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REPORT ON THE BALLISTIC MISSILE DEFENSE REVIEW AND THE FISCAL YEAR 2011 NATIONAL DEFENSE AUTHORIZATION BUDGET REQUEST FOR MISSILE DEFENSE PROGRAMS

HEARING

BEFORE THE

SUBCOMMITTEE ON STRATEGIC FORCES

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

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REPORT ON THE BALLISTIC MISSILE DEFENSE REVIEW AND THE FISCAL YEAR 2011 NATIONAL DEFENSE AUTHORIZATION BUDGET REQUEST FOR MISSILE DEFENSE PROGRAMS

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON STRATEGIC FORCES,
Washington, DC, Thursday, April 15, 2010.

The subcommittee met, pursuant to call, at 2:14 p.m., in room HVC–210, Capitol Visitor Center, Hon. James R. Langevin (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. JAMES R. LANGEVIN, A REPRESENTATIVE FROM RHODE ISLAND, CHAIRMAN, SUBCOMMITTEE ON STRATEGIC FORCES

Mr. LANGEVIN. Good afternoon. This hearing of the Strategic Forces Subcommittee will come to order. Today we will take testimony on the Ballistic Missile Defense Review (BMDR) and the fiscal year 2011 budget request for missile defense programs.

Let me begin the hearing today by welcoming our three distinguished witnesses. First we have Dr. Bradley Roberts, Deputy Assistant Secretary of Defense for Nuclear and Missile Defense Policy. Dr. Roberts was responsible for coordinating the Department's Ballistic Missile Defense Review. Prior to his current duties, Dr. Roberts helped former Secretaries Perry and Schlesinger write the report on the Bipartisan Congressional Commission on the Strategic Posture of the United States. Dr. Roberts holds a bachelor's degree from Stanford University, a master's degree from the London School of Economics, and a doctorate from Erasmus University in Rotterdam, Holland.

Next, Lieutenant General O'Reilly, Director of the Missile Defense Agency (MDA), has agreed to appear before the subcommittee to discuss his agency's programs and budget. General O'Reilly is a graduate of the U.S. Military Academy and has three master's degrees: one in physics, one in national security and strategic studies, and one in business. As a scientist, and through his skills as the program manager of highly technical projects, he has been instrumental in the success of many of MDA's most important programs, including its directed energy work, Patriot, Terminal High Altitude Area Defense (THAAD), and the Ground-based Midcourse Defense System.

Finally, we will hear from Dr. Michael Gilmore, Director of Operational Test and Evaluation, about the operational status of our ballistic missile defense (BMD) systems. Prior to his confirmation, Dr. Gilmore served as the Assistant Director for National Security

at the Congressional Budget Office. Dr. Gilmore has worked at the Pentagon before, having served for 11 years in the Office of Program Analysis and Evaluation. Early in his career, Dr. Gilmore worked for the Lawrence Livermore National Laboratory on magnetic fusion energy. He is a graduate of MIT, where he earned a B.S. in physics, and he earned his master's and Ph.D. in nuclear engineering from the University of Wisconsin.

Gentlemen, I want to thank each of you for being with us here today, and we certainly look forward to your testimony.

As ballistic missile technology proliferates across the globe and increases in capability, the potential threat to our Nation and our allies grows as well. Continued developments in both Iran and North Korea are our most urgent concerns. While recent intelligence estimates have highlighted the growing number of short- and medium-range missiles developed by these nations, both of these rogue states continue, as we know, to work on intercontinental ballistic missile (ICBM) technology that could lead to missiles which directly threaten our homeland.

This past September, President Obama announced his plan for strengthening missile defenses in Europe through a Phased, Adaptive Approach to deploying defenses against the threat of Iranian ballistic missiles. On February 1, with the release of the budget, the Department submitted its first-ever Ballistic Missile Defense Review. The Administration's review established six clear objectives to guide ballistic missile programs.

First, the U.S. will continue to defend the homeland against the threat of limited ballistic missile attack.

Second, the U.S. will defend against regional missile threats to U.S. forces, while protecting allies and partners and enabling them to defend themselves.

Third, before new capabilities are deployed, they must undergo testing that enables assessment under realistic operational conditions.

Fourth, the commitment to new capabilities must be fiscally sustainable over the long term.

Fifth, BMD capabilities must be flexible enough to adapt as threats change.

