



Testimony

Before the Subcommittee on Strategic Forces, Committee on Armed Services, House of Representatives

MISSILE DEFENSE

Lessons Learned From Acquisition Efforts

Accessible Version

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GAO Highlights

Highlights of [GAO-20-490T](#), a testimony before the Subcommittee on Strategic Forces, Committee on Armed Services, House of Representatives

Why GAO Did This Study

For over half a century, the Department of Defense has funded efforts to defend the United States from ballistic missile attacks. From 2002 to 2020, MDA has received about \$174 billion to develop the BMDS and has requested about \$9.2 billion for fiscal year 2021. The BMDS consists of diverse and highly complex land-, sea-, and space-based systems and assets located across the globe.

This statement summarizes lessons that GAO has identified from its prior reviews of MDA starting in 2004 that can be applied to strengthen the transparency and acquisition practices for developing and fielding missile defense elements. Specifically, this testimony provides information on (1) steps MDA has taken to increase transparency and reduce acquisition risks; and (2) ongoing challenges associated with improving transparency and reducing high risk acquisition practices. In our prior work, GAO reviewed key MDA management documents including annual program reviews, tests plans and budget documents. We also interviewed officials from MDA and from other key DOD offices.

What GAO Recommends

GAO is not making any new recommendations in this statement. GAO has previously recommended that MDA take steps to increase transparency and align its acquisition approach to reduce high-risk practices. MDA concurred with certain recommendations and is taking steps to implement them.

View [GAO-20-490T](#). For more information, contact Cristina T. Chaplain at (202) 512-4841 or ChaplainC@gao.gov.

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MISSILE DEFENSE

Lessons Learned From Acquisition Efforts

What GAO Found

The Missile Defense Agency (MDA) has taken important steps in recent years to improve management practices, reduce acquisition risks, and deliver capabilities to defend the United States and its allies from ballistic missile attacks. Specifically, MDA has made advances across a broad range of management activities, such as improving stakeholder outreach, reducing concurrency, (broadly defined as the overlap between product development, testing, and production), improving testing of the Ballistic Missile Defense System (BMDS) and increasing transparency of its progress. MDA has also made progress toward improving homeland and regional defense.

However, MDA can go further to align itself with best practices as it faces ongoing challenges associated with improving transparency and reducing high risk acquisition practices. These challenges include:

- **Stakeholder involvement:** MDA has improved its outreach to stakeholders, including the intelligence community and other DOD stakeholders, however, opportunities remain, such as obtaining more input from the defense intelligence community. While MDA is not required to do so, the community is uniquely positioned to help keep pace with emerging threats and validate threat models
- **Concurrency:** MDA has taken steps to reduce concurrency, but falls back on this practice when experiencing developmental delays or schedule pressures. The recently canceled Redesigned Kill Vehicle (RKV) initially aligned production decisions with flight testing. However, in response to advancements from North Korea, development and production were performed concurrently and flight testing was reduced, thereby removing the safeguards that had been put into place.
- **Flight test schedule changes:** Despite initiating a new approach to developing its flight test schedule in 2009, MDA continues to struggle with execution. Namely, MDA is frequently revising its annual schedule by adding new tests, and deleting or delaying others—sometimes multiple times.
- **Transparency of test cost estimates:** MDA regularly makes changes to its test schedule without reporting the impact to its costs and funding needs. We continue to believe that breaking out funding requests by test will improve transparency into planned versus actual test costs and aid departmental and congressional decision makers as they make difficult choices of where to invest limited resources.

MDA is at a pivotal crossroads, needing to balance its ability to pursue new and advanced efforts while also maintaining its existing portfolio. Congress and the Secretary of Defense are undertaking multiple reviews to determine how to address these concerns and chart a path forward for MDA.

