

EVOLUTION OF THE U.S. Missile Defense System: A Russian View

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Abstract

The Chapter examines the development of the U.S. missile defense system or (MDS) during the first tenure in office of the Donald Trump administration. Special emphasis is given to the examination of the main tasks, technical backup and financial resources allocated for the MDS implementation in the long run. The essay contains the analysis of the multilateral cooperation in this field expanded between the USA and other MDS-capable nations.

It also assesses the placement of the 2019 Missile Defense Review amongst other key military strategies of the United States stamped during 2017-2020. The Chapter incorporates a predicament what are national and international im-

plications of the U.S. MDS policy and employment of its striking elements in the form of interceptors versus the capabilities of the HGV or hypersonic glide vehicles that do not have any legal arms control restrictions and are gradually improving.

Introduction

In 2002, the United States unilaterally withdrew from the 1972 *Anti-Ballistic Missile Treaty* and set a course for a one-sided ambitious build-up of its global missile defense system or MDS without any restrictions. This act wrecked one of the pillars of the global strategic stability system deeply rooted in the objective interrelationship between defensive like the MDS and strategic offensive nuclear arms.¹

The 2019 Missile Defense Review

On January 17, 2019, President Trump, unveiled an updated strategy for the U.S. global MDS following the lat-

¹ The author prefers to use here the more accurate term MDS or “missile defense system”, rather than often used BMDS or “ballistic missile defense system”, because the former is developed to intercept more types of weapons rather than just ballistic or cruise missiles. It is the view of the author that the term MDS has much wider use because its interceptors could be used against ballistic and cruise missiles as well as against hypersonic glide vehicles such as have been included into the 2019 MDR.

est Missile Defense Review (MDR) by the Department of Defense (DOD). In his remarks the President said: “Our goal is simple: to ensure that we can detect and destroy any missile launched against the United States – anywhere, anytime, anyplace.”²

According to the MDR, the system provides active defense of the U.S. homeland and deployed forces, allies, and partners. The MDS has an integrated, layered architecture that provides multiple opportunities to intercept missiles and their warheads before they can reach their targets. The architecture includes land, sea, and space-based elements to track, target, and destroy offensive ballistic missiles of different ranges, speeds, and sizes after they are launched. Some elements of the MDS also have capabilities to defend against cruise missiles.

The 2019 MDR emphasized that the missile threat environment calls for a comprehensive approach to missile defense against ‘rogue states’ and regional missile threats. The MDR determined that the threat environment has grown markedly more dangerous in recent years and said that it de-

² Remarks by President Trump and Vice President Pence Announcing the Missile Defense Review. The White House, Washington, January 17, 2019. - <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-vice-president-pence-announcing-missile-defense-review/>.

mands a concerted U.S. effort to improve existing capabilities globally.

For the past 17 years, the United States has devoted significant effort to developing and deploying a layered missile defense system. That is why the 2019 report placed renewed emphasis on new technology and reduced funding during the last administration, as well as repurposing existing technology and solving the long-standing problems of boost-phase interception, directed energy for defenses, and space-based interceptors.

This approach integrates offensive and defensive capabilities for deterrence and includes:

- an *active defense* to intercept missiles in all phases of flight after launch
- a *passive defense* to mitigate the effects of a missile attack, and
- if deterrence fails; *launch attack operations* during a conflict to neutralize offensive missile threats '*prior to launch.*'

It is especially noteworthy that that is openly talking about a preemptive strike *prior to launch.* (emphasis added).

The 2019 MDR justifies the further development of the MDS by saying that potential adversaries are fielding an increasingly diverse

and more powerful missiles that can threaten US forces abroad, allies, and partners. These include multiple types of short-range, medium-range, and intermediate-range missiles intended to provide "*coercive political and military advantages*" in a regional conflict.³

1. Basic elements of the US missile defense strategy

While the 2019 MDR retains continuity in the U.S. missile defense policy and programs, it makes a significant departure in the assessment of threats.

For the first time, the document puts Russia and China in the same sentence as missile defenses, making explicit what has hitherto been implicit. It claimed that the expanding military capabilities of these "*revisionist powers*", particularly their offensive missile capabilities, challenge the US ability to deter aggression in key strategic regions.

The fundamental starting point and guidelines for the 2019 MDR follow from principal emphases found in the 2017 National Security Strategy (NSS), the 2018 National Defense Strategy (NDS), and the 2018 Nuclear Posture Review (NPR).

³ Wasserby D. Pentagon kicks off crucial missile defense review// Jane's Defence Weekly. 2019. May 17. P.11.