And, finally, the U.S. will seek to lead expanded international efforts for missile defense.

The BMDR also endorsed applying the new Phased, Adaptive Approach across the board, including for the defense of South Korea, Japan, and our allies in the Middle East. This new approach links missile defense deployments more directly to the current threat; provides for flexible responses to future threats; and signals to the Russians, the Chinese, and the world that we are serious about maintaining strategic stability.

As we all know, ballistic missile defense is sometimes a controversial subject, but I believe that there is much greater consensus on this matter than meets the eye. In 1999, an overwhelming bipartisan majority of the House of Representatives voted to deploy a national missile defense system capable of defending the territory of the United States against limited ballistic missile attack. Since that time Congress has appropriated over $90 billion for missile defense, and the Pentagon has delivered 30

ground-based interceptors (GBIs) effective against long-range missiles that might be launched by Iran or North Korea; 52 batteries of Patriot short-range missiles, 44 of which are capable of launching the advanced Patriot Advanced Capability–3 (PAC–3) missile; 2 Terminal High-Altitude Air Defenses, or THAAD, batteries and 16 interceptors; and 55 medium-range Standard Missile 3 (SM–3) interceptors. The program has also converted 28 Aegis ships to use the SM–3 interceptors.

And this year the President's budget provides another $9.9 billion for missile defense programs, an increase of $670 million over the fiscal year 2010 appropriated level.

The consensus that paved the way for these developments is rooted in the basic principles that missile defenses should discourage rogue nations from developing threatening systems and that deployment of U.S. defenses protect us against those threats, but should not create strategic instability or increase the risk of nuclear war.

Yet a new strategy alone will not be enough. The Administration must convince Congress that it has an effective plan for ensuring that our defense systems are thoroughly tested, and that sufficient resources will be allocated to make sure that our missile defense systems are available when we need them.

That said, we are eager to hear from each of you this afternoon. Dr. Roberts, I am especially interested in your thoughts on how we should balance our efforts to defend the homeland with the challenges of building regional defenses against short- and medium-range missile threats.

General O'Reilly, I had asked if you would focus on how the BMDR and the Phased, Adaptive Approach have modified the MDA's plans for testing and deployment over the past year.

And, finally, Dr. Gilmore, we look forward to hearing your assessment of the operational capabilities of each of the components of the Ballistic Missile Defense System.

With that, again, gentlemen, I want to welcome you here today and I look forward to your testimony.

Before I turn the floor over to you, though, I want to turn to the ranking member for any comments he may have.

[The prepared statement of Mr. Langevin can be found in the Appendix on page 35.]

STATEMENT OF HON. MICHAEL TURNER, A REPRESENTATIVE FROM OHIO, RANKING MEMBER, SUBCOMMITTEE ON STRATEGIC FORCES

Mr. TURNER. Thank you, Mr. Chairman.

I would like to welcome Dr. Roberts, General O'Reilly and Dr. Gilmore. I appreciate you being here today, and I appreciate your attention to these important issues.

I also think it might be appropriate if, in the opening of this hearing, that we recognize the tragedy with Polish President Kaczynski. The Polish Government was so accommodating and welcoming of what are our important missile defense assets, and we certainly are all saddened by the tragedy of his military and civilian leaders who perished in the weekend's airplane accident.

Well, we have a lot of ground to cover today, so let us dive into some of the issues that are of concern to me.

First, I am very concerned by recent comments from Administration officials that, essentially, Congress has everything it needs to know about the Phased, Adaptive Approach, PAA. As Under Secretary Tauscher said at our hearing yesterday in reference to PAA details, "It's on the Internet." Well, unfortunately, the Internet does not provide sufficient details on the four phases of the PAA, nor does it provide a description of the options considered by the Administration in addition to the PAA and the analysis to support why it was chosen as the preferred approach.

Now, let me share a few examples of information that the committee does not have.

Phase 1 of the PAA calls for the deployment of a forward-based radar in Europe by the end of 2011. Now, we are considering the fiscal year 2011 budget request, yet we don't have where this radar will be located or how long host nation negotiations might take. Right now this would appear to be a high schedule risk item.

We do not know the number of ships, interceptors, and sensors that will be required for each phase, nor do we know the estimated costs or acquisition strategies for each phase.

We have minimal information on the technical feasibility, expected performance, and cost of the SM–3 Block IIA and IIB interceptors, which Senator Lieberman called "paper systems" just last year. So far, I am a little concerned as to why the Administration would be so slow in providing the information.