Chairman Cooper, Ranking Member Turner, and Members of the Subcommittee:

I am pleased to be here today to discuss the Missile Defense Agency's (MDA) progress in developing and fielding missile defense elements, as well as ongoing challenges that the agency faces. MDA's mission is to develop an integrated and layered Ballistic Missile Defense System (BMDS) to defend the United States, its deployed forces, allies and friends from ballistic and hypersonic missile attacks. In order to meet this mission, MDA is developing a highly complex system that includes land-, sea-, and space-based systems and assets located across the globe. MDA has received approximately \$174 billion from fiscal years 2002 through 2020 and is requesting an additional \$9.2 billion for fiscal year 2021 to continue its efforts.

Since the fiscal year 2002 National Defense Authorization Act was enacted, we have been mandated to prepare annual assessments of MDA's progress towards its acquisition goals and objectives. Since our first report in 2003, we have reported on MDA's progress and challenges in acquiring and fielding BMDS capabilities.¹ In general, we have reported that MDA has developed, demonstrated, and fielded a limited homeland and regional ballistic missile defense capability, but MDA has fallen short of its goals, in part, because of high-risk acquisition practices. These include initiating new programs without robustly assessing alternative solutions, incorporating high levels of concurrency, and fielding capabilities prior to completing flight testing. These practices enabled MDA to quickly ramp up efforts in order to meet tight, presidentially directed deadlines, but they also resulted in problems that caused some programs to be canceled or significantly disrupted. In recent reports, we have also identified contracting challenges; challenges in working with warfighters and stakeholders, such as the intelligence community; and

¹Related GAO reports are found at the end of this statement.

challenges associated with testing, such as optimistic planning.² We have also reported on MDA's need for more reliable models and simulations, which play an integral role in validating performance.³

MDA has made efforts to put newer programs on a more sound footing and it has taken some actions to address acquisition issues, including adopting acquisition best practices in some cases. However, MDA is not always able to sustain its use of these best practices.

Today, I will highlight (1) steps MDA has taken to increase transparency, reduce acquisition risks, and deliver capability; and (2) ongoing challenges associated with improving transparency and reducing high-risk acquisition practices. My testimony is based on reports we issued from April 2003 to December 2019 and on preliminary observations for our ongoing work covering fiscal year 2019. For our previous work, we reviewed MDA management documents including their reported baselines and test schedules. We compared these plans against MDA's actual delivery and testing achievements recorded in agency documents and through interviews with agency officials and relevant officials in the Department of Defense. More detailed information on our objectives, scope, and methodology can be found in those reports. For our ongoing work covering fiscal year 2019, we reviewed MDA's planned delivery and testing goals for fiscal year 2019. We also discussed the agency's plans and performance in interviews with agency officials and the BMDS Operational Test Agency. In addition, we met with officials from the office of the Undersecretaries of Defense for Research and Engineering and Acquisitions and Sustainment.

We conducted the work on which this statement is based in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained

²GAO, *Missile Defense: Some Progress Delivering Capabilities, but Challenges with Testing Transparency and Requirements Development Need to Be Addressed*, [GAO-17-381](#) (Washington, D.C.: May 30, 2017); GAO, *Missile Defense: The Warfighter and Decision Makers Would Benefit from Better Communication about the System's Capabilities and Limitations*, [GAO-18-324](#) (Washington, D.C.: May 30, 2018); GAO, *Missile Defense: Delivery Delays Provide Opportunity for Increased Testing to Better Understand Capability*, [GAO-19-387](#) (Washington, D.C.: June 6, 2019) and *Missile Defense: Further Collaboration with the Intelligence Community Would Help MDA Keep Pace with Emerging Threats*, [GAO-20-177](#). (Washington, D.C.: Dec. 2019).

³See [GAO-18-324](#) and [GAO-19-387](#).

provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

MDA is responsible for developing a number of systems, known as elements, with the purpose of defending against ballistic and hypersonic missile attacks. MDA’s mission is to combine these elements into an integrated system-of-systems known as the Ballistic Missile Defense System (BMDS). The goal of the BMDS is to combine the abilities of two or more elements to achieve objectives that would not have been possible for any individual element. These emergent abilities are known as integrated capabilities or BMDS level capabilities. Table 1 provides a brief description of selected BMDS elements.