As has been previously mentioned, the January 2017 MDR was fully aligned with the '*Chicago Triad*' as outlined at the NATO summit in Chicago in May 2012 to include U.S. and NATO nuclear arms, missile defense assets, and conventional weapons combined into a single interoperable strategic structure. It implies that their combined weapon systems will operate according to a single strategic plan and in close conjunction with other types of nuclear and conventional weapons.

The new MDR highlights the main priorities of U.S. in MDS and identifies new "threats" from ballistic/cruise missiles, and hypersonic systems⁴

The report hinted that U.S. may decide to increase further the capacity of the Ground-based Missile Defense (GMD) force beyond the currently planned force size of 64 *Ground Based Interceptors* (GBIs). The missile base in Fort Greely, Alaska, has the potential for installing an additional 40 interceptors. Besides that, building a new GBI site in the continental United States would "*add interceptor capability against the potential expansion of missile threats to the U.S. homeland, including a future Ira-*

⁴ Missile Defense Review. The US Defense Department. Washington. 2019. February//P.I//https://www.defense.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-review/The%202019%20MDR_Executive%20Summary.pdf.

nian ICBM capability.”

Regarding the preparation for emerging threats and uncertainties, the 2019 MDR states that:

“The SM-3 Block IIA interceptor is intended as part of the regional missile defense architecture, but also has the potential to provide an important “underlay” to existing GBIs for added protection against ICBM threats to the US homeland. This interceptor has the potential to offer an additional defensive capability to ease the burden on the GBI system and provide continuing protection for the US homeland against rogue states’ long-range missile capabilities.”

U.S. is also developing a Multi-Object Kill Vehicle (MOKV), which is a next generation kinetic kill vehicle for the GBI. It is designed to improve the ability to engage ICBM warheads, decoys, and countermeasures using a single defensive interceptor. While the number of GBIs is limited, the MOKV could improve the performance of the GMD system by increasing the probability of successfully intercepting the warhead. The Pentagon officials admit that the U.S. is also “seriously studying the boost-phase MDS for interception over enemy territory.”⁵

2. US missile defense structure

As already mentioned, the US missile defense structure includes an active defense, a passive defense to mitigate the potential effects of offensive missiles; and, if deterrence fails, launch attack operations to defeat offensive missiles prior to launch. The system employs a globally-integrated network of sensors, interceptors, and command and control centers. The MDR describes in detail the various aspects of the system:

DOD is increasing the number of GBI interceptors in Fort Greely, Alaska, from 44 to 64 beginning as early as 2023. It is also enhancing the performance of existing missile defense sensors, and fielding new sensors for even greater discrimination capability.

Moreover, complex offensive missile threats from, hypersonic glide vehicles, and advanced cruise missiles, for example, are on the horizon, the report warned. To counter these challenges, DOD is enhancing ways to collect and process information from both existing space-based and terrestrial sensors to track cruise missiles and HGVs. The Pentagon believes that one of the prospective ways to meet

the future HGV threat is to use a directed-energy system.

The *Terminal High Altitude Area Defense* (THAAD) system engages short-, medium-, and intermediate-range ballistic missiles using hit-to-kill technologies in the terminal phase of flight in either the endo-atmosphere or the exo-atmosphere. In 2020, the United States possessed seven THAAD batteries, including one deployed in Guam and another in the Republic of Korea.

As a clear demonstration of the American commitment to NATO missile defense, when the *Aegis Ashore* site in Romania underwent a scheduled update, the United States temporarily deployed a THAAD system to Romania during the upgrade.

The Aegis Sea-based missile defense is in the form of the *Aegis Weapon System* (AWS) for active missile defense. It uses both the SM-3 and SM-6 interceptors to provide protection at sea and ashore against “regional ballistic and cruise missiles.” U.S. is testing improved variants of both the SM-3 and SM-6 missiles and fielding a new sensor. These new missiles and sensor will significantly increase Aegis missile defense capabilities. Multi-mission Aegis MDS-capable ships are also “highly maneuverable and survivable,” and will be surged as needed during crisis and conflict.”