And, lastly, while we have positive statements from the North Atlantic Treaty Organization (NATO) Secretary General, we have yet to see details of a "NATO-ization" of the PAA, its integration with NATO's missile defense architecture, and any allied contributions.

Now, today, General O'Reilly, you provided a great deal of detail to us that we are going to be digesting from that. You have indicated that we can take, in a review of the information, the types of information to provide us milestones to be able to look at. We greatly appreciate your providing that to us.

Also today, I provided the General with a letter requesting his assistance in focusing on the issue of Phase 4 of PAA being the phase where mainland United States really becomes engaged with the assistance of missile defense. And I have a copy of that letter, if we can add that into the record, Mr. Chairman.

Mr. LANGEVIN. Without objection.

[The information referred to can be found in the Appendix on page 89.]

Mr. TURNER. I appreciate all of your expertise and all of your dedication. I know that you guys have worked diligently to ensure that we have a quality system, and I look forward to the exchange and the additional information you can provide so that we can work even more closely together.

I want to note that this committee had asked similar information of the prior administration on its prior proposed configuration of missile defense. And I think that this is an opportunity to gain bipartisan support for the current PAA plan, but the committee must have confidence that the PAA is the best approach for protecting

the United States and our European allies, and then, of course, mainland United States.

Second, my second concern is the 30 percent increase to the Ground-Based Midcourse Defense program is welcome—after last year's reductions—as in the Department's decision to finish Missile Field 2 in Alaska. However, it is unclear whether MDA has planned and budgeted for a sufficient number of ground-based interceptors, GBIs, to support reliability flight testing through 2030 and to accommodate test failures or surge scenarios. The health of the industrial base supporting the GMD program remains a concern, and the last thing any of us want to see are GMD options precluded because suppliers went cold.

In addition, the BMDR states that the U.S. "will continue development and assessment of a two-stage ground-based interceptor" as a hedging strategy for defense of the homeland. We are interested to see how does MDA plan to make it a viable hedging strategy, particularly when the budget request removes some two-stage GBI flight tests and delays others? I am concerned that such delays may preclude the two-stage GBI from being considered as a viable hedge.

Third, the Ballistic Missile Defense Review states that the Phased, Adaptive Approach will be tailored to other regions. And we know qualitatively that these new regional missile defense architectures will have significant force structure and inventory implications. However, without any tailored understanding of these plans, basing locations, inventory requirements and costs, it is difficult to assess whether MDA's budget is sufficient.

One thing is clear: Demand exceeds supply. Despite plans for Aegis and THAAD inventory growth, the bulk of the funding is planned for out-years. This creates near-term production gaps and inefficiencies for industry. An example shortfall is Aegis SM–3 interceptors. The Administration wants an inventory of 436 interceptors by 2015, yet is only buying eight new interceptors in this year's budget. Industry is sized to build 48 interceptors a year. Why were such decisions made?

Fourth, we need to see a long-term commitment towards a robust research and development program. I worry that we are giving up on some promised technologies while rushing to pursue others. The Airborne Infrared, ABIR; Precision Tracking Space System (PTSS); and SM–3 Block IIB are interesting concepts, but still unproven technologies.

Meanwhile, the Airborne Laser (ABL)—I appreciate the briefing that we just had with the General—recently demonstrated a successful missile shoot-down, yet the budget request appears insufficient to maintain the aircraft, conduct flight experiments, and fund further development of innovative directed energy technologies.

Fifth, I remain concerned that Russian linkage between U.S. missile defense activities and their adherence to the New START Treaty may have the potential to self-constrain U.S. missile defense activities. After all, the U.S. scrapped plans to deploy GBIs in Poland and a radar in the Czech Republic, and there are those who believe that was to "remove an irritant" in U.S.-Russian relations. It is important for the Administration to clarify its missile defense plans not only for Congress, but also for the Russians.

Lastly, we know that the threat is changing, and our missile defense plans must be flexible to those changes. A year ago, the Administration concluded that the long-range threat was not materializing as rapidly as once thought. However, since then, new details are emerging on both North Korean and Iran's long-range missile programs that should be grounds for the Administration to revisit the assumptions behind its policy changes.