Table 1: Description of Selected Ballistic Missile Defense System (BMDS) Elements

BMDS element ^a	Description
Aegis Ballistic Missile Defense (BMD) Weapon System	Aegis BMD includes ship- and land-based ballistic missile defense capabilities using a radar, command and control, and Standard Missile-3 (SM-3) interceptors.
Aegis Ballistic Missile Defense (BMD) Weapon System: Aegis BMD Standard Missile-3 (SM-3) Block IB	Aegis BMD SM-3 Block IB features capabilities to identify and track objects during flight to defend against short-, medium-, and intermediate-range ballistic missiles threats.
Aegis Ballistic Missile Defense (BMD) Weapon System: Aegis BMD SM-3 Block IIA	Aegis BMD SM-3 Block IIA has increased range, more sensitive seeker technology, and an advanced kill vehicle to defend against medium- and intermediate-range ballistic missiles.
Aegis Ballistic Missile Defense (BMD) Weapon System: Aegis Ashore	Aegis Ashore, a land-based version of Aegis BMD, uses SM-3 interceptors and Aegis BMD capabilities as they become available and will have three locations: one test site in Hawaii and two operational sites, one in Romania and one under construction in Poland.
Command, Control, Battle Management, and Communications (C2BMC)	C2BMC is a globally deployed system of hardware—workstations, servers, and network equipment—and software that links and integrates individual elements, allowing users to plan ballistic missile defense operations, see the battle develop, and manage networked sensors. C2BMC integrates Ballistic Missile Defense System Overhead Persistent Infrared Architecture (BOA), which is made up of space-based sensors that support the BMDS missions by providing cues and tasking to downstream sensors and weapon systems.
Ground-based Midcourse Defense (GMD)	GMD is a ground-based system with launch, communications, and fire control components that use interceptors with a booster and a kill vehicle to defend against intermediate- and intercontinental-range ballistic missiles. The fielded inventory of GMD interceptors currently consists of: 20 interceptors equipped with the Configuration (C)1 boost vehicle and Capability Enhancement (CE)-I kill vehicle; 16 interceptors equipped with the C1 boost vehicle and CE-II kill vehicle; and 8 interceptors equipped with the C2 boost vehicle and CE-II Block I kill vehicle.

Sensors

BMDS element ^a	Description
Army Navy/ Transportable Radar Surveillance and Control Model 2 (AN/TPY-2)	AN/TPY-2 is a transportable X-band high-resolution radar capable of tracking ballistic missiles of all ranges that can be used in two modes: (1) forward-based mode—to support Aegis BMD and Ground-based Midcourse Defense, or (2) terminal mode—to support Terminal High Altitude Area Defense.
Long Range Discrimination Radar (LRDR)	LRDR will be an S-band radar and will provide capabilities to track incoming missiles and discriminate the warhead-carrying vehicle from decoys and other non-lethal objects for GMD. Construction and integration activities are ongoing, with initial fielding planned for fiscal year 2021 and transfer to the Air Force planned for 2022.
Sea Based X-Band (SBX)	SBX is a radar capable of tracking, discriminating, and assessing the flight of ballistic missiles. It is mounted on a mobile, ocean-going, semi-submersible platform capable of being positioned to cover any region of the globe. SBX primarily supports the GMD system for defense of the U.S. and is considered a critical sensor for GMD, in part because it is able to provide tracking information to the GMD interceptor as it targets an incoming threat missile.
Upgraded Early Warning Radars (UEWR)	UEWR is a solid-state, phased-array, long-range radar that detects sea-launched or intercontinental ballistic missiles. Three UEWRs were upgraded and integrated into the BMDS to improve sensor coverage by critical early warning, tracking, object classification, and cueing data. They were transferred to the U.S. Air Force in October 2013 and are located in Beale, California; Fylingdales, United Kingdom; and Thule, Greenland. Modernization efforts for UEWRs located in Clear, Alaska and Cape Cod, Massachusetts are ongoing.
Targets and Countermeasures ^b	Targets and Countermeasures provides a variety of highly complex short-, medium-, intermediate-, and intercontinental-range targets to represent realistic threats during BMDS flight testing.
Terminal High Altitude Area Defense (THAAD)	THAAD is a mobile, ground-based system to defend against short- and medium-range threats using a battery that consists of interceptors, launchers, a radar, and fire control and communication systems.