5 Ibidem. P. 8.

Number of US Aegis-capable ships with SM-3 interceptors

| Numbers of MDS-capable Aegis ships and SM-3 missiles under FY2019 budget submission | FY17 | FY18 | FY19 (req.) | FY20 (proj.) | FY21 (proj.) | FY22 (proj.) | FY23 (proj.) |
|---|------|------|-------------|--------------|--------------|--------------|--------------|
| MDS-capable Aegis ships | | | | | | | |
| 3.6 version | 17 | 15 | 10 | 6 | 5 | 4 | 4 |
| 4.0.X version | 9 | 2 | 0 | 0 | 0 | 0 | 0 |
| 4.1 version | 1 | 9 | 16 | 20 | 21 | 22 | 22 |
| BL 9C.1 version | 8 | 10 | 7 | 4 | 1 | 0 | 0 |
| BL 9.C2 version | 0 | 2 | 8 | 16 | 22 | 29 | 31 |
| Total | 35 | 38 | 41 | 46 | 49 | 55 | 57 |
| Aegis Ashore sites | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| SM-3 missile cumulative deliveries | | | | | | | |
| Block I/IA | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| Block IB | 147 | 182 | 218 | 253 | 287 | 324 | 362 |
| Block IIA | 0 | 4 | 15 | 17 | 27 | 42 | 48 |
| Total | 297 | 336 | 383 | 420 | 464 | 516 | 560 |

Source: FY 2019 Missile Defense Agency (MDA) budget submission. The FY 2019 quantity of two for Aegis Ashore sites in FY 2019 may on reflect the delay in the construction of the second site in Poland to FY 2021.

The number of sea-based interceptor missiles installed on *Ticonderoga-class* guided-missile cruisers and *Arleigh Burke-class* guided-missile destroyers will significantly increase. The *Aegis* MDS system was originally designed primarily to intercept theater-range ballistic missiles, meaning short-, medium-, and intermediate-range ballistic missiles (SRBMs, MRBMs, and IRBMs, respectively). In

2020 the MDS interceptor missiles used by Aegis ships are the SM-3 Block IIA, the SM-2 Block IV, and the SM-6.

In 2020 there were 40 operational multi-mission *Aegis* MDS-capable ships divided between the Pacific and Atlantic Fleets, with plans to increase that number to 60 by the end of FY 2023.

"Some of these multi-mis-

*sion Aegis MDS-capable ships will be upgraded with new software, and thereby provide greater missile defense capability. The combination of increased ship numbers and capability of each ship will result in a more flexible and resilient Aegis force with significantly greater missile defense capability."*⁶

⁶ Navy Aegis Ballistic Missile Defense (BMD) Program: Background and Issues for Congress. Washington:

By 2023, the MDS will be installed on 60 ships, and by 2042-2043 – on 84 or 96 vessels. Thus, the Aegis MDS will be on 24 percent of USN warships

Allied countries that now operate the MDS, are building, or are planning to build *Aegis*-equipped ships, include Japan, South Korea, Australia, Spain, and Norway.⁷

The 2019 *Missile Defense Strategy* broadly disclosed plans to use heavy unmanned aerial vehicles to deliver missile interceptors as well as the fifth-generation *F-35 Lightning II* multipurpose fighter-bomber, which is already being delivered to some NATO countries and other Washington's allies. In particular, this aircraft is to be adapted for the installation of anti-missile sensors and a special air-to-air interceptor missile to destroy ballistic missiles in their boost-phase.

The implementation of Phase III of the *European Phased Adaptive Approach* (EPAA), which features an *Aegis Ashore* system in Poland, is underway. Using the SM-3 Block IIA missile, it will expand defensive coverage against medium- and intermediate-range ballistic

missile threats.

The US has often denied that *Aegis Ashore* in Romania has been designed, engineered, or tested for an offensive strike capability, saying that it lacks the vital command, control, communications, and weapons support architecture, software, and hardware required for launching the *Tomahawk Land Attack Cruise Missile*. Narratives to the contrary exist only in the imaginations of Russia's information operations machine, a US official insisted. But these claims are not correct: and the missile defense installations can house offensive weapons, and do not require any special computer reprogramming for that function.⁸

The *Patriot* air and missile defense system has a proven successful combat record. It can launch several interceptor variants, and is now deployed with US, allied, and partner forces in 12 countries in multiple theaters of operations to defend against SRBMs and cruise missiles. In 2020, eight *Patriot* battalions with 33 batteries were stationed in the

8 Козин В. Объекты ПРО США в Румынии и Польше должны быть демонтированы // Портал МГИМО. 2020. 14 февраля// <https://mgimo.ru/about/news/experts/obekty-pro-ssha-v-rumynii-i-polzhe-dolzhny-byt-demontirovany>. Козин В. В Редзиково продолжают «строить». Размещение американских противоракетных комплексов в Старом Свете расшатывает здание европейской безопасности//Красная звезда. 2020. 28 февраля// <http://redstar.ru/v-redzikovo-prodolzhayut-stroit/>.

United States while seven battalions with 27 batteries are stationed overseas.