I am pleased with the restoration of some funds in the budget request after last year's $1.2 billion cut. It is a welcome indication that the Administration took note of concerns expressed by many of us that a top-line increase was necessary to accomplish all that was being asked of MDA: homeland missile defense, PAA, regional missile defense architectures, expanded inventory, increased testing, and continued investments in science and technology.

I would like to thank our witnesses for their leadership and dedication and for being here today, and I look forward to your testimony.

Mr. LANGEVIN. Thank you. I thank the ranking member.

[The prepared statement of Mr. Turner can be found in the Appendix on page 39.]

Mr. LANGEVIN. We received prepared testimony statements for each of our witnesses, and these will be entered into the record, without objection. So at this point if you could please summarize your key points so that we have plenty of time to ask questions and answers.

With that, we will turn the floor over to Dr. Roberts.

STATEMENT OF DR. BRADLEY H. ROBERTS, DEPUTY ASSISTANT SECRETARY OF DEFENSE FOR NUCLEAR AND MISSILE DEFENSE POLICY, OFFICE OF THE SECRETARY OF DEFENSE

Dr. ROBERTS. Thank you, Chairman Langevin. Thank you, Ranking Member Turner. Thank you, members of the committee. I am pleased to have the opportunity to be here today to share our thinking and address your questions.

My statement for the record touches on two main topics. The first is the contents of the Ballistic Missile Defense Review, just to review the main elements there, to make the point that that review proceeded in parallel with the Quadrennial Defense Review and the Nuclear Posture Review. These were intended to be integrated looks at the strategic landscape in front of us. You have reviewed the elements of the policy and strategy framework elaborated there; I will not do so.

A key question you pose to us in the assignment for the first-ever Ballistic Missile Defense Review was this question about balance on future investments between defense of the homeland and defense of the region, and it was posed a bit as an either/or question. And, of course, as you know, the conclusion of the review is it is not an either/or question. We need a sound pathway forward for both the protection of the homeland and protection against regional threats and, because of the inherently unpredictable nature of the threat, the need to be well-hedged, to be able to accelerate capability deployment, and to be flexible with the capabilities we do deploy to meet unexpected requirements.

The second main part of the prepared statement addresses your questions about implementation of the conclusions of the review. I think we are likely to have three areas of focus. One is on aligning programmatic requests with the policy objectives. And, as noted in General O'Reilly's testimony, we have requested increases for homeland defense, for regional defense, and for testing consistent with the results of the review.

A second likely area of focus is the implementation of the missile defense in Europe and the Phased, Adaptive Approach. I perfectly agree with the proposition the committee must have confidence in the choices made and the logic behind them. It needs information in order to have that confidence. It does not have all of the information it needs to have that confidence, and part of my purpose in being here today is to better understand the pieces of the puzzle that are missing in order to help fill them in. I would give a more detailed answer to your question, but I will save that for the question and answer portion.

I think the third focus in my remarks on implementation is about cooperation with Russia. General O'Reilly, Under Secretary Tauscher and others have engaged Russia to further explore areas of cooperation on the basis of shared interest and mutual benefit. We have an ambitious agenda there.

And, with that, I will wrap up and look forward to your questions.

Mr. LANGEVIN. Thank you, Dr. Roberts.

[The prepared statement of Dr. Roberts can be found in the Appendix on page 43.]

Mr. LANGEVIN. General O'Reilly, the floor is yours.

STATEMENT OF LT. GEN. PATRICK J. O'REILLY, USA, DIRECTOR, MISSILE DEFENSE AGENCY, U.S. DEPARTMENT OF DEFENSE

General O'REILLY. Good afternoon, Chairman Langevin, Congressman Turner, and other distinguished members of the committee. It is an honor to testify before you today on the Missile Defense Agency's support to the Ballistic Missile Defense Review and our $8.4 billion fiscal year 2011 budget request to continue our mission to develop and field an integrated, layered Ballistic Missile Defense System to defend the United States, its deployed forces, allies, and friends against ballistic missiles of all ranges and in all phases of flight.

This budget request reflects strategy and policies stated in the Ballistic Missile Defense Review report and the prioritized missile defense needs of our combatant commanders and services as stated in the latest U.S. Strategic Command's missile defense prioritized capabilities list.

Under the oversight and direction of the Missile Defense Executive Board, chaired by the Under Secretary of Defense for Acquisition, Technology, and Logistics, the Missile Defense Agency proposes a fiscal year 2011 program that is balanced to achieve the six strategy and policy goals documented in the Ballistic Missile Defense Review report.

