

HEARING TO RECEIVE TESTIMONY ON BALLISTIC MISSILE DEFENSE PROGRAMS IN REVIEW OF THE DEFENSE AUTHORIZATION REQUEST FOR FISCAL YEAR 2012 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, APRIL 13, 2011

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES,
COMMITTEE ON ARMED SERVICES
Washington, DC.

The subcommittee met, pursuant to notice, at 2:32 p.m. in room SR-232A, Russell Senate Office Building, Senator E. Benjamin Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Nelson, Levin, Udall, Shaheen, and Sessions.

Committee staff member present: Mary J. Kyle, legislative clerk.

Majority staff members present: Madelyn R. Creedon, counsel; Richard W. Fieldhouse, professional staff member; and Jessica L. Kingston, research assistant.

Minority staff member present: Daniel A. Lerner, Professional Staff Member.

Staff assistants present: Hannah I. Lloyd and Breon N. Wells.

Committee members' assistants present: Ann Premer, assistant to Senator Nelson; Casey Howard, assistant to Senator Udall; Lindsay Kavanaugh, assistant to Senator Begich; and Lenwood Landrum, assistant to Senator Sessions.

**OPENING STATEMENT OF SENATOR E. BENJAMIN NELSON,
CHAIRMAN**

Senator NELSON. The subcommittee today meets to consider the ballistic missile defense policies and programs of the Department of Defense supported in the fiscal year 2012 budget request. We're pleased to have four distinguished public servants as witnesses today and we all appreciate your service to our country.

Dr. Brad Roberts is the Deputy Assistant Secretary of Defense for Nuclear and Missile Defense Policy. He's been deeply involved in developing missile defense policy and strategy, including last year's comprehensive ballistic missile defense review. He continues to develop our strategy and is also working to ensure the implementation of those policies and strategies.

Lieutenant General Patrick O'Reilly is the Director of the Missile Defense Agency, which is responsible for conceiving, developing, testing, building, and delivering an integrated and operationally ef-

fective ballistic missile defense system, including its component elements, to the services and combatant commanders.

Rear Admiral Arch Macy is the Director of the Joint Integrated Air and Missile Defense Organization at the Joint Staff. He has been leading the joint warfighter assessment of our missile defense needs and has just completed an important study called “The Joint Capabilities Mix 3,” which will help guide our future missile defense program and budget decisions. I would note that Admiral Macy is planning to retire at the end of this month, so this is likely his last hearing with the committee, but at his suggestion, not ours. And we thank you for your many years of service to the Nation, Admiral Macy, and we wish you and your family the very best in your future.

Cristina Chaplain is the Director of Acquisition and Sourcing Management for the Government Accountability Office. She and her team have recently completed their annual assessment of MDA’s progress on the development and acquisition of the ballistic missile defense system, focusing particularly on issues of transparency and accountability.

As the ballistic missile defense review emphasized last year, ballistic missile defense is an essential national priority to protect the homeland from the possibility of a missile attack from countries such as North Korea and Iran and to protect our forward-deployed forces, our allies and partners overseas against the large and growing threat of regional missiles. As Admiral Winnefeld indicated last week, with our ground-based midcourse defense system we’re ahead of the homeland threat from North Korea and Iran, and we want to keep it that way. Our regional missile defenses, using the Phased Adaptive Approach, are designed to meet the existing threat and adapt to future threats.

Developing effective ballistic missile defense systems is an extremely complex technical endeavor. Consequently, it often takes longer than we would like. However, it’s essential that we develop the systems carefully, test them adequately and realistically, and demonstrate that they work effectively before we produce and deploy them. Lives depend on it.

Ballistic missile defense is also expensive. This is particularly notable under the current constrained budget environment. The fiscal year budget request for missile defense is \$10.7 billion and the planned budget for the Missile Defense Agency for fiscal years 2011 through 2016 is roughly \$52 billion. As GAO notes, the ballistic missile defense system is the largest single acquisition program within the Department of Defense. So it’s important that the administration has a policy that missile defenses must be fiscally sustainable and affordable and that we have appropriate accountability and transparency for the program.

Within this context, there are a number of issues we hope to discuss today. For example, concerning homeland defense we’re interested to hear about proposed fixes, enhancements, and hedging options for the ground-based midcourse defense system. We’re interested to know what the implementation of the European Phased Adaptive Approach is to—to know more about that to missile defense. This includes the development, testing, production, and deployment of the planned elements for the EPAA, such as the

Standard Missile 3 interceptor variants to be deployed with each successive phase. We'd also like to learn more about our efforts to expand other international cooperation, including efforts to cooperate with Russia on missile defense.

So we thank all of you for your contributions to improving missile defense and to our security and we look forward to your testimony.

Now it's my pleasure to turn to my ranking member and good friend Senator Sessions for any opening comments you may have.

STATEMENT OF SENATOR JEFF SESSIONS

Senator SESSIONS. Thank you, Mr. Chairman. This is an important hearing and an important committee. Thank you for your leadership. I've enjoyed working with you and respect you and your judgment on these issues very highly.

Today's hearing focuses on the President's 2012 budget for the Missile Defense Agency. I'm pleased that the top line of \$8.6 billion includes a modest increase over last year, but I'm concerned that the overall 5-year budget represents a more than \$2.2 billion reduction below last year's planned future defense budget. So I've got concerns whether we have the ability to support the full cost and on-time delivery of the weapons systems we've invested so much in.

I've long urged that we focus more on the ground-based mid-course system, the only system solely responsible for protecting the homeland at this time. Unfortunately, the budget request continues to deprive GMD, I'm afraid, of the resources necessary to provide and refine the system.

General O'Reilly, you tout the improvements of GMD such as the emplacement of 30 interceptors and upgrades to the missile to Fort Greely area. Those accomplishments are welcome and appreciated, but without additional resources the GMD program may not succeed, and the two recent test failures should serve as key reminders that more must be done to ensure the capability we have works and that it will improve over time. I'm confident that the difficulties we are having will and can be solved, but we've got to spend some time and effort on that.

So I look forward to understanding why you believe you can achieve and sustain success in a program that needs more attention with a budget that's \$1.4 billion below what you said you needed in the fiscal year 2011 future year defense plan. After all the money we've spent on developing this program, it's really not time to take—the time to take our eye off the ball. It really needs to be completed. I think it would just be a tragedy if we didn't follow through here after all the decades of work.

The Government Accountability Office questions the plan for the sustainment and modernization of GMD. Last year GAO reported that the Defense Department “still lacks full knowledge of GMD's capability and limitations” and that, although there is a need to continue development until 2020, the “acquisition of major GMD assets is nearly complete,” and that DOD has shifted its focus to “improving its knowledge of GMD's capabilities and improving integration.”

Given the two recent failures, I look forward to discussing whether or not we need to look back a bit here and make sure we're not ahead of ourselves.

The Aegis weapon system remains one of our most promising capabilities and its legacy of incremental development, refinement, and proven design is a cornerstone of its success. Last week, MDA awarded its first contracts for the new Aegis evolution, the SM-3 Block IIB, and I look forward to hearing more about the development plan for the IIB.

Nonetheless, I remain concerned that the schedule is overly optimistic. Development of the SM-3 Block I was an 8-year effort for an incremental upgrade of the proven SM-2 Block IV. The SM-3 Block IIB concept appears to be a far more significant upgrade and according to some initial descriptions could represent a significant departure from Standard Missile variants.

Furthermore, I question the decision not to include the Aegis program office in the early stage development, ignoring in my opinion the design philosophy that has epitomized success.

The Phased Adaptive Approach to missile defense establishes a global framework for regional uncertainties. If executed correctly and on time, it will represent a good approach that is both relocatable and scalable. According to the BMD review, the fourth phase of the Phased Adaptive Approach and SM-3 Block IIB will improve the defense of the homeland. As we are all aware, this layered protection could have come earlier with the prior plan that we had from the prior administration. However, I agree that defending both Europe and the U.S. from Iran with only ten interceptors was not sufficient—was not going to provide the inventory necessary to deter Iranian aggression.

So I look forward to learning more on the anticipated homeland defense capabilities of SM-3 Block IIB, how they compare to the previously planned two-stage GBIs, while the two-stage GBI has been designated as a contingency if the recent development of IIB takes longer than anticipated.

The Joint Capabilities Mix 3 study to provide warfighter input on necessary global force requirements for sensors, interceptors, and launchers has just been finalized. I look forward to hearing more about this study.

Let me close by offering a special thanks to Admiral Macy for being here today. I understand you plan to retire this month and we congratulate you on your service and thank you for your commitment to your country.

Thank you, Mr. Chairman.

Senator NELSON. Thank you, Senator Sessions.

Senator Udall, do you have any opening comments that you might like to make?

Senator UDALL. I'm eager to hear from the witnesses.

Senator NELSON. Senator Shaheen?

Senator SHAHEEN. No.

Senator NELSON. If it's okay with everybody, let's have a 7-minute round. Is that satisfactory?

General O'Reilly, you know we're more than halfway through fiscal year 2011 and the Defense Department is still—oh, excuse me,

yes. I guess you get a chance to talk first. That doesn't happen often enough. But thank you, Richard. Thank you.

You may even answer the question before I ask it, now that I've tipped you off. Will you start first, General O'Reilly.