MDS is a threat to global strategic stability

It is difficult to agree with the 2019 MDR notion that the US missile defenses are having a stabilizing effect. They could have been 'stabilizing', if they were carefully balanced between opposing nations and limited to certain qualitative ceilings and geographic deployments. But, after the demise of the ABM Treaty in 2002 when Washington unilaterally withdrew from it and began fielding strategic MDS interceptors without limitation and by neglecting the objective interrelationship that exists between strategic defensive and strategic offensive potentials. The establishment of an unlimited global MDS cannot be considered as 'stabilizing.'

Another controversial setback of the 2019 MDR is that an active US missile defense will require the examination and possible fielding of advanced technologies to provide greater efficiencies for active missile defense capabilities, "including space-based sensors and boost-phase defense capabilities."

The situation will become particularly destabilizing as the number of missile defense interceptors get closer to the number of strategic

Congressional Research Service. 2019. July 24. P. 7.

7 Navy Aegis Ballistic Missile Defense (BMD) Program: Background and Issues for Congress. Washington: Congressional Research Service. 2019. July 24, P. 2-3.

missiles, which are currently limited by the New START treaty.

According to figures released by the U.S. Congress and the Pentagon's Missile Defense Agency in the next couple of years the number of US strategic missile defense interceptors of different types, excluding the Patriot PAC-2/PAC-3 AAD/ systems, may reach 1826. So, the overall quantity of strategically-designated interceptors produced by the USA will outweigh the number of 700 operationally deployed Russian SOA delivery vehicles by a factor of 2.6:1, while the total number of such interceptors directly controlled by the USA (1202) will surpass the number of 700 operationally deployed Russian SOA delivery vehicles by a factor of 1.7.

The problem will be especially worsened in the future if/when the ratio between US BMD interceptors and Russian strategic offensive arms' delivery vehicles reaches a proportion of 3:1, and the ratio between the US interceptors and Russian strategic nuclear warheads climbs to 2:1 (once again, the AAD/BMD Patriot missile systems are not counted here). If this happens, it will be a major blow to the global strategic stability, because after delivering a massive nuclear first strike, any retaliation will be able to be countered by a multi-layered global missile defense infrastructure.

3. U.S. treats missile defense as separate from arms control

The 2019 MDR asserts that the United States was committed to diplomatic efforts that advance US, allied, and partner security. Missile defenses provide US leaders a position of strength from which to engage potential adversaries diplomatically in peacetime or during crises. This was important in the past, and likely will continue to be so in the future. The MPR contends that the American MDS can contribute to arms control agreements and other diplomatic initiatives – a theory that the Russian Federation and the PRC find irrelevant as they frequently point out that, on the contrary, American MDS creates hindrances to achieving arms control.

Ex-director of the US Missile Defense Agency (MDA), Lieutenant General Samuel Greaves, observed in 2019 that American missile defense has three major priorities:

1. to ensure that the US will continue focusing on increasing system reliability to ensure it builds the confidence in the mind of the combatant commander;
2. to increase US engagement capability and capacity;
3. to rapidly address the ad-

vanced threat.

He also separated active from passive MDS as those that involve hardening, dispersal and deception measures to protect them from potential destruction.⁹

During the next stages of the missile defense deployment in Europe – the so-called Phased Adaptive Approach – the US MDA plans to develop and test several new technologies designed to intercept and destroy ballistic missiles during the ascent phase of flight, to provide increased flexibility and targeting opportunities and called the '*Early Intercept Concept*'. A robust advanced missile defense technology development program is an integral part of the US strategy to hedge against future missile threat uncertainties.

To address the increasingly complex missile threat environment, however, a broader approach is required. It should be remembered here that the United States will also field, maintain, and integrate three different means of missile defense – active defenses; passive defenses and attack operations – as mentioned above, "*to improve the overall likelihood of countering offensive missile attacks successfully*".

Plans for the integration of missile defense, force man-

⁹ The 2019 Missile Defense Review: What's Next? 2019. 2019. February 4// <https://www.csis.org/analysis/2019-missile-defense-review-whats-next>.

agement, and operations support require an emphasis on global coordination and design, but employing regional execution to enable engagement from the best interceptor using the best sensor data. As the MDR states: *"toward that end, it is necessary to pursue more integrated approaches to the missile defense mission that leverage the full range of assets available."* Addressing emerging transregional offensive missile threats will require interoperable missile defense systems comprised of networked sensors, shared intelligence, interceptors, and a command-and-control structure coordinated among multiple combatant commands.