Source: GAO analysis of Missile Defense Agency data | GAO-20-490T

^aMDA is developing and has already fielded additional elements for the BMDS that are not included in this statement because they fall outside the scope of the BMDS Accountability Report. In addition, programs that have been transferred to a military service for production, operation, or sustainment such as the Cobra Dane Radar and Patriot Advanced Capability-3 program are not covered in this statement.

^bTargets and Countermeasures provide assets to test the performance and capabilities of the BMDS elements, but these testing assets are not operationally fielded.

MDA was established in 2002 with exceptional flexibilities to manage the acquisition of the BMDS—developed as a single program—that allow MDA to expedite the fielding of assets and integrated ballistic missile defense capabilities. These flexibilities allow MDA to diverge from DOD’s traditional acquisition life cycle and defer the application of certain acquisition policies and laws designed to facilitate oversight and accountability until a mature capability is ready to be handed over to a military service for production and operation.

In addition, MDA has been operating in an environment of tight timeframes for delivering capabilities—beginning with a presidential directive in 2002 to field a limited capability by 2004. This was followed by

a presidential announcement in 2009 to begin deploying U.S. missile defense in Europe in 2011 finishing in 2020. This schedule required concurrency among technology, testing and other development activities.⁴ More recently, MDA has been directed to develop and deploy defenses against hypersonic and cruise missile threats as soon as technologically able. These schedule pressures compound challenges associated with complex technology, design, and integration associated with the missile defense mission that normally require careful planning, disciplined engineering practices, extensive coordination, and effective management and oversight to be successful.

MDA Has Taken Steps to Improve Management Practices, Reduce Acquisition Risks, and Deliver Capability

MDA has taken important actions to increase transparency, reduce high-risk approaches in its management of BMDS elements, and test and deliver BMDS capability. Specifically, MDA has improved reporting in its annual progress reports to the Congress and made advances across a broad range of management activities, including the involvement of stakeholders, reducing concurrency, and continued efforts to improve key aspects of testing necessary to demonstrate delivered capability.

- *Increased Transparency:* MDA, consistent with several of our recommendations has increased the ability to track progress over time in the BMDS Accountability Report (BAR). This is MDA's annual report that presents the current estimate of the BMDS programs' baselines. To increase insight into MDA's management of the BMDS, MDA implemented significant changes to its key acquisition processes

⁴This effort to deploy missile defense was initially comprised of four phases between 2011 and 2020. MDA delivered the first phase, for short- and medium-range defense of Europe, in December 2011, and delivered the second phase for medium-range missiles in December 2015, but the delivery of the third phase has been delayed from December 2018 to fiscal year 2022. Its effort for the first three phases were characterized by schedule delays, technical challenges that led to reductions in the scope of capability delivered, as well as testing reductions, which reduced confidence in capabilities that had been delivered. In March 2013, the Secretary of Defense canceled the fourth phase, which was intended to provide an additional layer for defense of the United States against intercontinental ballistic missiles. The cancellation was driven in part by affordability concerns, schedule delays and technical risks associated with these programs.

and for the first time developed and reported detailed baselines for each element in the BAR in 2010. As we found in March 2011, MDA's prior approach limited the ability for DOD and congressional decision makers to measure MDA's progress on cost, schedule, and testing.⁵ While MDA's changes were positive, over the years, we made additional recommendations to further improve MDA's reporting.⁶ In response to our recommendations, MDA made improvements to the BAR that include providing details on variances to its test plan from year to year and including information on its use of contract actions known as an Undefined Contract Actions (UCA) and Unpriced Change Orders (UCO).⁷

- *Improved Stakeholder Outreach:* MDA has increased its outreach to DOD stakeholders over the past few years. Our prior work on defense acquisitions has shown that establishing buy-in from decision makers is a key factor in achieving better acquisition outcomes because DOD components provide varying perspectives due to their unique areas of expertise and experience.⁸ For example, as we reported in December 2019, MDA has recently increased its interaction with the defense intelligence community.⁹ Specifically, MDA engaged the defense intelligence community on an analysis of alternatives the agency completed in February 2017 that assessed future sensor options for the BMDS. In addition, MDA reached out to the defense intelligence community on another analysis of alternatives pertaining to defense against hypersonic missiles. In fact, officials from several DOD organizations we met with over the past two years observed that MDA's engagement with their organizations was improving.