**STATEMENT OF LTG PATRICK J. O'REILLY, USA, DIRECTOR,
MISSILE DEFENSE AGENCY**

General O'REILLY. Good afternoon, Chairman Nelson, Ranking Member Sessions, other distinguished members of the subcommittee: I appreciate the opportunity to testify before you today on the Missile Defense Agency's \$8.6 billion fiscal year 2012 budget request to develop protection of our Nation, our armed forces, allies, and friends against the continually growing threat, the proliferation of increasingly capable ballistic missiles.

In fiscal year 2012 we propose to continue our enhancement and integration of sensor, fire control, battle management, and interceptors in the ballistic missile defense system, to improve the reliability and performance of our homeland defense, and to defeat large raid sizes of a growing variety of regional ballistic missiles. By the end of fiscal year 2012 we will complete the initial fielding of a ground-based midcourse defense system for homeland defense against first generation intercontinental ballistic missiles potentially being developed by current regional threats. We will also continue our initial fielding of regional defenses against today's short, medium, and intermediate-range ballistic missiles that are in direct support of our combatant commanders.

I should note that our fiscal year 2012 budget request was predicated on receiving the fiscal year '11 requested budget. Therefore, we will adjust our program accordingly once the final fiscal year '11 budget is approved.

We have had significant accomplishments over the past year, including the conduct of 8 out of 8 planned flight tests using 13 successful targets, the first flight of a two-stage ground-based interceptor, the third successful missile intercept by the Japanese Aegis program, a successful low-altitude intercept by the Terminal High Altitude Area Defense System. We destroyed two ballistic—boosting ballistic missiles with our airborne laser testbed; and we proved sufficiently accurate missile tracks from two space tracking and surveillance system satellites to enable a missile defense intercept without using ground radars.

Additionally, we supported Israel's successful intercept of a threat missile earlier last month. We also delivered 25 SM-3 IA interceptors, began the THAAD interceptor production, emplaced the 30th ground-based interceptor, and completed the upgrade of the early warning radar in Thule, Greenland.

Today MDA's top priority is to confirm the root cause of the most recent GBI flight test failure, then verify the resolution of the problem and successfully repeat the previous flight test. While the failure review board has only produced preliminary results, it is clear more ground testing and an additional non-intercept flight test of an upgraded ground-based interceptor exoatmospheric kill vehicle will be required before the next intercept.

For the ground-based midcourse defense, in fiscal year 2012 we are requesting funding for procuring five new ground-based inter-

ceptors, completing the construction of the GMD Missile Field 2 at Fort Greely, AK, the construction of a missile communications system on the East Coast of the United States, placing Missile Field 1 in a storage mode for possible upgrade and operations in the future, and upgrading the early warning radar in Clear, AK.

Today 30 operational GBIs protect the United States against a limited ICBM attack launched from current regional threats. We closely monitor intelligence assessments with the intelligence community and if this capability is determined to be insufficient we are developing options to increase the number of operational ground-based interceptors and accelerate the delivery of new sensor and interceptor capabilities.

The Department is committed to brief Congress soon on our strategy to hedge against uncertainties in threat estimates. Additionally, I've answered questions in other hearings that I've testified to that it is my personal judgment that, in light of the two ground-based interceptor test failures, the need for an additional non-intercept test, and the need to repeat the failed test, we will need to reassess the total number of ground-based interceptors we are procuring and reflect that assessment in the President's budget request for fiscal year '13.

Our execution of the European Phased Adaptive Approach is on track for meeting the time lines outlined by the President in September 2009. For phase 1, or our initial capability in Europe, our first Aegis ballistic missile ship deployment, the U.S.S. *Monterey*, is on station. The latest command and control system upgrades are being installed in the European command and the AN/TPY-2 forward-based radar will be available in August for deployment in southern Europe by the end of this year.

Finally, in a few days we will conduct a major test in the Pacific to verify the readiness of the phase 1 architecture against an intermediate-range ballistic target.

For phase 2, or our enhanced capability against medium-range ballistic missiles by 2015, we will conduct the first flight test of the next generation Aegis missile interceptor, the SM-3 Block IB, this summer and certify the associated upgrade of the Aegis fire control system in 2012. The design of the adaptation of the Aegis system for land basing, called Aegis Ashore, began last summer and the test site will be installed in Hawaii in 2013 and flight tested in 2014. The installation of the Aegis Ashore in Romania will also occur in 2014 and be fully operational by 2015.

For phase 3, or an enhanced capability against intermediate-range ballistic missiles by 2018, the SM-3 Block IIA interceptor is completing its preliminary design this year in support of flight testing in 2015 and deployment in 2018. We are preparing the airborne infrared sensor for early missile tracking using the Air Force's next generation sensor in fiscal year 2012, and we will begin the design process of the precision tracking space system.

For phase 4, or medium and intermediate-range and ICBM early intercept capability in Europe by 2020, we competitively awarded concept design contracts for the SM-3 IIB interceptor to three industry teams last week. The SM-3 IIB development time line is consistent with the average development time line of other missile interceptors of its class to ensure a low development risk approach.

While not necessary for the defense of the United States against limited attacks by early generation ICBMs, the SM-3 IIB will complement the GMD, Aegis, and THAAD systems to greatly increase the cost-effectiveness of our missile defenses.

Beyond PAA phase 4, we are pursuing advanced technologies for more effective missile defenses in the future, to develop high-energy, compact, lightweight laser technologies.

Finally, the Missile Defense Agency continues to engage in international missile defense projects, studies, and analysis with over 20 countries and the North Atlantic Treaty Organization.

In conclusion, our fiscal year 2012 budget request funds the development of ballistic missile defense capabilities that are flexible, survivable, cost-effective, and tolerant of uncertainties of intelligence estimates of both nation state and extremist ballistic missile threats.

Thank you, Mr. Chairman, and I look forward to answering your committee's questions.

[The prepared statement of General O'Reilly follows:]

Senator NELSON. Thank you, General, and I want to make it clear that we'll insert all your prepared statements in the record, so if you are able to summarize, as General O'Reilly did, that would be good. Thank you.

Dr. Roberts.

STATEMENT OF BRADLEY H. ROBERTS, PH.D., DEPUTY ASSISTANT SECRETARY OF DEFENSE FOR NUCLEAR AND MISSILE DEFENSE POLICY

Dr. ROBERTS. Thank you, Chairman Nelson, Ranking Member Sessions, members of the subcommittee. I'm grateful for the opportunity to be here today and look forward to your questions. I just have a brief oral statement. The written statement begins with a review of the scope and conclusions of the ballistic missile defense review, with the hope that that might be of general interest to this subcommittee. But my focus here today is on the key issues that have emerged in our dialogue as we have shifted from the phase that was policy development to policy implementation.

From my perspective, there have been four main issues in discussion between us of a policy kind. The first relates to developments in the threat. In the missile defense review we made a commitment to closely monitor developments in the threat and to assess our defense investment priorities in light of new information about the threat. Of course, in the last year we've had a lot of new information about—that simply reconfirms the fact that we have an accelerating development of threat, both quantitatively and qualitatively, and this new information has simply reinforced the commitment, our commitment as reflected in the missile defense review, to a balanced approach that ensures that we continue to improve protection of the homeland while at the same time accelerating regional protection.

The second main issue that's been of continuing discussion among us relates to homeland defense. In the missile defense review we made the commitment to firstly continue to improve our ground-based midcourse defense of the homeland in order to, in your words, stay ahead of the threat as it develops, and to keep

ahead over the long term. But we made a related commitment to be well hedged, and we've had some continuing discussion about what that means.

I would emphasize that we made a series of commitments in the last budget and some new commitments in the current budget to take steps to continue to improve the performance of the GMD system. Enhanced performance of the system can add future capability in meeting quantitative and qualitative threat developments clearly.

But the focus of discussion has been about the hedge. What is it, first of all, we seek to hedge against? In shorthand, it's the appearance of a second generation threat before we're ready for it. Now, what does that mean? The posture we have today is one that has us well protected against the initial ICBMs that might be deployed by states like North Korea and Iran, that are few in number, relatively slow, and lack sophisticated countermeasures. Against this threat we have the current posture of 30 GBIs and the expected enhancements to come in the defense of the homeland with the future deployment in 2020 time frame of SM-3 IIB.

The hedge problem is what happens if we have a number of ICBMs deployed by states like North Korea, Iran, or sophisticated ICBMs with sophisticated countermeasures before the availability of the SM-3 IIB to enhance the protection of the homeland? For that problem, we have already taken steps to hedge, as reflected in the ballistic missile defense review, principally providing additional silos into which we could place additional GBIs if required to do so. This year we took the additional step of mothballing rather than decommissioning some additional number of silos. So that when that's implemented we would have the ability to increase from 30 to 44, roughly 50 percent, the number of GBIs as a part of the hedge posture. We've also committed to maintaining development of the two-stage GBI as a part of this hedge.

The question that we've been engaged with now internally in the Defense Department for a few months is what more do we need to do to ensure that the hedge posture is sufficient to deal with the possible threat developments in the time frame before 2020? As we've stated in various venues, we're committed to bring that work forward to you as soon as our Secretary is satisfied that it's complete, and we expect to do so soon.

The third topic of continuing discussion between us has been on implementing the Phased Adaptive Approach. Our attention has naturally been attracted to Europe because this is the approach that attracted the most political discussion and required the biggest push over the last year politically. But this is a global approach to the regions and one that has to be tailored to each of the regions.