The Pentagon reportedly commissioned several studies following the findings of the MDR that included among others as follows:

1. designation of an organization to acquire cruise missile defense for the homeland;
2. assessment of the required number of THAAD batteries;
3. conversion of all Aegis destroyers to be "fully missile defense capable" within ten years;
4. acceleration of efforts to enhance missile defense tracking and discrimination sensors;
5. integration of the F-35 sensor suite into the

MDS;

6. study of the development and fielding of a space-based missile intercept layer;
7. identification of resources, testing, and personnel requirements for defense against hypersonic threats;
8. designation of an organization with acquisition authority for capability development, employment concepts, and operational integration of pre-launch attack operations.

In the same year as the 2019 MDR, US officials made clear-cut statements where they excluded any arms control arrangements dealing with national and global missile defense.

Addressing the 2019 Multinational Conference on Missile Defense in Dresden, Germany, on October 29, 2019, Thomas Dinanno, Deputy Assistant Secretary of State for Defense Policy, Emerging Threats, and Outreach,¹⁰ emphasized very clearly that the it has been the policy of the United States for many administrations that missile defense and arms control are separate and distinct is-

¹⁰ Dinanno Th. Remarks to 2019 Multinational Conference on Missile Defense. Dresden, Germany, October 29, 2019// <https://www.state.gov/remarks-to-2019-multinational-conference-on-missile-defense/>.

sues.

4. Cooperation with U.S. global partners on missile defense

As offensive missile capabilities continue to proliferate, cooperation with the allies and partners has gained increasing importance to advance missile defense architectures for their common protection,

U.S. has publicly stated that it is working with its NATO allies and partners to develop an integrated air and missile defense architecture that provides 360-degree coverage for Europe against all air and missile threats. France, Germany, Italy, the Netherlands and Spain, already have such capability. Poland and Romania are in the process of procuring interoperable capabilities such as the Patriot system. The United Kingdom is investing in a ground-based radar.

It is clear that NATO MDS components will be enhanced. According to NATO officials, the Alliance's missile defense capabilities have been planned to exist until 2075 and beyond.

The participants in the 2018 Brussels NATO Summit once again underscored that NATO deterrence and defense is based on *"an appropriate mix of nuclear, conventional and missile defense capa-*

bilities," which they promised to continue to adapt. The Summit was reminded that NATO MDS Initial Operational Capability was declared in 2016 and the next major milestone is the completion of the core element of the NATO MDS Command and Control - the only component eligible for common funding.

The Summit also expressed commitment to the strengthening of the NATO Integrated Air and Missile Defense system and guided its aerospace capabilities "to operate together jointly, more swiftly, and effectively in peacetime, crisis, and conflict." In the Alliance's view, missile defense can complement the role of nuclear weapons in deterrence, but it cannot substitute for it. By stressing that the NATO MDS is based on voluntary national contributions, mainly the EPAA assets in Romania, Turkey, Spain, and Poland, the 2018 Brussels Summit eloquently hinted that additional voluntary national contributions to that system are needed "to provide its robustness and effectiveness".

There are seemingly three main problems that the US and NATO MDS might create globally in the coming decades:

1. the US MDS assets that are mainly sea-based will move into the World Oceans, where 95 percent of US MDS potential will then be deployed;

2. by making a permanent 'mix' of the U.S. and NATO nuclear, missile defense and conventional forces; and
3. the production of thousands of interceptors by the United States without any limitations will considerably outweigh the number of strategic offensive nuclear arms fixed by New START. Sales of the Aegis system to allied countries began in the late 1980s.

Two points:

Firstly, such consequences will inevitably arise because of the constant modernization of American and NATO nuclear, missile defense and conventional assets. According to the last four transatlantic Summits assembled in 2012-2019, the eventual goal is to adapt the constantly transforming military and political situation on the globe and to dominate it militarily.

Secondly, if the US-NATO strategic and tactical nuclear weapons, missile defenses and conventional forces that have already been deployed on the European continent, or are in the process of continuous modernization in the form of the 'Chicago Triad', are used, there will be too little time for other nations to make highly responsible decisions to counteract

them.

This military and political deadlock is being deepened by the fact that other nations do not have such 'forward-based forces' close to the US coast or around many NATO states. This creates an operational and strategic disparity between the USA and NATO, on the one hand, and non-NATO nations pursuing their own domestic and foreign policy, on the other. Talking at the *Royal United Services Institute MDA* conference in February 2019, Frank Rose, a senior fellow in security and strategy at the *Brookings Institution* who had previously been US Assistant Secretary of State for Arms Control, Verification and Compliance and Deputy Assistant Secretary of State for Space and Defense Policy, State Department, admitted that the 'central element' of the layered US missile defense capability is the contribution of allies and partners, such as those within NATO, in terms of national developments and contributions to MDS.