⁵GAO, *Missile Defense: Actions Needed to Improve Transparency and Accountability*, [GAO-11-372](#) (Washington, D.C.: Mar. 24, 2011).

⁶See [GAO-11-372](#); [GAO-17-381](#); and [GAO-18-324](#).

⁷UCAs authorize contractors to begin work before an agreement on terms, specifications, or price have been agreed upon. See Defense Federal Acquisition Regulation Supplement (DFARS) subpart 217.74. A UCO is generally a unilateral, within-scope order on which the parties have not yet reached agreement on an equitable adjustment. See DFARS subpart 243.2. For additional information on MDA's use of UCAs, see [GAO-18-324](#).

⁸[GAO-17-381](#)

⁹As we reported in [GAO-20-177](#), MDA uses information from the defense intelligence community to determine how to design and test its weapon system.

- Reducing Concurrency:** MDA continues to take steps to reduce concurrency, an issue we have reported on for many years.¹⁰ Concurrency is broadly defined as the overlap of development, testing, and production; coupled with an aggressive testing schedule. MDA's concurrent development has often left the agency committing to production and fielding before development is complete. This approach has resulted in performance shortfalls, cost increases, and schedule delays. MDA has taken steps to mitigate this risk consistent with our recommendations. For example, as we found in May 2017, MDA took steps to reduce concurrency in the Aegis BMD SM-3 Block IB by adding in tests and delaying the full-rate production decision until the tests were completed. Figure 1 represents a highly concurrent acquisition schedule as compared to an approach based on gaining knowledge before proceeding to the next acquisition phase.

Figure 1: Concurrent Schedules vs. Knowledge-Based Approach

Highly concurrent schedule



Knowledge-based approach



Source: GAO analysis of Missile Defense Agency data. | GAO-20-490T

- Improving BMDS Testing:** MDA has improved the accuracy of tools it uses to assess integrated BMDS capabilities. The BMDS is a system of systems that cannot be completely assessed using intercept flight tests because of the system's scope and complexity, and because of safety constraints. Consequently, MDA, independent DOD testing organizations, and the warfighter must rely heavily on representations of the integrated BMDS called models and simulations in ground testing. This approach is used, rather than live tests, to test the operational

¹⁰GAO, *Defense Acquisitions: Production and Fielding of Missile Defense Components Continue with Less Testing and Validation Than Planned*, [GAO-09-338](#) (Washington, D.C.: March 2009); GAO, *Missile Defense: Opportunity Exists to Strengthen Acquisitions by Reducing Concurrency*, [GAO-12-486](#) (Washington, D.C.: April 2012); GAO, *Missile Defense: Opportunities Exist to Reduce Acquisition Risk and Improve Reporting on System Capabilities*, [GAO-15-345](#) (Washington, D.C.: May 2015); and [GAO-19-387](#).

performance of the whole BMDS against attacks with more threats represented. Our preliminary observations for fiscal year 2019 are that the number of accredited models and simulations that are needed to assess the integrated performance of the BMDS has steadily risen over the last 3 years.

Over the past several years, we have reported on MDA's progress in delivering assets and capabilities to counter attacks as well as cyber threats.¹¹ MDA delivered important BMDS capabilities for architectures in the United States as well as those defending U.S. troops and allies in Europe, the Middle East, and the Eastern Pacific. For example:

- *Homeland Defense*: In fiscal year 2017 and 2018, MDA delivered a significant integrated capability for defending the United States, including improvements in the ability to discriminate lethal objects in targets, and increased capacity. This was a key achievement in fulfilling a directive from the Secretary of Defense to increase inventory of ground-based interceptors by the end of 2017.
- *Regional BMD*: In fiscal year 2016, MDA delivered capabilities for the second phase of its effort in Europe, called European Phased Adaptive Approach (EPAA). This effort required coordinated development of a number of elements and their integration to provide integrated BMDS-level integrated capabilities against short and medium range ballistic missiles. More recently, in fiscal years 2018 and 2019, MDA rapidly delivered capabilities for its effort to meet an urgent regional need.