In a general summary, General O'Reilly has already given you good detail on the technical aspects of this. But our first priority in implementing PAA is to ensure that we are growing the capabilities that are available that are relocatable and flexible and adaptive to the different security environments. So we've been ramping up procurement in order to meet the rising demands of the COCOMs, and politically we've been working within the multi-

lateral framework at NATO, bilaterally with our allies in East Asia and elsewhere, to define needed next steps.

Lastly, the fourth issue I'd like to touch on relates to expanding international cooperation. This is again a global agenda from our perspective, but our focus here today I think is on Russia. You've posed some specific questions there. We believe, as I think you do, in the potential benefits of cooperation with Russia. We believe also in the potential risks.

We see the benefits as potentially significant for the United States, for the European security environment, and for NATO, but also for Russia. We're mindful of the challenges. We reject cooperation that would in any way limit our missile defenses. You know the shorthand: NATO will defend NATO, but Russia will defend Russia, and we will see to reinforce each other's defense where there's mutual benefit in doing so.

We will not compromise essential technologies. There's no discussion of sharing hit-to-kill with Russia. We have made clear that cooperation will require successful conclusion of the defense technology cooperation agreement. As you know, this has been under discussion with Russia since it was proposed by the Bush Administration in 2004. We've also made it clear that any classified information that's required for discussion with the Russians on this topic would only be discussed after thorough review under our National disclosure policy.

So we hope that we're being mindful of the risks while being clear about the opportunities. We're working two parallel paths, as you know: the NATO-Russia Council pathway with Russia, where we are exploring the possibility of cooperative systems in defense of common spaces, where, as you know, we've resumed the theater missile defense cooperation that was being pursued under the Bush Administration and where we're developing a joint analysis for a future framework of cooperative activities.

Bilaterally, we're also working to pursue parallel work on a joint analysis in order to better understand the capabilities we would each contribute and on the defense technology cooperation agreement.

With that, let me close my opening remarks and look forward to your questions.

[The prepared statement of Dr. Roberts follows:]

Senator NELSON. Thank you.

Admiral Macy.

**STATEMENT OF RADM ARCHER M. MACY, JR., USN, DIRECTOR,
JOINT INTEGRATED AIR AND MISSILE DEFENSE ORGANIZATION,
THE JOINT STAFF**

Admiral MACY. Thank you, sir. Good afternoon, Mr. Chairman, ranking member, and members of the committee. I appreciate the opportunity to testify on the Joint Integrated Air and Missile Defense Organization and our contribution to ballistic missile defense. Let me also take a moment here to thank you both for your comments on my behalf, and I very much appreciate your attention and the opportunity to work with this committee over the last 2 years. It's been truly a pleasure.

JIAMDO supports the Chairman of the Joint Chiefs of Staff, the Joint Staff, and the combatant commanders. Our mission is to identify and coordinate joint requirements for air defense, cruise missile defense, and ballistic missile defense to support the development of solutions, to deliver capabilities for the warfighter. We provide expertise, analysis, planning, and coordination across the combatant commanders and the services in a number of vital efforts relative to both air threat and ballistic missile defense. These include advocating for the warfighters' desired air and missile defense capabilities, where we facilitate combatant commands and services' collaborative efforts to identify and develop operational concepts, joint requirements, system interoperability, and operational architectures for integrated air and missile defense.

We provide support to the U.S. Strategic Command in his role as the air and missile defense integrating authority. We provide support for and interaction with other elements of the Joint Staff for global force management of the high-demand, low-density BMD assets and systems.

We represent the United States to NATO for matters of air and missile defense policy and planning, and we conduct assessment, analysis, and validation of integrated air and missile defense capabilities to inform both warfighter planning and system development and acquisition.

The Chairman has directed JIAMDO to be at the intersection of the requirements processes for air defense and ballistic missile defense and to act as an integration mechanism for harmonizing both common and differing needs across multiple services, platforms, and systems. Several recent JIAMDO key activities in ballistic missile defense capability development highlight this integration responsibility. These include follow-on efforts from the ballistic missile defense review, initial steps in fielding the European Phased Adaptive Approach, and conducting the Joint Capability Mix 3 study that the chairman referred to earlier.

During the ballistic missile defense review, completed approximately a year ago, I was one of the three co-directors of the review, which holistically assessed U.S. ballistic missile defense policy and strategy. Since that time, JIAMDO serves as a nexus within the Joint Staff for tracking and enabling implementation of the recommendations and characteristics of the BMDR report and, critically, providing support to the COCOMs and the inter-agency in fulfilling the goals of that review.

These efforts have included examining how BMD capability needs fit into the Department's global force management processes to apportion, allocate, and assign BMD elements in a process to adjudicate competing COCOM requirements.

As the Director of JIAMDO, I am the U.S. representative to the North Atlantic Treaty Organization Air Defense Committee, responsible for addressing air and missile defense-related issues in NATO and for drafting and coordinating U.S. positions. In this role, I have the privilege of working with the NATO staff and member countries to discuss the application and implementation of the PAA in Europe and the potential for regional missile defense capability in a NATO context.

As was mentioned already, the first BMDS element deployment in support of phase 1 EPAA capability occurred on March 7 of this year when the cruiser USS Monterey deployed to Europe. 2 weeks ago, the permanent representatives to the North Atlantic Council, the NATO Military Committee, the NATO Air Defense Committee, and other NATO senior policy and technical committees and international staff received tours and demonstrations aboard the ship during a port call on Antwerp. For the rest of this year, Monterey will spend the spring and summer helping to develop, test, and verify the command and control processes, the data pathways, tactics, techniques and procedures necessary for the phase 1 capability to become operational later this year.

In the course of this, two areas have become clear in my dealings with the allied nations. First is the criticality of being able to integrate partner nations into the missile defense architecture and structure through networking. This builds coalition unity and provides other nations the opportunity to actively participate in both their own defense and a larger collaborative defense, and results in shared responsibility and costs.

Second is the value of satellite systems, such as the space tracking and surveillance system, to provide a means to rapidly increase the level of protection in designated areas or extend protection to an undefended area. This is an unprecedented level of flexibility and responsiveness for combatant commanders to offer their allied partners should the need arise.

Finally, as was mentioned, JIAMDO recently completed the base case in the third of a series of air and missile defense inventory sufficiency analyses called the Joint Capability Mix, or JCM-3 study, to examine the implications and opportunities for the Phased Adaptive Approach to our overall capability for ballistic missile defense. This study has been reviewed by the Department. We're in the process of briefing the base case results to appropriate parties, including this committee, and we are continuing the analytic efforts of JCM-3 to examine a number of excursions and alternatives that we have developed.

The JCM-3 study assesses the warfighter's requirements for ballistic missile defense elements for the homeland and for each of the European Command, Central Command, Pacific Command areas of responsibility as the commanders anticipate using BMD capabilities within their overall operational planning. Working with the combatant commands, the services and the Missile Defense Agency, we looked to understand how many interceptors, launchers, and sensors were needed to counter various future scenarios and, most critically, the effect those numbers had on warfighting capability. We took into account how the combatant commands intend to employ the BMD elements, their desire for a layered defense, what the threats are, and generally how the threat will be expected to be employed.

The significant level of warfighter and development involvement in the process gives us a high level of confidence in the results. It also shows that the development programs are correctly focused on the warfighter's desires for forward-based airborne and satellite systems that enable earlier intercepts, larger engagement areas,

more shot opportunities, and increased effectiveness against countermeasures.

You may remember that we previously conducted JCM-1 in 2005 and '6 and JCM-2 in 2007 and '8. These focused on the number of interceptors that might be required under different scenarios against specific threats. There are three main differences between these earlier studies and JCM-3. First, JCM-1 examines all the elements of the regional BMD system, including sensor systems, launcher systems, and interceptors, whereas the previous studies looked only at interceptors.

Second, JCM-3 examines performance against threat ballistic missiles that employ a range of countermeasures. We had not done this previously.

Third, as I have previously noted, JCM-3 is a study of warfighting sufficiency rather than inventory acquisition objectives. We examine the ability of the application of PAA architectures in the different areas of responsibility of the combatant commands and for the defense of the homeland to determine how BMDS contributes to their overall plan to deter aggressors and, if necessary, to end enemy ballistic missile attacks should they occur. We do not attempt to simply answer how much to buy. We give alternatives to the warfighter on how to achieve his overall warfighting goals.

The specific study results cannot be discussed in this open forum, but I'm prepared to discuss the classified results in a closed session following our time this afternoon or at another time at the committee's convenience or that of the individual members.

Overall, JIAMDO continues to provide the Joint Staff and the combatant commanders a linchpin resource for the development, refinement, planning, and fielding of, among other things, ballistic missile defense for our homeland, our deployed forces, citizens, partners, and friends overseas.

Thank you, Mr. Chairman, Mr. Member, for the opportunity to testify, and I look forward to answering your questions.

[The prepared statement of Admiral Macy follows:]

Senator NELSON. Thank you, Admiral.

Ms. Chaplain.

