military and industry leaders, and the broader public policy communities make informed decisions in a complex and dynamic global environment. To find out more about IFPA's work and publications, visit www.IFPA.org.