First, defense of the homeland against limited attack. We continue to upgrade the Ground-Based Midcourse Defense System to

increase reliability, survivability, and expand the ability to leverage new ballistic missile defense sensors, as well as test the GMD system to accredit our models and simulations. The purchase of five additional ground-based interceptors and limited life components for refurbishment—and our program is very extensive—will sustain our production capability until 2016 and critical component manufacturing beyond 2020.

Second, the defense against regional threats. We have increased our investment in regional assets and, by 2015, will procure 436 SM–3 IA and IB interceptors and 431 THAAD missiles, and have available 38 ballistic missile defense-capable ships.

We are developing regional missile defense elements that can be adapted to unique circumstances of each combatant command region. For example, we determined, based on intelligence estimates, that our previous plan for the defense of Europe could simply be overwhelmed by the large number of Iranian medium-range ballistic missiles (MRBMs) today and intermediate-range ballistic missiles (IRBMs) in the near future. Therefore, we plan to deploy a larger number of interceptors in Europe in four phases as missile defense threats from the Middle East evolve.

Third, prove that the missile defense system works. We have submitted a comprehensive, Integrated Master Test Plan signed by the Director of Operational Test and Evaluation, Dr. Gilmore, the services, the Operational Test Agencies, the Commander of the U.S. Strategic Command's Joint Functional Component Command for Integrated Missile Defense subcommand to ensure we extensively fly our missiles and test them before we buy them.

The two largest challenges to executing the U.S. missile defense program is acquiring a cost-effective set of reliable targets and improving quality control. Over the past year, we have initiated steps to acquire a new set of targets of all ranges. Our new target acquisition strategy initiated in 2009 procures targets and production lots to increase competition, quality control, reduce costs, and ensures the availability of backup targets starting in 2012.

We have had many successes in improving our prime contractor and supplier quality assurance to meet the precise manufacturing standards required for missile defense components; however, not all companies have sufficiently improved. Until we complete planned competitions, including the greater use of firm, fixed-price contracts, we will have to motivate greater attention by senior industry management through intensive government inspections, low award fees, the issuance of cure notices, stopping the funding of new contract scope, and documenting inadequate quality control performance to influence future contract awards.

Fourth, we are hedging against threat uncertainty. In accordance with warfighter priorities, we are focusing our future technologies in four areas: one, developing more accurate and faster tracking sensors on platforms to enable fire control solutions and intercepts earlier; two, developing enhanced command-and-control networks to link and rapidly fuse sensor data to handle large raid sizes of missile threats; three, developing a faster, more agile version of our SM–3 interceptor to destroy long-range missiles early in flight; and, four, developing discrimination techniques to rapidly resolve re-

entry vehicles from other nearby objects. And we will continue to develop high-energy laser technologies.

Fifth, develop new, fiscally sustainable capabilities over the long term. The Missile Defense Agency is complying with the Weapons Systems Acquisition Reform Act by establishing six baselines—cost, schedule, technical, test, contract, and operational—to plan, manage, and increase service and warfighter participation, and increasing emphasis on competition in all phases of programs' acquisition life cycle.

Six, expand international missile defense cooperation. We are currently engaged in missile defense projects, studies, and analysis with over 20 countries, including Japan, Poland, the Czech Republic, Israel, Australia, United Kingdom, Germany, South Korea, NATO, United Arab Emirates, Bahrain, Saudi Arabia, and Kuwait. Additionally, Poland and Romania have agreed to host our Aegis Ashore sites, and we continue cooperative development of the SM–3 IIA interceptor with Japan.

We also continue to support expert dialogue with the Russian Federation on missile defense cooperative efforts. Relative to the recently expired START Treaty, the New START Treaty actually reduces constraints on the development of the missile defense program. Our targets will no longer be subject to START constraints, which limited our use of air-to-surface and waterborne launches of targets which are essential for the cost-effective testing of missile defense interceptors against medium-range and intermediate-range ballistic missiles in the Pacific region.

In conclusion, MDA is working with the combatant commanders, services and other Department of Defense (DOD) agencies, academia, industry, and international partners to address the challenges and difficulties of managing, developing, testing, fielding new military capabilities to deter the use of ballistic missiles and effectively destroy them once launched.