STATEMENT OF CRISTINA T. CHAPLAIN, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT, GOVERNMENT ACCOUNTABILITY OFFICE

Ms. CHAPLAIN. Chairman Nelson, Ranking Member Sessions, and members of the subcommittee: Thank you for inviting me to discuss accountability and transparency for the ballistic missile defense system. As you noted earlier, the BMDS is DOD's largest single acquisition program. It is also likely the most challenging, not only because of the inherent technical challenges involved with the missile defense mission, but because of the wide range of assets involved, the global nature of the system, and the need for a high degree of integration and jointness.

While the inherent risks are substantial, intense early schedule pressures driven by presidential directive exacerbated acquisition risks, as they required MDA to take on a high degree of concurrency in development. That concurrency continues. More recently, budgetary pressures have further challenged MDA. A faster

pace of acquisition and development activity often comes with a higher price tag. Yet fiscal conditions require DOD to re-examine all of its programs with an eye toward achieving greater cost efficiencies and savings.

Taken together, these conditions create a high risk environment for the MDA and thus call attention to the need for strong oversight, accountability and transparency. Yet the flexibilities given to MDA in order to field initial capability quickly have made accountability and transparency elusive. Our testimony and report detail the differences between the BMDS and DOD's largest acquisition programs. I would just like to highlight a few.

First, while other large programs have been required to create baselines and report variances once they enter into the engineering and manufacturing development cycle, until recently MDA has not been required to do so for pieces of the missile defense system.

Second, while other programs must obtain approval of a higher level acquisition executive before making changes to their baselines, MDA does not. In fact, the Director of MDA serves as both approving acquisition executive and as the program manager.

Third, while other programs must obtain independent life cycle cost estimates, the MDA does not.

Fourth, while other programs must complete initial operational test and evaluation before proceeding beyond low rate production, MDA does not.

This broad flexibility enabled MDA to make decisions faster than other acquisition programs and to be more agile. But from an oversight and decisionmaking perspective, there were considerable disadvantages. The lack of baselines for BMDS along with high levels of uncertainty about requirements and program cost estimates effectively set the missile defense program on a path to an undefined destination at an unknown cost.

I'm pleased to report, however, that the MDA has recently made significant strides in increasing transparency and accountability. Specifically, in the last year MDA established resource, schedule, test, operational capacity, technical, and contract baselines for several BMDS components. MDA also identified three phases where baselines are approved to help ensure the appropriate level of knowledge is obtained before acquisitions move from one phase to the next.

In addition, MDA implemented a process under which product development and initial production baselines can be jointly reviewed by MDA and the military service senior leaders, as a number of missile defense systems are expected to eventually transition to the services for operation. These improvements were made subsequent to recent improvements to test planning to better link testing to models and simulations needed to assess performance and to extend test planning into the future.

Given the breadth, scope, and complexity of the systems involved in the missile defense mission and the wide range of stakeholders and gaps in past data, these improvements were not easy achievements. Significant progress has been made. Nevertheless, there is still much work ahead to ensure oversight and management data is clear, complete, accurate, and reliable. My statement and our re-

port detail improvements that are needed, particularly in the areas of cost reporting and testing.

Moreover, improvements to oversight reporting should be complemented by other actions, including stabilizing the approach to efforts, improving transparency and accountability for the European Phased Adaptive Approach, and lastly embracing knowledge-based acquisition practices that ensure programs complete developmental activities before proceeding in production, that test plans are stabilized and adequately reported, and that targets used for testing are reliable, available, and affordable.

This concludes my statement and I'm happy to answer any questions you have.

[The prepared statement of Ms. Chaplain follows:]

Senator NELSON. Thank you.

I guess now I get to ask a question. General O'Reilly, as I was starting to say, and I think you began to address it, being more than halfway through fiscal year 2011 and the Defense Department still operating under a continuing resolution at fiscal year 2010 funding levels, can you tell us what the impacts on your missile defense program has been on operating under the continuing resolution, and will you be able to mitigate some of those impacts if Congress passes a year-long funding resolution with most of the fiscal year 2011 defense appropriation levels by this weekend, soon?

General O'REILLY. Thank you, sir. The impact of the continuing resolution, series of continuing resolutions, for 2011 on the Missile Defense Agency's program has been significant. One area, for example, is the ground-based midcourse defense system, which the President had requested a \$324 million increase in '11 over fiscal year '10, so we're still operating at the fiscal year '10 position. That is significant when it comes to construction, for example, of the ground-based midcourse defense system in Alaska. We're approaching the construction season, where most of the work is done, and if we were not able to get a budget this week I would be in a significantly diminished position in order to hire the construction crews on time and we could perhaps lose most of the year's construction.

The mitigation to that is, if it does look like and if we do receive a budget for fiscal year 2011 I will be able to accomplish about 80 percent of the construction I was intending. But I must tell you that across our programs the continuing resolutions have prevented us from starting new starts for fiscal year 2011, such as our satellite programs that were to support EPAA, and they have caused a tremendous inefficiency in allowing contracts to only move forward, very large contracts, for several weeks at a time.

So the combined impact is a significant inefficiency and a reduction in, now with this budget, how much can I accomplish over the next remaining months of this fiscal year. I do believe I'm going to have to readjust what I intended to accomplish in fiscal year 2012 because the budget was received in April and before all of the funding will be received will be many weeks later than that.

Senator NELSON. Thank you.

Well, I see we're joined by the chairman of the Senate Armed Services Committee, Senator Levin. Senator Levin, would you have any comments you'd like to make?

Chairman LEVIN. I would have questions later on, but Senator Shaheen was here first, so please go in the regular order. Thank you, though.

Senator NELSON. Thank you.

Senator Shaheen.

Senator SHAHEEN. Thank you, Mr. Chairman.

You all have alluded to the current budget situation that we're facing and clearly it's going to affect everyone across the board. As you look at the budget situation, can you talk about how you expect to be able to keep programs on track? And specifically—I guess this goes to you, General O'Reilly, and perhaps Dr. Roberts—can you talk about the balance between development and testing versus deployment and what potential risks there are if you misjudge on one side or the other?

General O'REILLY. Senator, I will start first. As far as the budget impacts are, as I said, they're very significant across the board. In some cases where we've just lost at least half a year worth of program and we will not—for example, the start of my satellite surveillance program, our new program—we will now be allowed our new start at the end of this week if we receive a budget, which is more than half a year. I don't believe we're going to be able to catch up on that time.

So in some cases we can't. In other cases, with production lines and so forth, we will try to acquire larger lots of supplies and accelerate the production line on some of our interceptors. But again, I don't believe we're going to be able to mitigate the total impact of the CRs this year. So what we set out to accomplish in '11, some of it's going to have to occur in '12.

As far as the balance between testing and development, we have taken a look several years ago at all of the data that was required for testing in order to do two things: one, to confirm for the operational test agencies, independently confirm, that missile defense systems are suitable and operationally deployable and effective. The second reason is to support the accreditation of our models and simulations. Our testing is so expensive—a typical GMD test can cost \$300 million. So to fully test its full operational capability, especially against large raid sizes of missiles, it's critical that we have independent verification of our models and simulations which our combatant commanders will use.

So we have set out and restructured our programs to ensure that every new deliverable product has gone through a testing regime sufficient for the operational test agencies to make an independent assessment, are they ready.

The penalties we can see in the approach for GMD, for example: I can understand why we fielded GMD as quickly as we did, but we will still be testing some of the original fundamental operations of the system for many years. As we discover that we need to upgrade the system because of something we found in flight testing, we will go back and refurbish the missiles we have. So that's why we've started a stockpiling of missiles to do that. But that is much more expensive than to completely qualify, what we call, for production all of our systems on the ground before we go into flight testing.

But I understand why we did it in GMD. We have a strategy to increase over time the reliability of the system through testing. But we will not approach that, nor have we, as a result of the ballistic missile defense review for the rest of our systems.

Senator SHAHEEN. So when you do those independent verifications of your models, since we're not actually testing in real time, is there—do you have any evidence that there's ever a problem?

General O'REILLY. Senator, there's two levels where we find problems, actually three. The first is in the component testing on the ground, where we—to the greatest extent possible, we replicate the performance of the missile components on the ground as if they were flying. We do that hundreds of times. It's very severe environments. That's our first confidence level that these components work right.

In our latest GMD test, we did find we had a failure mode that could not be replicated on the Earth and that's why I am going to request an additional test to verify we fixed it. The Earth's gravitation is one problem with testing it on the ground, and literally the rotation of the Earth. These are very sensitive items and you must be in flight testing, and the frequencies and shocks that we can replicate on the ground are limited, even with our best capabilities, our best facilities.

So one of the problems is until you're into flight testing you can't totally replicate on the ground. But you can do a lot.

Second is to integrate the system in ground testing, extensive ground testing. We do it in laboratories and then we repeat it actually in the field with the soldiers, sailors, and airmen operating the system, and we simulate threats on the system and we run those hundreds of times in order to gain a confidence level. But the Director of Operational Test and Evaluation—and each service has its own independent operational test agency—makes the final assessment on my products, not the Missile Defense Agency, so that there's some independence.

Senator SHAHEEN. Thank you.

In competing for some of the scientists and engineers that we're going to need for the future to continue the work of the MDA and also for DOD, are you comfortable that the current budget actually supports our ability to recruit and train the scientists and engineers and mathematicians that we're going to need? I have an ulterior motive in asking this question because I think we're not doing enough to train the folks in the STEM subjects that we're going to need for the future to continue to lead this country, and obviously in your agency there's a critical need for people with those degrees and training.