In addition, preliminary observations from our review covering fiscal year 2019 indicate that cybersecurity assessments in fiscal year 2019 informed the network defense posture in U.S. Northern Command and provided data on how to reduce mission risk for these elements operating in a cyber-contested environment. Moreover, the agency is incorporating lessons learned from prior cyber activities, and continues to address issues discovered in prior testing, improving its overall cybersecurity survivability. However, our preliminary observations indicate much remains to be done to ensure cyber resiliency of the BMDS including the completion of cybersecurity testing for capabilities delivered in 2017 and

¹¹See [GAO-15-345](#); [GAO-18-324](#); and [GAO-19-387](#).

2018, along with conducting element-level operational cooperative and adversarial assessments.¹²

MDA Faces Ongoing Challenges to Improve Transparency and Reduce High-Risk Acquisition Practices

MDA has made efforts to put some programs on a more sound footing and it has taken actions to address the issues I just mentioned. However, MDA can go further to align itself with best practices for acquisitions. Today, I will highlight certain acquisition challenges MDA still faces.

- *Stakeholder involvement:* While MDA has increased its outreach to the stakeholders over the past few years, opportunities remain for further engagement on key decisions. For instance, as we found in December 2019, although MDA has been increasing its engagement with the intelligence community, MDA provides the defense intelligence community with limited insight into how the agency uses threat assessments to inform its acquisition decisions. MDA is not required to obtain the defense intelligence community's input; however, the community is uniquely positioned to assist MDA keep pace with rapidly emerging threats. Moreover, this limited insight has, in part, prevented validation of threat models designed to assess BMDs capabilities. Without validation, any flaws or bias in the threat models may go undetected, which can have significant implications for the performance of MDA's weapon systems. MDA and the defense intelligence community recently began discussing a more suitable level of involvement in the agency's acquisition processes and decisions. As we recommended in May 2017 and December 2019, MDA also needs to strengthen its collaboration with other stakeholders, including the warfighting community and independent cost and technical experts.¹³ In the early stages of the RKV program, concerns raised about the design—which ultimately was a key reason for the cancellation of the RKV—went

¹²Operational cybersecurity testing consist of two types of assessments: a Cooperative Penetration and Vulnerability Assessment (CVPA) and an Adversarial Assessment (AA). A CVPA provides initial information about the resilience of a system in an operational context, which is used to develop the subsequent AA. The AA characterizes the operational effects caused by threat representative cyber-attack and the effectiveness of defensive capabilities.

¹³See [GAO-17-381](#) and [GAO-20-177](#).

unheeded. For example, preliminary observations for our assessment covering fiscal year 2019 showed that MDA and contractors did not adequately address technical risks despite numerous warnings from stakeholders about the performance issues. However, MDA officials indicate they are working with stakeholders more closely as they plan for the Next Generation Interceptor, a new more advanced interceptor.