The Pentagon believes that missile defense plays a critical role in NATO's defense of Europe from coercion and aggression. Interoperable NATO active missile defense systems will improve the Alliance's collective defense capabilities. For example, the UK's Fylingdales Upgraded Early Warning Radar can support the defense of the United States against Iranian long-range missile

threats while also supporting the defense of Europe from potential IRBM threats. Early detection and tracking of incoming offensive missiles allows the GMD system to engage threats earlier in their flight, improving the likelihood of destroying them. The missile defense radars the US has deployed in Japan provides enhanced early warning and tracking of missiles launched from North Korea toward the US or Japan.

The US and Japan are collaborating closely to develop the SM-3 Block IIA interceptor, which will provide a new missile defense capability against MRBMs and IRBMs. Japan is developing key components of the SM-3 Block IIA. The integration of the SM-3 Block IIA into land- and sea-based platforms will provide greater regional defense coverage against threats to US forces, and allies and partners. Initial fielding was planned for the 2018 timeframe. The US will eventually deploy the SM-3 Block IIA to the fleet and will also deliver this interceptor and AWS upgrades to support the U.S. contribution to NATO MDS. Two Aegis Ashore systems are also scheduled for fielding in the 2023 timeframe, and these will add to Japan's layered defense posture and provide greater flexibility in deploying mobile missile defense systems.

Within the Indo-Pacific, Japan remains one of the Unit-

ed States' most important allies. The Pentagon benefits greatly with each shared effort with their 'good friends' in Japan. The US \$3.6 billion *SM-3 Block IIA Cooperative Development* (SCD) Project has been the cornerstone of US-Japan missile defense cooperation and the USA has now entered the production phase of the missile. In Washington's opinion, Japan has a robust missile defense capability and hosts a significant number of US MDS assets. Therefore, the USA looks forward to future potential MDS cooperation as it proceeds with efforts to bolster their already strong mutual defense.

The Republic of Korea (ROK), another "*stalwart of mutual defense*" in East Asia, with whom the USA shares a nearly seven decades-old alliance, is also an important missile defense partner. This partnership, with the advantages of combining missile defense assets in the region, greatly increases ROK security and the security of US interests on the Korean peninsula.

Israel is another vital partner for the United States because it faces missile threats from Iran, and elsewhere. The US-Israel bilateral security relationship dates back many decades and the two states continue to work together on several missile defense projects. These the *Arrow*, *David's Sling* and *Iron Dome* systems. They contribute to a multilayered defense ar-

chitecture which has proven the effectiveness of Israeli missile defense. In recognition of this, the US Army has announced the purchase of *Iron Dome* weapons systems to enhance their *Indirect Fire Protection Capability*. The strong US-Israeli missile defense partnership is underpinned by a new *Memorandum of Understanding* that includes a commitment of US \$500 million for Israeli missile defense each year from FY 2019-2028.

Elsewhere across the region, Saudi Arabia has begun the process of acquiring a significant THAAD capability and Bahrain has decided to acquire *Patriot AD/MDS*. This is in addition to the already substantial missile defense forces in Saudi Arabia, the United Arab Emirates, Kuwait, and Qatar.

The United States is working closely with *Gulf Cooperation Council* (GCC) partners to encourage them to acquire and deploy missile defense capabilities that, when integrated over time, would provide the basis for a networked, layered defense across the region. US Central Command maintains a series of regular engagements with GCC air and missile defense forces. These exchanges are establishing the foundation for joint missile defense planning and operational cooperation.

The MDR does not mention any cooperation in missile defense with Russia and the

PRC. On the contrary, it has labelled them as adversaries. US researcher Elaine Bunn has commented that it is unclear whether the 2019 MDR proposes defending the US homeland by intercepting Russian and Chinese cruise missiles and hypersonic glide vehicles, or just seeks to improve early warning of such attacks. In some sections, the report focuses on early warning while in others, it appears to be talking only about regional defense against Russian and Chinese cruise missiles and hypersonic glide vehicles. In other sections, the report states that enhancing US ability to track hypersonic glide vehicles and advanced cruise missiles will make defeating them possible.¹¹

5. Projected expenditures for missile defense

According to MDA [estimates](#), Congress has already appropriated over US \$ 200 billion in total for the agency's programs on missile defense development between FY 1985-2020. This figure does not include spending by the military services on programs such as the Patriot PAC system or the many additional tens of billions

of dollars spent since the development of MDS first began in the 1950s.