General O'REILLY. Ma'am, I couldn't agree more. Senator, our issue with qualified young engineers and scientists has been increased or exacerbated by our recent—or the 2005 Base Realignment and Closures Act. We moved our technical work force from Washington, where I had over 3,000 engineers. I will now have 300 people here by the end of September. We moved those to Huntsville, Alabama, and Colorado Springs and Dahlgren, Virginia.

The problem was the average age of my work force was 49, so most of them were not willing to move. So I needed to hire over

a thousand engineers. We went to the universities and two aspects. One, I think it takes personal engagement. I have personally engaged with universities, as well with the chairman, out on trips. We've gotten a tremendous response from that.

Two is, unfortunately, the economy. For every engineering position I have had as we hire the college graduates, we have had between 18 to 26 highly qualified applicants for every position. So the Missile Defense Agency as a consequence, unintended, of the economy, we've received tremendously qualified applicants. The average person we receive has over a 3.8 average. 40 percent are master's degrees or Ph.D.s.

But I do spend a lot of time in the universities, also with research. Key to this is investing in research with the faculty members so they in fact can talk to the students and the postdocs and they can see opportunities in government such as this.

Finally, I have outreach to historically black colleges and universities because our agency had 12 percent minorities, but in the engineering field 2 years ago we were at .3 of a percent of our engineers were minorities. Today it's 4 percent. So it may not seem like a lot, but it took a significant amount of effort to reach that.

So in all of those areas, Senator, I couldn't agree more. It takes—the young folks really respond to personal energy and personal appearances and that's what I have been pursuing.

Senator SHAHEEN. I'm out of time, but how many women?

General O'REILLY. In some universities over 70 percent of the engineering students are women, and that's reflected today. In the group that we have hired since I first mentioned, over 40, I believe it's 42 or 44 percent are women engineers. So we previously had less than 10 percent—significant growth in that area, too.

Senator SHAHEEN. So what's the final number? Where are you at today?

General O'REILLY. As far as—we still have several hundred more—we have hired 380 new college graduates in the last 2 years. What I'm trying to do is prevent a demographic bump again in my organization. So we hire 100 at the end of every semester, to smooth out the demographics.

Senator SHAHEEN. Thank you.

Thank you, Mr. Chairman, for letting me go over.

Senator NELSON. Thank you, Senator.

Senator Sessions.

Senator SESSIONS. Thank you.

General O'Reilly, as I mentioned in the opening statement, after two recent test failures it's clear that GMD is in need of some additional resources. More I think is needed to ensure the capability that we have works to the advanced degree that you'd like it to operate at.

I would first note—see if I'm correct—that the initial guidance system's kill vehicles have performed ably and I believe 20 of those are in the ground today and you believe are capable of defeating the kind of incoming missiles likely to be received from an Iran or North Korea; is that correct at this point in time?

General O'REILLY. I can't get into the actual number of that configuration, but our original configuration, yes, sir, we have had five flight tests and three intercepts out of three attempts and have

found no indication of the type of problem we found in the newest version, where we have failed twice.

Senator SESSIONS. And the new version was designed to be even more sophisticated to deal with more sophisticated threats; is that correct?

General O'REILLY. Yes, sir. It had more accurate guidance instrumentation on board.

Senator SESSIONS. So it's going to take some effort to get that under control. Do you foresee a need—I think you've indicated you need more interceptors to facilitate the kind of realistic testing that you believe is necessary?

General O'REILLY. Yes, sir. Before the first generation of ground-based interceptor, we flew a test where we did not have an intercept, and I'm asking for another test in order to verify we've resolved the problems on this latest interceptor version.

Senator SESSIONS. Could you give an estimate of what that test might cost, one, say one test?

General O'REILLY. Sir, since it does not involve a target, the cost would be primarily of the interceptor, which would be around \$70 million, and then an additional 30 to \$40 million of support for that test. So it's approximately \$100 million for that test.

I have also, sir, determined that we're going to need significant ground testing of at least 50 to 100 million more on the ground, again to verify that we have absolutely resolved this problem.

Senator SESSIONS. Well, we've done such a—we've had such a long and basically successful effort to establish the capability to defend the United States against a missile attack, we don't need to stop, allow our adversaries to develop more sophisticated missiles, and then all of our efforts have been not productive.

So you would say that it does make sense that we continue to develop the more sophisticated capabilities that the threats may pose to us in the years to come?

General O'REILLY. Yes, sir. I would agree with, for example as Admiral Winnefeld said, to stay ahead of the threat.

Senator SESSIONS. Dr. Roberts indicated that the threat is qualitatively and quantitatively advancing, I believe.

Now, with regard to this money that's going to be needed, maybe \$250 million you just referred to, where do you plan to get that and how can you obtain that?

General O'REILLY. Sir, for this year I've had to stop the production of seven ground-based interceptors in production because we don't want to go forward until we've absolutely assured we've identified and resolved this design issue that's caused the most recent failure. So I am proposing to divert the funding that we would have had to build those seven interceptors and to do more refurbishments and to support this ground testing, than we had originally planned.

Senator SESSIONS. So that looks to me like you're robbing Peter to pay Paul, and it raises the fundamental question, is does this budget give you enough money to keep the program on track and actually fix the failures. I know that you've got difficulties. All of us in Congress and the White House and the Secretary is saying watch spending, try to contain spending, and we all believe in that. Trust me.

However, when we've done this much work and we're down to maybe \$40 billion more has been spent on this project and we've hit a difficulty, we need to be able to go forward with it and we don't need to stop short of the number of interceptors we need in the ground and prepared.

So I guess my question is, in your personal professional opinion—and we ask you for that—do you have enough money to keep this program on track and to fix the challenges from the GMD system?

General O'REILLY. Sir, for fiscal year '11 and for fiscal year 2012, because I have had to stop the production of the current GBIs and I am diverting that funding to fixing this problem and I'm using funding that was reserved for a flight test next year of the two-stage interceptor, which will have to move another year—

Senator SESSIONS. That will push the two-stage interceptor back.

General O'REILLY. Sir, without additional funding in fiscal year 2013 and beyond, there will have—there will need to be a delay of about a year of our overall flight test program that we were trying to complete by 2017. So that's one way to do it.

Right now, sir, I've got the funding I need to address this problem because I've stopped my production line.

Senator SESSIONS. Well, that has costs and ramifications also.

So I guess what I would say, Mr. Chairman, is that the Defense Department budget is tight. Just looking at the basic numbers on the MDA budget, the Defense Department gets an increase as requested by the President, I think, in the House. But you have a reduction of, I estimate, about 5 percent in MDA's budget request; is that correct?

General O'REILLY. Sir, for fiscal year 2012 it's \$48 million higher than fiscal year 2011, and fiscal year 2011 was \$324 million higher than fiscal year 2012. So for this budget it's actually higher than last year.

Chairman LEVIN. You mean fiscal year 2010?

General O'REILLY. I'm sorry. I meant '10. Fiscal year 2010 to fiscal year 2011 was 324—

Senator SESSIONS. I think we should take a note here how alert the chairman is over here.

General O'REILLY. Yes, sir.

Chairman LEVIN. I apologize.

Senator SESSIONS. Somebody is watching the store. You get an A, Mr. Chairman. I'm asking the questions. I wasn't following that—I wasn't that quick.

Chairman LEVIN. I didn't mean to interrupt.

Senator SESSIONS. No. You do do a fabulous job of keeping up with things.

General O'REILLY. Sir, I do believe in the near term, for fiscal year 2011 and '12, however, as I've said before—

Senator SESSIONS. Next year you begin to bite. '13, the budget is less than originally projected, is it not, the 5-year?

General O'REILLY. Yes, sir. Across the following 5 years, two things. First, we're finishing the heavy construction over the next—over fiscal year 2012. So the remainder of the work is focused on interceptors, flight testing, and upgrades. So that accounts for about half of it.

The other half is the efficiencies we're approving, sir. We have not reduced what we intended to accomplish, even though there's \$2.4 billion less in the MDA budget. We have identified all of the steps we're taking so they can be accounted for and it will be evident we're either achieving it or we're not, these efficiencies, for the same amount.

Senator SESSIONS. Excuse me. You just noted, though, that you're delaying the two-stage testing and you're stopping the production of your interceptors. Both of those will add costs to the future.

We can talk about it more—my time is up—actually where we are financially. I applaud you for the efficiencies that you've found, but I think there's no doubt, with the unfortunate failures of these tests, that it's going to hit our budget more than we expected, and we really need to see what we can do to keep your already-reduced plans from putting us in a situation we don't want to be in.

Senator NELSON. Thank you.

Chairman Levin.

Chairman LEVIN. Thank you, Mr. Chairman.

You say you stopped the production of the interceptors. I thought it was the kill vehicles which you've stopped production on.

General O'REILLY. Sir, it is the kill vehicles. I can't deliver the interceptor without the kill vehicles.

Chairman LEVIN. No, that's fine. But you said the production of the interceptors and I think you meant kill vehicles; is that correct?

General O'REILLY. That part of the interceptor, yes, sir, the kill vehicles.

Chairman LEVIN. Now, the reason that you are—on the funding issue, you're stopping production not to save money, but because you want to do testing first to make sure that what you produce will work; is that fair?