- *Concurrency:* Although MDA has taken steps to reduce concurrency as we have previously recommended, the agency still turns to this practice when experiencing developmental delays or schedule pressures.¹⁴ For example, we reported in June 2019 that delays to construction resulted in MDA's introduction of increasing levels of concurrency into the delivery schedule for the Aegis Ashore site in Poland. We found that key phases of the delivery process had been shortened from 16.5 months to 6.5 months.¹⁵ While overlapping acquisition activity, in theory, could speed up the construction process, this risky practice ultimately failed to mitigate the effects of problematic construction practices. However, program plans indicate that the site has experienced further delays and will not be ready for operational use until at least 2022—a 4 year delay from the original 2018 delivery date. In addition, the recently canceled Redesigned Kill Vehicle (RKV) program originally sought to avoid concurrency by aligning production decisions with flight testing. However, later—in response to the advancement of the North Korean missile threat—the program accelerated RKV development by concurrently performing development and production and reducing the number of necessary flight tests. This acceleration altered the schedule for the previously aligned flight tests and production decisions.
- *Contracting:* Although MDA has flexibilities in managing its acquisition process, it must follow the same contracting regulations that apply to DOD, including the Federal Acquisition Regulation and the Department of Defense Federal Acquisition Regulation Supplement. These regulations allow MDA to use a particular type of contract action called an undefinitized contract action when the negotiation of a definitive contract is not possible in sufficient time to meet the government's requirements and government interests demand that the contractor be given a binding commitment so that contract performance can begin immediately. These actions authorize contractors to begin work before an agreement on terms, specifications, or price have been agreed upon. In May 2018, we found that the average length of the undefinitized period and the not-to-

¹⁴See [GAO-12-486](#); [GAO-15-345](#); and [GAO-17-381](#).

¹⁵[GAO-19-387](#)

exceed price of MDA's undefinitized contract actions had increased over the past 5 years.¹⁶ While MDA policy permits use of undefinitized contracts on a limited basis, we and others have found that they can place unnecessary cost risks on the government. As we reported in June 2019, while MDA improved its performance in timely definitization of these contract actions, the total not-to-exceed value of the undefinitized contract actions MDA initiated in 2018 far exceeded previous years we reviewed.¹⁷

- *Transparency in test cost estimates:* As we reported in May 2017, MDA requests more than \$1 billion in funding each fiscal year for the tests outlined in its integrated test schedule based on MDA's internally developed test cost estimates. However, our analysis found these estimates were inconsistent and lacked documented traceability. A cost estimate is the summation of individual costs using established methods and valid data. Developing and maintaining reliable cost estimates ensures the appropriate amount of funds are needed when requested and for the expressed purpose. We found, however, in May 2017, MDA's testing budget lacked transparency and could be improved.¹⁸ Specifically, we found that MDA's annual budget submission did not provide insight into the funding for each specific test. MDA regularly makes changes to its test schedule without reporting the impacts to its costs and funding needs. Without a breakout of MDA's costs by test in its annual budget submission and BAR, how many times or how much funding has been requested, received, or used for a specific test will continue to be unclear. Therefore, we recommended that MDA break out funding request by test. DOD did not concur with our recommendation and stated that MDA's current approach for assigning resources prior to the test execution, is adequate. We continue to believe that breaking out funding requests by test will improve transparency into planned versus actual test costs and aid departmental and congressional decision makers as they make difficult choices of where to invest limited resources.

Changes to MDA's Test Schedule Persist, Reducing Knowledge to Support Asset and Capability Deliveries

MDA also continues to struggle with fully achieving its annual flight testing goals. After MDA revised its approach to developing the annual

¹⁶[GAO-18-324](#)

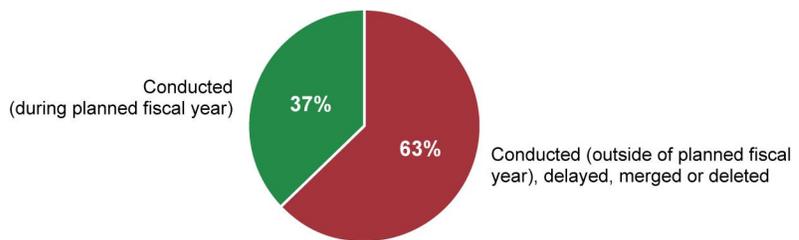
¹⁷[GAO-19-387](#)

¹⁸[GAO-17-381](#)

Integrated Master Test Plan in 2009, in February 2010, we recognized the new test schedule’s potential to address prior issues with shifting testing requirements or test dates, and adding or deleting tests. MDA also focused its testing to collect data necessary to support the development of models and simulations.