The 2019 MDR strategy recognized that outer space is particularly important to missile defense. Consequently, plans have been formulated for upgrading the space-based components of the Early Warning System (EWS) servicing the global MDS infrastructure, and to continue the development of space-based strike weapons and anti-satellite systems. On January 19, 2018, U.S. Air Force launched into orbit the fourth satellite of the SBIRS series (Space-Based Infrared Satellite System), named SBIRS GEO-4. SBIRS system designed to transmit details of a missile attack to the MDS. It is also capable of discriminating warheads from decoys and transmitting technical intelligence on combat situations on the Earth's surface. The first four satellites of this category, from SBIRS GEO-1 to SBIRS GEO-4, were launched in 2011, 2013, 2017, and 2018, respectively. The launch of SBIRS GEO-5 and SBIRS GEO-6 satellites is expected in 2020-2021.

The Donald Trump administration's FY 2021 defense budget request sought to supplement US homeland missile defenses by modifying existing systems to defend against longer-range threats. Specifically, the budget submission for the MDA requested funds to adapt the Aegis missile

defense system and the THAAD system, designed to defeat short- and intermediate-range missiles, to intercept limited ICBM threats.

The administration was asking for a total of US \$20.3 billion for missile defense programs in FY 2021, a decrease of US \$1.6 billion from the fiscal year 2020. Of that amount, \$9.2 billion would be for the MDA, \$7.9 billion would be allocated to non-MDA-related missile defense efforts such as early-warning sensors and the Patriot system, and \$3.3 billion would be for non-traditional missile defense and left-of-launch activities such as offensive hypersonic glide vehicles.

The MDA request of US \$9.2 billion would be a decrease of 12 percent from the 2020 funding of \$10.5 billion. The GMD system would receive about \$1.7 billion under the budget proposal, a decrease of about \$465 million from the previous year's spending. Of the \$1.7 billion, \$664 million would be for the new *Next Generation Interceptor*. The MDA decided to pursue development of the interceptor last year in the wake of the demise of the Redesigned Kill Vehicle.

The MDA was proposing to request \$9.3 billion for the GMD system between 2021-2025. This is an increase of \$3.7 billion, or 66 percent, above what the agency planned to request between 2020-2024. Although

11 Bunn E. Musings of a Missile Defense Moderate//Arms Control Today//2019. March// <https://www.armscontrol.org/act/2019-03/features/assessing-2019-missile-defense-review>.

the DoD initially requested to spend approximately US \$7.4 billion per annum from 2017-2020, the 2018 *National Defense Authorization Act* (NDAA) initially provided more than US \$12 billion. For the sake of comparison, the average amount of money spent by President Barack Obama for the MDS configuration during his eight White House years was US \$ 8.22 billion per year. Thus, by 2020 more than 40 USN warships were equipped with SM-3 anti-missile systems.

Congress agreed another big increase for MDS in FY 2019, approving US \$10.3 billion for the MDA, an increase of \$1.4 billion above the budget request of \$9.9 billion. The 2020 NDAA has allocated nearly the same amount, US \$10.4 billion, for missile defense, including \$108 million for a space-based sensor array to focus on tackling hypersonic and ballistic missiles.

Seven batteries were armed with THAAD-type missile defense systems in the United States, two are planned to be deployed in South Korea, and the total number of the Patriot PAC-3 antimissiles has reached almost 1,000 interceptors.¹²

According to *Jane's Defence Weekly*, acting Defence Secretary Mark Esper and US

Army Chief of Staff General Mark Milley, pledged in the future to concentrate on six military modernization priorities for the Armed Forces, including missile defense that undoubtedly will constitute the highest priority of the succeeding U.S. Administrations.¹³

Taking into account that there are no international arms control legal barriers, it is highly likely that the unrestrained US MDS global expansion will trigger a specific missile defense arms race. Such an uncontrolled arms race will undoubtedly affect Russian and Chinese nuclear capabilities as they have been specified as the two major adversaries in the 2018 *Nuclear Posture Review*.

6. Moscow's stance on the MDS

The Russian Federation paid special attention not to deploy MDS on a global scale, emphasizing that it could lead to an arms race, undermine the strategic stability around the planet, and create additional barriers towards normalization of the Russo-American relationships.

As mentioned in the beginning, after the USA unilaterally withdrew from the ABM

Treaty in 2002, Russia tried to convince U.S. to put certain limitations on their respective missile defense systems. These were, either to limit the speed of the interceptor missiles, or to have a 'sectoral approach' to missile defense for shared responsibility. The latter would entail a mutual division of responsibilities in intercepting hostile missiles in specific regions, or to narrow the geographical area for the deployment of their respective MDS assets, especially those very close to the national territories of each nation. The Russian officials also expressed their concern over the possibility of the US deploying offensive missiles, like cruise and hypersonic missiles, into the same launch tubes of the MDS operational bases located in Rumania and at a future base in Poland, thus making them readily convertible from defensive to offensive systems.