General O'REILLY. That's absolutely the case, sir. We did not anticipate this failure, and especially when it happened when the budget was already developed. So that was not to save any money. It is solely driven by we need to confirm the design works before we go back into production.

Chairman LEVIN. Well, I totally agree with that philosophy, because I think you should know whether something works before it's produced and deployed, and there's been too many times where we've deviated from that course in the past, particularly in missile defense, for my comfort level.

But you're satisfied. And I think the other witnesses—let me ask them, too. Do you all agree that it makes sense to not produce further kill vehicles until we have corrected the problem, so that when we do produce them we know that they're going to properly behave? Admiral, would you agree with that?

Admiral MACY. Absolutely, sir. It was one of the basic results of the ballistic missile defense review that we would, if you will, fly before we buy, that we would ensure that to the best of our ability within costs of testing and modeling and simulation that we would understand the performance of the systems, so when they fielded from my perspective representing the warfighter I have confidence in their level of performance, so that I can build my operational plans to meet the need.

Chairman LEVIN. Dr. Roberts, do you have any difference with that?

Dr. ROBERTS. Ditto.

Chairman LEVIN. Now, General, last year I believe you displayed some frustration with the quality of some contractors' work, and you and I discussed the need to improve the MDA contracts to try to get more protection for the government against defects, which would require some defects clauses in the contracts.

Have you made any progress towards including defects clauses in the contracts?

General O'REILLY. Sir, we've worked with industry to get their feedback. I've worked with the leaders, the chief executive officers, of the major aerospace corporations and asked them for their ideas and help on this, so that it is most effective, these clauses.

The clause that we're looking at is not to indemnify industry from trying to achieve an unprecedented technical goal. That is the reason why we have cost-plus contracts. Unfortunately, when we find a failure mode that was caused by a quality, what we refer to as a quality escape—they didn't follow their own processes, their supervisors didn't catch it, and ultimately it caused a defective product—that's also today under our contracts protected by a cost-plus contract. It's the cost just went up.

An example is the first of the two GMD failures was caused because of a quality problem, and no matter how much additional money we added that wouldn't have resolved the root cause of that problem.

So where I am today is looking at the fee and looking at the profit that we're providing contractors and having the ability to go beyond the limited scope that we currently have in our award fees for quality control and extending it to a much greater pool of award fee money, even past-awarded money, so that the government can be compensated for egregious errors in quality control.

Chairman LEVIN. Well, I hope you'll pursue that. As I understand it from our conversations, that first flight failure was due to a lock wire, if I have the right word, not being in place; is that accurate?

General O'REILLY. That is accurate, sir.

Chairman LEVIN. It was not where it was supposed to be?

General O'REILLY. Yes, sir.

Chairman LEVIN. Now, that is not something that the government should be losing money over as far as I'm concerned. I agree with you that you want the industry to be creative and if things fail because there's design problems and because we're taking risks, that's fine. That's what research is all about. But if you've got a plan that says the lock wire, whatever that is, has got to be here and instead it was put over here and we have a missile test failure because of that, that's a totally different deal as far as I'm concerned.

There is a role for cost-plus. We use it much too much, and I commend, by the way, Senator McCain and others on this committee for really joining in an effort to go after cost-plus contracts where they shouldn't be cost-plus. But I'm very much troubled by this. When you have a missile failure, a test failure, and it costs hundreds of millions of dollars and it's because something was not

put in the right place according to the plan, then I think that the government shouldn't be—the taxpayers should not be paying for that, and I hope you'll pursue that approach that you're using vigorously.

Do I have time? I don't know.

Senator NELSON. Go ahead.

Chairman LEVIN. I'd like to talk to you, Admiral, about the Phased Adaptive Approach to missile defense in Europe. As I understand it, you are responsible for assessing missile defense capability requirements of the combatant commanders. I believe that, after input from the combatant commanders, the Joint Chiefs unanimously recommended the Phased Adaptive Approach to missile defense in Europe. If that's true so far, can you tell us why from a warfighter perspective the military benefits of the European Phased Adaptive Approach to missile defense make sense?

Admiral MACY. Thank you, Senator. Yes, it makes sense because it provides us two opportunities. The first is an opportunity in time and the second is an opportunity in planning.

In the role of time, the Phased Adaptive Approach allows us to address the closer threat to Europe, the threat of medium-range, intermediate-range missiles coming from the Middle East, whereas previously we did not have a method to do so prior to 2017 at the earliest with the so-called third site plan, which because of physics also would have had some limitations in defending some of the parts of Europe, those more to the south.

The Phased Adaptive Approach, being phased to our own technologies and adapted to the threat, gave us a way in which to organize our thoughts and our plans to take advantage of the near-term capabilities that are present in Aegis and in THAAD, developed by the Missile Defense Agency, to address those near-term threats to Europe. So that's a time issue. Basically, we can address the threats to Europe much sooner than we would have been able to.

The second is in the flexibility and the capability of the system. It allows us to adapt to changes that may appear in enemy intent and the emergence of threats from another area. We have done most of our planning for threats coming from one particular country or set of countries and part of the region. If another were to develop this capability, it would allow us to adjust faster.

It would allow us to increase or decrease the capability based on the amount of threat. And it allows us opportunities for partners to take part in the missile defense of Europe by having more opportunities for ways in which they can connect with our system and come up with an allied approach, whereas previously it was a unitary system linked to the homeland defense BMD capability and there was not a real practical way to have the partners involved.

So we have flexibility in capability, we have flexibility in the alliance, and we have the opportunity to address threats on a more timely basis.

Chairman LEVIN. Thank you.

Thank you very much, Mr. Chairman.

Senator NELSON. Thank you, Chairman Levin.

Senator Udall.

Senator UDALL. Thank you, Mr. Chairman.

Welcome to all of you. Thank you for being here today.

Let me start with this. As we develop active defense networks to counter advanced ballistic missiles, deployed American forces and some of our allies, as we know all too well, are faced with the threat of low-tech rockets and missiles. Some of these weapons don't require a lot of technical knowledge for the user. They can be launched from the backs of pickup trucks and they're easily hidden.

How do we strike a balance between countering complex systems and those that are basically flying IEDs? For the Admiral.

Admiral MACY. Senator, that falls into the, if you will, the larger realm of which I am responsible, which is integrated air and missile defense, where we look at the defense of the homeland, of own forces and partner forces from all objects arriving, threat objects arriving in the atmosphere, regardless of source. So we look at the integrated air and missile defense architecture, the IAMD capability, across the board to address that.

We have a IAMD operational architecture, a formal way of looking at what decisions, what information has to be made at each stage in that process, who has to make it, and who they have to provide it to. This has been done in a very rigorous and organized fashion, in accordance with the official architectural framework.

We coordinate with program providers across the spectrum of air and missile defense at their programs, how they fit into that operational architecture, and how they address these issues. Recently we've had a number of discussions with the Army in particular on countering rockets, artillery, and mortar issues, and what needs to be done, what are the requirements, what are the current capabilities and what are the shortfalls.

We serve, as I said earlier, at the nexus of how this is done within the Department. We participate with the services in their development of classic air defense systems through the joint capabilities process, and we participate with Strategic Command, who has the responsibility as the air and missile defense integrating authority to look at those requirements across the spectrum of threat.

In the ballistic missile defense world, we look at the prioritized capabilities list, the achievable capabilities list, that's generated by STRATCOM with the combatant commanders, and the dialogue that goes on with MDA over the programs that General O'Reilly is asked to provide.

So we are the nexus across that span of questions from rockets, artillery, and mortar, long-range rockets, short-range ballistic missiles, manned bombers, fighter aircraft, etcetera. I don't know if that answers your question, but that's how we try to put it together, then integrate both solely service programs—Army air defense, Navy air defense, Air Force air defense capabilities—with joint programs, how they work together.

We conduct a number of studies on that, one of the most significant being a series of exercises known as Nimble Fire, where in a classified environment we can bring together the air defense capabilities of all of the services and see how they interact. And as you know now, we've been up involved in all of these discussions that we've had here today.

Senator UDALL. I may want to follow up with some additional questions for the record.

General, did you have any addition, or Dr. Roberts?

General O'REILLY. Well, sir, in my charter it does not cover the very short-range rockets you referred to. So I develop typically a Scud threat and beyond. I have been asked by Congress and we do co-manage some Israeli programs that are short-range, such as the David's Sling. But even what you're referring to is more in the realm of the Iron Dome system, which was not part of our development, but I have been watching that and I have seen it's been successful in its recent deployment against very short-range rockets.

Admiral MACY. Senator, I'd like to add, if I may, sir, that I'm frankly very proud of the very close liaison between my staff and that of MDA, where we look at these intersections very closely to understand where there are opportunities for exchange of information, exchange of data and capabilities.

So it's not that one part of JIAMDOD is doing air defense and another part is doing ballistic missiles. We are very closely integrated with MDA as well as with the service engineers. We understand this is a spectrum of capability.

Senator UDALL. It's hard to see it being a threat in a broad-based way to our forces, but General O'Reilly mentioned the situation in Israel and I think that that has political elements as well as military elements, and the political elements can affect the military situation and the stability in the region. The more we develop the capacity to counter flying IEDs, in some ways the better.