However, MDA’s test plan has not stabilized. Since it formalized its approach in 2010, MDA has continued to revise its test schedule frequently by adding new tests, and deleting or delaying tests, in some cases, multiple times and further into future fiscal years. As a result, less testing is being conducted prior to delivery than originally planned, which means less data are available to understand BMDS capabilities and limitations. Specifically, preliminary observations from our fiscal year 2019 review show that from fiscal year 2010 through fiscal year 2019, MDA has conducted only 37% of its planned testing as originally scheduled, while the remainder has been either been delayed, deleted or conducted in a later fiscal year, as shown in figure 2.¹⁹

Figure 2: Timeliness of Missile Defense Testing Events for Fiscal Years 2010-2019



Source: GAO analysis of Missile Defense Agency data. | GAO-20-490T

Accessible Data for Figure 2: Timeliness of Missile Defense Testing Events for Fiscal Years 2010-2019

Category	Percentage
Conducted (during planned fiscal year)	37
Conducted (outside of planned fiscal year), delayed merged or deleted	63

¹⁹ As in our prior reports on MDA’s annual progress, tests where MDA participated but did not possess the primary system under test (e.g. Army’s Patriot program or Israel’s Iron Dome) have been omitted from the totals.

In addition, we reported in June 2019 that European Phased Adaptive Approach (EPAA) Phase 3 testing against intermediate range ballistic missiles (IRBM) had been reduced by 80 percent and MDA no longer planned to conduct a flight test against a raid—a likely tactic in a real-world attack—prior to delivery. The lack of raid flight testing prevented the accreditation of Aegis BMD models for assessment under those circumstances in all fiscal year 2019 ground tests that included Aegis BMD.

Balancing New Efforts with Existing Portfolio Needs will be Challenging

MDA is currently at a pivotal crossroads, needing to balance its ability to pursue new and advanced efforts while also maintaining its existing portfolio of BMDS elements that have not transferred to the military services as originally planned. The new and advanced efforts, such as hypersonic defense and a Next Generation Interceptor (NGI) for GMD, are research and development-intensive tasks, which carry significant technical risks and financial commitments. If MDA's elements are not transferred as originally intended, as they move further into production and operations and sustainment these elements will continue to consume a growing portion of the agency's budget.

MDA and military services have taken some actions to prepare for transferring the BMDS elements; however, the actions have not enabled transfer primarily due to a lack of early and frequent coordination, according to officials from the Undersecretary of Defense for Research and Development and Acquisitions and Sustainment. Consequently, there are overarching concerns related to transfer such as who funds the sustainment of the elements which have not been resolved. Congress and the Secretary of Defense have directed multiple reviews to determine how to address these concerns and chart a path forward for MDA.

Chairman Cooper, Ranking Member Turner, and members of the Subcommittee, this concludes my prepared statement. I would be happy to respond to any questions you may have at this time.

GAO Contact and Acknowledgements:

If you or your staff members have any questions about this testimony, please contact Cristina T. Chaplain, Director, Contracting and National Security Acquisitions, at (202) 512-4841 or Chaplainc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement.

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Related GAO Products:

Missile Defense: Delivery Delays Provide Opportunity for Increased Testing to Better Understand Capability. [GAO-19-387](#). Washington, D.C.: June 2019.

Missile Defense: The Warfighter and Decision Makers Would Benefit from Better Communication about the System's Capabilities and Limitations. [GAO-18-324](#). Washington, D.C.: May 2018.

Missile Defense: Some Progress Delivering Capabilities, but Challenges with Testing Transparency and Requirements Development Need to Be Addressed. [GAO-17-381](#). Washington, D.C.: May 2017.

Missile Defense: Ballistic Missile Defense System Testing Delays Affect Delivery of Capabilities. [GAO-16-339R](#). Washington, D.C.: Apr. 2016.

Missile Defense: Opportunities Exist to Reduce Acquisition Risk and Improve Reporting on System Capabilities. [GAO-15-345](#). Washington, D.C.: May 2015.

Missile Defense: Mixed Progress in Achieving Acquisition Goals and Improving Accountability. [GAO-14-351](#). Washington, D.C.: Apr. 2014.

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