Some Russian experts have articulated a notion of jointly identifying and fixing in a quantitative way the balance of capabilities between the Russian and the U.S. defensive missile interceptors, on one hand, and their respective strategic offensive missiles, on the other.

When it became clear to Russian military and political leaders that all these met with a cold reception at the White House, they decided, without any political noise and ballyhoo, to start devel-

12 Reif K. Budget Would Augment National Missile Defense//Arms Control Today. 2020. March// <https://www.armscontrol.org/act/2020-03/news/budget-augment-national-missile-defense>.

13 Roque A. Pentagon shake-up poised to continue US Army's modernization priorities// *Jane's Defence Weekly*. 2019. July 3. P. 13.

oping and building a military solution to the U.S. MDS, a new weapon system that could penetrate the American missile defense 'shield' and destroy it.

One option considered by Russia was to radically increase the quantity of the Russian strategic missiles could overwhelm the American MDS. However, Moscow decided instead to trail a completely different and untraditional path by producing not excessively huge numbers of SOA missiles, but high-tech hypersonic, maneuverable weapons, in which U.S. had initially an edge over the former U.S.S.R.

According to autoreactive sources, the Russian Federation has developed, tested and produced a "specially designed" hypersonic warhead called, in Russian, 'Avangard' ('Vanguard' in English). It can reportedly fly at 27 Mach.¹⁴ It can penetrate not only the existing U.S. MDS, but potentially any future version of it, irrespective of the location of its missile defense assets, whether they are deployed on the U.S. mainland, or at high seas on an Aegis-capable combat ship.¹⁵ This is a

greater challenge to the US current and future MDS, because it cannot be intercepted and destroyed.

A dialogue with the United States on new Russian hypersonic weapons systems cannot be held without a comprehensive discussion of similar American systems, Deputy Foreign Minister Sergei Ryabkov told the *RIA Novosti* News Agency on April 17, 2020. He specified that it is also necessary to discuss the issue of creating a global US missile defense system, placing weapons in space, the 'Prompt Global Strike' and a number of other military programs that are extremely destabilizing and cause Moscow concern. According to him, the Russian side once again signaled to Washington that the conversation on strategic stability must be comprehensive, and within this conversation Moscow will be guided solely by the task of ensuring Russian national security. "This is the alpha and omega of our approach to work in the field of arms control in general," said the Deputy head of the Russian diplomatic ministry, who oversees the issue of arms control and Russia's relations with the United States.¹⁶

There is also very strong resistance in the Russian expert community to any attempt to put any type of limitations on the 'Avangard' hypersonic glide vehicles for two main reasons:

Firstly, they are not captured by the provisions of the *New START*, and thus cannot be limited by any extension. The US suggestion that these systems should be controlled either by the UNO or by the US Government are not serious, and they will not be debated. Similarly, the US MDS will not be debated with Moscow, as President Donald Trump once publicly observed.

Secondly, the production of 'Avangard' hypersonic gliders equipped with conventional (non-nuclear) warheads on a massive scale could lead to a totally different military and political global situation that will gradually be based on non-nuclear arms and on non-nuclear deterrence.

So, the further development of hypersonic systems with pin-point accuracy may help to completely eliminate nuclear weapons by the year 2045 – which is, by a tragic coincidence, the centenary of the atomic bombings of the Japanese cities Hiroshima and Nagasaki by the US

14 Комплекс «Авангард». Преимущества и противодействие. 2019. 14 февраля// <https://topwar.ru/154001-kompleks-avangard-preimuschestva-i-protivodejstvie.html>.

15 Some Russian experts believe that in order to destroy just one "Avangard" the USA needs to employ around 50 SM-3 interceptors. That makes the U.S. MDS

useless against Russia. Nuclear yields of any "Avangard" vary from 800 kiloton to 2 megaton// <https://news.rambler.ru/weapon/42502256-giperzvukovoy-kompleks-avangard-novaya-golova-nadryahlom-tele/?updated>.

16 МИД назвал условие диалога с США по гиперзвуковому оружию// РИА Новости. 2020. 17 апреля//<https://>

[ria.ru/20200417/1570165694.html?in=t;Интервью заместителя Министра иностранных дел России С.А. Рябкова журналу «Международная жизнь».](https://ria.ru/20200417/1570165694.html?in=t;Интервью_заместителя_Министра_иностраных_дел_России_С.А._Рябкова_журналу_«Международная_жизнь».) 2020. 20 апреля//<https://interaffairs.ru/news/show/26067>.

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