I'll follow up with some additional questions on cost and so on. I want to use the second half of my time, if I have some left, to turn to the GAO. Ms. Chaplain, you're here, and thank you for your good work. You talked about some aspects of MDA's flexible acquisitions process that create what the report describes as "down sides" for oversight and accountability. I know the DOD concurred with some of the GAO recommendations and that the MDA has made some significant progress. But there are some recommendations that the DOD still disagrees with, and I'd like you just to discuss those, if you would, and then give General O'Reilly a chance to respond.

Ms. CHAPLAIN. Yes, there were some disagreements. Our recommendations focused on where we thought MDA could further improve the reporting that it had started. One issue, for example, was with regard to sunk costs for targets, and we believe those sunk costs should be reported and pretty clear, and MDA only partially agreed with that. They didn't feel like that would fit the way they want to report targets and that it's difficult to report some of the heritage costs in targets.

But our concern was even the MDA sunk costs weren't reported and we felt that they need to be, and to the extent the other costs can be or cannot be found that needs to be disclosed.

We also had some partial disagreements on the way testing is planned. We encouraged MDA to make test plans more realistic to account—there's often failures in testing and a lot of rework going on. We thought maybe some additional time and resources should be built into the plan, and they only partially agreed with that recommendation. I think it's just part of the issues involved with testing. As General O'Reilly said, they're very expensive tests to conduct and it would require—it might require more resources up front.

But our goal is to avoid a lot of the rework that goes along with a test plan that's not fully stabilized yet.

Senator UDALL. Thank you.

I think my time has expired, so, General O'Reilly, I'll have you respond for the record if I might, so that Senator Shaheen can ask some questions.

But I would just add that when I was a businessman I on the one hand loved seeing my auditors and on the other hand I wasn't all that happy to see my auditors. So thank you for what you do. I know General O'Reilly and I have had some conversations and he takes seriously your insights and has made some real improvements and is notably and understandably proud. I look forward to your responses for the record. I did want to yield so Senator Shaheen can ask her questions.

Thank you.

Senator NELSON. Thank you, Senator.

Dr. Roberts, you in your testimony referred to the hedge options. It's my understanding the Department's been planning to implement a number of these hedge capabilities and I understand the Department's currently conducting an analysis. Do you have some idea of when this analysis of the hedge options would be finished, and is it possible that you would brief us at the time that you have those options analyzed and under consideration?

Dr. ROBERTS. Yes, we're committed to brief you as soon as we have the Secretary's review and decisions in this area. Frankly, we expected that to be by now. We thought we'd have more to say on the hedge about—more to say in this hearing about the hedge. But of course, other events have intervened and we expect within a matter of a few short weeks.

Senator NELSON. General O'Reilly, are you confident that the MDA will be able to deploy additional ground-based interceptors at the eight extra silos at Fort Greely in a timely manner if the Department chooses to do so?

General O'REILLY. Sir, we're going to need to complete the additional missiles that are currently stopped in production in order to do that. As soon as we have those completed, we will have at that point over, I believe, over ten missiles additional for those eight silos, sir. So I will get back on the record the exact delivery dates for those remaining missiles.

[The information referred to follows:]

[SUBCOMMITTEE INSERT]

Senator NELSON. Okay, thank you.

Admiral Macy, can you explain how the Department assesses how many missile defense interceptors are required to meet the needs of the combatant commanders? I presume it's not as simple as planning to have at least two interceptors for each adversary ballistic missile so we can shoot at every missile. But if you could help us understand how the combatant commands and the military view the actual role of missile defense and the force structure that they need.

In other words, how does missile defense fit into the larger picture of a combatant command's missions and capabilities?

Admiral MACY. Yes, sir. I look forward—I'm looking forward to addressing that. To begin with, it's important to note that ballistic

missile defense capability as we have been talking about it today is not an isolated mission. As you pointed out, it's on the warfighter's planning. It's part of a larger campaign against an adversary.

I shorthand it sometimes that ballistic missile defense does not defend you against ballistic missiles. Ballistic missiles are an action taken by an adversary for a political result. Ballistic missile defense provides part of the National capability to deal with that potential threat or to deal with the event should it occur.

So what ballistic missile defense allows us to do is to prevent the adversary from winning the fight with the first wave. What it does is to provide the requisite level of protection for critical forces and nodes and capabilities sufficient for the combatant commander to bring all the other elements of national power to bear to get the enemy to change his behavior, because in the end that's what you're trying to do, is to change the enemy's behavior.

The goal is not to just simply sit there and keep taking incomings. As you pointed out, it's not practical. The number of threat missiles in the world already exceed our inventory and will continue to do so. So buying missiles equal to twice the number is just not practical.

So what we look for and what we have done in the JCM3 study is to look at that from a warfighting perspective: How long can ballistic missile defense capability provide the requisite level of protection to those critical assets that the combatant commander has identified so that he can take other steps necessary to change the enemy's behavior, to stop the enemy's use of ballistic missiles?

That's from an operational perspective. From a planning perspective, demonstrating that having sufficient capability may assist in deterring the enemy from contemplating the use of ballistic missiles, knowing that he will not be successful in his initial attacks, and he can remain confident that the reaction of the United States is going to be significantly more than simply defending against the incoming.

Senator NELSON. How does the Joint Staff allocate the number of missile defense systems to the various combatant commanders, who I'm sure are competing to one degree or another for those assets?

Admiral MACY. Yes, sir. It's a safe bet that each of them has a list which is a little bit longer than the one I have.

It is part of our global force management process, which is our formal process to assess the operational plans and requirements of each combatant commander, to understand the risks and the rewards of allocating them different capabilities. This is true across the board, whether it's ballistic missile defense ships, whether it's long-range bombers, whether it's infantry brigades, for their different needs.

We have an ongoing process through the GFMB, the Global Force Management Board, to understand their needs and their requirements, to balance across the forces what we have available, and to use that information to essentially do two things. One is to feed back through the Secretary to the development community and the budget community what we need to increase because we assess the overall risk as being too high and, until we have those,

to give to the Secretary those—that information he needs to make the decision on what risks he’s going to take and where he’s going to take them.

We last year looked very carefully at the issue of ballistic missile defense forces with the GFM community. We are folding that into the community. The Strategic Command is currently leading an effort among the three COCOMs plus NORTHCOM to understand how all of their different plans fit together and to understand how we would apportion and allocate forces in the near term and over time as we get more capability to each one of those.

Senator NELSON. So at the end of the process is it the Secretary that makes the decision or is it brought to the Secretary’s attention and the Secretary either assents or dissents to it?

Admiral MACY. No, it is an absolute—every deployment order is a decision by the Secretary in his role on behalf of the President as the command authority, whether it’s for a ship or for a brigade. We have a process that goes on every week. It’s called the Dep Ord Book. It’s the Deployment Order Book, where the movement of forces, the reassignment of forces, goes through a review process among the COCOMs, goes through the Joint Staff, is reviewed by the Chairman in his role of providing military advice, and then is presented to the Secretary, and he literally signs off each page. His initials go on, yes, no, or come see me more.

Senator NELSON. Thank you.

Senator Shaheen.

Senator SHAHEEN. Thank you, Mr. Chairman.

I just have a final question. I was interested in the back and forth around Israel’s Iron Dome and David’s Sling program and the Arrow program, because I had the opportunity to visit Israel last summer and be briefed by their director of the missile defense program on those systems. I actually think we should take a lesson in terms of naming our systems. I think theirs are quite descriptive.

But what I was interested in is, you mentioned that the Iron Dome technology was Israeli and I know that we contribute to the work that’s being done there, so I wonder if you could talk about what we have learned from the technology that’s been developed and how much of that is shared and whether we are actually incorporating any of that into what we’re doing here.

General O’REILLY. Senator, actually the Iron Dome is one of the few Israeli programs that’s totally developed by them. So we do not have a sharing agreement with them. David’s Sling, we provide 50 percent of the funding and they provide 50 percent of the resources. Our companies, such as Raytheon, work with that development so that they have the property rights and the information rights to develop that type of capability should we want David’s Sling. The same with Boeing on Arrow 3. Those two programs, in which we are investing approximately half of the resources, we do not—first of all, our industry team is working on those programs, so they see the details of the technology, and we have the rights to that technology. There are certain limitations, but all that is pre-agreed to prior to the start.

But in the Iron Dome, that is not a Missile Defense Agency program. I have been asked to provide funding out of my budget for

the procurement of Iron Dome. So we're ready to follow the guidance of Congress in that regard. But I don't participate in the actual management or the development of that capability. But I've reviewed it.

Senator SHAHEEN. And where are we in terms of the procurement? There has been a request from Congress, but have we done anything on that?

General O'REILLY. Senator, I need this year's budget, fiscal year 2011. It's in the fiscal year 2011 budget, \$205 million for the Missile Defense Agency for the procurement of that for Israel.

Senator SHAHEEN. If we do contribute to that, what will that—what would we learn from that and will we be able to take advantage of any of the procurement efforts?

General O'REILLY. Once we have the budget, I will begin that process. But we have not begun that, those agreements with the—and the office in Israel that you were referring to, they also were not responsible for the development of Iron Dome. That office, we work together closely every day. So this is something we're going to have to determine ahead of time of the agreements. That hasn't occurred yet.

Senator SHAHEEN. So who developed the Iron Dome technology?

General O'REILLY. I know the company is Rafael and I've been out there. I've seen their testing. It's very impressive for what it can do.

Senator SHAHEEN. Thank you.

Thank you, Mr. Chairman.

Senator NELSON. Thank you, Senator.

Ms. Chaplain, when GAO makes recommendations for MDA to approve its program management, the Defense Department formally indicates its view of those recommendations. I believe in response to recommendations as in your report for March DOD—in March, DOD either agreed or partially agreed with all your recommendations. Your report and your testimony indicate that MDA has made significant progress in improving the accountability and transparency of its programs.

If MDA implements the recommendations in your report, how far will it have come toward what you would consider an acceptable level of transparency and accountability?

Ms. CHAPLAIN. If they implemented all the recommendations, they will have come a very long way in getting the things that we want to see for accountability and transparency. There are some actions that need to be taken that shouldn't be taken lightly. One thing we're looking for, for example, are independent cost estimates and MDA has just started that process. So that's going to take some time.

Another thing we're looking for is backing cost estimates with all the data and documentation you need to trace and verify them and to really understand them in an easy way. That wasn't present this round. I think they'll be more present the next round.

Along with the transparency and accountability of just what they report to Congress, we would like to see a few other things happen. One is just stabilizing the acquisition approach. We've had three different ways of reporting on progress for the missile defense system and each time we change those ways it becomes very difficult

for us to go backwards and track costs back in time and schedule and progress.

We'd also like to see some of the things we recommend extend to the efforts like EPAA, where we can learn more about costs and schedule within that effort. Then we'd also like to see the structure and the clarity of MDA's budget request improve as well.

So there's more beyond just what you see on paper, but I think if everything that we're asking for in this round is implemented it will be just a huge amount of progress that's been made.

Senator NELSON. Thank you.

General O'Reilly, have you determined what or how many of the recommendations you may be seeking to implement?

General O'REILLY. Senator, we believe the GAO has accurately captured the challenges which Missile Defense has to operate in, but at the same time—the management challenges. At the same time, we are on a path to accomplish the independent cost estimates. As she has said, there's been recent changes. I've made most of those changes, to enhance the baseline reporting.

This was the second year we've done it in a row. This year's report that we submitted to Congress wasn't taken into account. The delivery was after this GAO audit was done. We believe that has each year more enhanced accuracy and the level of detail they're looking at.

The one area in which we disagree with the GAO's recommendation—Ms. Chaplain just referred to it before - - is in the area of our targets we feel that we reuse—because we have to find intermediate-range and ICBM-type targets, instead of buying brand-new targets we go out and work with the Air Force and we identify retired—and the Navy—retired missiles, and then we modify those missiles and make them into a target.

Now, the cost of the original missile we don't believe accurately reflects the cost to MDA of achieving that target. I know GAO looks at it as the cost to the government, but those missiles were bought for a particular reason, they were retired, and we've taken them out of retirement. We do agree with the GAO we should capture all of the costs of modifying those missiles, but there's a difference there that we're still in discussions with the GAO on.

Senator NELSON. In that regard, I know that you've changed some of your acquisition requirements and contracting requirements now where you get competitive bidding for contracts. Could you tell us a little bit about what you've been doing there and maybe some of the cost savings that the agency has achieved?

General O'REILLY. Sir, of our \$2.4 billion that was identified in efficiencies by MDA this year, almost a half a billion was due to the way in which we acquire contractor support for government agencies or government staff. In the past, we used to hire—we determined and told our contractors how many engineers we needed and of what seniority and what were the particulars of the resources we wanted these companies to provide us to augment our staffs. Instead, we're taking a different approach. We define the task that we want these companies to provide for us and we leave it up to the companies to determine the seniority and number of engineers.

We do this in a competitive fashion, so they know they're competing for cost, schedule, and performance of their competitors, against their competitors. This year we've identified so far over \$100 million in savings because of the way that contractors have proposed. It may be an equal amount of personnel or it may be even more, but it might be fewer senior engineers that cost more, more mid-level, and then some junior engineers, which industry has told me in the past the way we were contracting was preventing them from literally hiring and developing a new generation of engineers.

So this has worked quite effectively for us, sir. We do have about \$30 billion more of contracts over the next 5 years which we are looking to compete.

Senator NELSON. General O'Reilly, given the two failed GMD test flights, flight tests, you're planning to conduct two more flight tests to verify the solution for the problem encountered in the test, and you've indicated that you will need some additional ground-based interceptors for the GMD test program, but that number hasn't yet been determined. I understand that you plan to assess the need for additional GBIs after the flight tests verify and demonstrate the solution to the GBI problem we've been discussing.

Is that correct? And since the GBI production line will remain open for several years and the refurbishment and target programs will also keep that production line busy, we'll have several years in which to decide how many additional GBIs are needed. In other words, we don't need to decide that this year; is that assumption accurate?

General O'REILLY. Yes, sir. We believe that through this failure review board process one of the outcomes will be what is the right number and the strategy for testing GBI reliability in the future. We already have a program that we plan over the next 10 years to test over 900 components off the missiles that are currently in the missile fields as we refurbish, as you say. But we will reassess what additional testing is needed beyond that.

Senator NELSON. This is to both you, General, and Dr. Roberts. Your prepared statements discuss a number of planned enhancements to the existing ground-based midcourse defense system to increase the capability to defend the homeland over the coming decade. General O'Reilly, can you summarize the enhancements briefly and describe the degree to which they are expected to improve our defenses and over what period of time are we looking?

General O'REILLY. Sir, there's several studies that are being done independently and they all indicate that—one of them, including Admiral Macy's study that he just finished—one of the key indicators to the effectiveness of missile defense is not actually the number of interceptors—you do need a certain amount—but it is the sensor system and our ability to discriminate objects and determine which is the RV with enough certainty in order to effect your firing doctrine, how many missiles are you going to shoot at that cluster of objects?

All missiles when they're launched have associated objects that come with them—upper stages, shrouds, other components that come off the missile during powered flight. So we have to have the ability to determine where is the reentry vehicle to hit it. Those

type of upgrades to the sensor systems, as I've mentioned, Clear, Alaska, those algorithms, will have a significant impact on our capability.

Also, the East Coast communications system will in fact significantly enhance the protection of the United States because we can communicate with the ground-based interceptor late in flight before it has to intercept any threat that's coming from the Middle East.

Those are, the ability to discriminate, the ability to use our new sensors like our satellite systems and even our forward-based airborne platforms and forward-based radars, those totally combined give us a very early track, and with the SM-3 IIB we would be able to intercept. Our cost estimates of that interceptor is about \$15 million, so it's a very cost-effective for the first layer of defense for homeland defense. It doesn't replace the GMD system, though. That still is necessary.

Senator NELSON. Dr. Roberts, how do you see these GMD enhancements fitting into our overall missile defense strategy?

Dr. ROBERTS. Well, to go back to your opening formulation, we're ahead of the threat of limited strikes from states like North Korea and Iran, and we want to make sure that we stay ahead. A part of that is on the quantitative side. We want to be sure that we have the ability to provide sufficient interceptors, a sufficient number to match the requirement.

But we often forget the qualitative side, and we can significantly enhance the performance of the current system and prepare it for substantially enhanced performance when the SM-3 IIB becomes available to us. So we see these capabilities enhancements as essential. They are separate from the hedge, meaning these are things we're going to do in any case because they're important to staying ahead, and the hedge involves a set of things that we might want to do that are in addition, in the case of a more early emergence of capabilities that would overwhelm the GMD system.

Senator NELSON. In that regard, my colleague Senator Sessions was raising questions about the budget for what I would call I guess the out years, from '13 on, and raised a question about whether or not that was sufficient funding for that period of time. Do you have—Dr. Roberts, do you have any thoughts about how you might respond to that?

Dr. ROBERTS. Well, you had two good answers from the same military advisers that we listen to in Policy on this topic. We are satisfied that the budgets as projected are sufficient to our purpose. We don't see any opportunity for additional savings.

We have a clearly emerging threat in the regions. We have the challenge of staying ahead in the defense of the homeland. We have future technologies that we'd like to be invested in to ensure that we remain competitive over the very long term. And we have a testing program that we've all accepted needs to be robust and sustained over the long term. There's no significant opportunity there for additional savings.

So Policy clearly has the view that there are not significant new savings to be realized in the ballistic missile defense budget if we're committed to the policy principles articulated in the ballistic missile defense review.

Senator NELSON. General O'Reilly, do you have any thoughts you'd like to share?

General O'REILLY. Senator, as Dr. Roberts laid out, our current budget, the question that Senator Sessions was referring to, the reduction, that was aimed at efficiencies. We're still intending to accomplish the same scope, and we've done this in a way that's auditable to determine are we more efficiently buying this capability. It was not determined nor is it our intent to reduce the amount of work that we plan to do in fiscal year 2011.

As Dr. Roberts was saying, the hedge strategy would be additional, if we executed those hedges, would be beyond what was in our current budget.

Senator NELSON. So we would have to increase the budget at some point down the road to take into account these additional efforts at defense?

General O'REILLY. If those efforts are turned on, yes, it would require additional funding.

Senator NELSON. Well, my final question is is there anything we should have asked that we didn't ask?

General O'REILLY. No, sir.

Senator NELSON. Very politic.

Thank you very much, all of you, and thank you for your service to our country. We appreciate it.

The hearing is adjourned.

[Whereupon, at 4:23 p.m., the subcommittee adjourned.]