Our 2011 budget funds the warfighters' near-term priorities while building the foundation of a layered defense system with our partners and friends that can provide an adaptive, cost-effective strategy to protect our homelands and counter ballistic missile proliferation in the future.

Thank you, Mr. Chairman. I request my written statement be submitted for the record, and I look forward to answering your questions.

Mr. LANGEVIN. General, thank you very much.

[The prepared statement of General O'Reilly can be found in the Appendix on page 57.]

Mr. LANGEVIN. Dr. Gilmore, the floor is yours.

STATEMENT OF HON. J. MICHAEL GILMORE, DIRECTOR, OPERATIONAL TEST AND EVALUATION, OFFICE OF THE SECRETARY OF DEFENSE

Dr. GILMORE. Mr. Chairman, Congressman Turner, Members of Congress, I will, as you requested, very briefly summarize my written statement.

First of all, my characterization of demonstrated BMD performance is contained in the report submitted to Congress this past February. I characterized capability of ballistic missile defense sys-

tems using six levels of capability, with one being the lowest demonstrated level and six being the highest.

Generally speaking, Aegis, THAAD, Patriot performance against short-range ballistic missiles (SRBMs), or capability against SRBMs, is rated at the highest level. There has been fairly extensive testing against those kinds of threats, and generally I characterize their performance at levels from four to six.

With regard to Aegis Ground-Based Missile Defense and THAAD against medium-range ballistic missiles, intermediate-range missiles and intercontinental-range missiles, I generally characterize their performance at levels one to three or four because there has been lesser testing against those threats, and the capability levels that have actually been demonstrated tend to decrease pretty much in step with the increase in range of the potential threats.

With regard to major events on testing, of course there was the demonstration of the Airborne Laser, which was a significant technical achievement. But also, there was a significant achievement in planning for tests, and General O'Reilly has already discussed the Integrated Master Test Plan which was developed and then revised. It is a rigorous plan for conducting tests and collecting the data needed to rigorously and independently verify, validate, and accredit the models that are going to be critical to assessing the operational effectiveness of missile defense, because we will never be able to do enough live flight tests to span the entire battle space that we are concerned about in demonstrating operational performance of the system.

And then, finally, with regard to challenges moving forward, there are many challenges. These are some of the most complex tests that the Department of Defense attempts. There have been failures, particularly with regard to targets. And so, as General O'Reilly has already mentioned, target reliability and realism are particular challenges that the Agency is going to have to address in the future.

Thank you. And I will be happy to answer your questions.

[The prepared statement of Dr. Gilmore can be found in the Appendix on page 76.]

Mr. LANGEVIN. Gentlemen, thank you for your testimony. After myself and the ranking member ask questions, we will recognize members for five minutes in the order in which they arrived.

Dr. Roberts, let me start with you, if I could. I understand that the Department thoroughly assessed the previous Administration's plan for missile defenses in Europe, the so-called third-site plan, during the BMDR. Would you, for the subcommittee, summarize the key shortfalls of the previous Administration's European missile defense plan and the reasons for rejecting that approach? And could you also describe the key reasons that the President adopted the new Phased, Adaptive Approach to defending our allies and deployed forces in Europe?

Dr. ROBERTS. I would be happy to have the opportunity to do so. Thank you.

To begin at the beginning, we did not come, first and foremost, to the question of what to do about the third site. We came first and foremost to the questions, as scripted in the legislation, for the missile review, which was to begin with an assessment of the

threat, how the threat had evolved, expectations about how it might yet evolve, and then to assess current capability *vis-à-vis* that threat globally.

And so before we came to the question of what to do about the third site in Europe, we came to a view of the following landscape: That our posture—after a decade of investment and active capability development, our posture and protection of the homeland, relatively strong *vis-à-vis* the threat. If we had been seeking limited protection from the ICBM capabilities of North Korea and Iran, we have that today. We have 30 interceptors on the ground that are operational, and that threat from their ICBMs does not exist today. We are in a strong posture.

But inherent to our understanding or assessment of the threat was that it was unpredictable and, indeed, that we need to be more strongly hedged than we were for possible accelerated developments in the ICBM threat. So you saw, as a result of the review, a number of actions to strengthen our hedge for protection of the homeland.

In the case of our regional defense posture, we were not so well-positioned *vis-à-vis* the threat. The threat had clearly been exploding. We had many capabilities reaching the end of the development pipeline but not yet reaching the field, and the clear need here is to increase—accelerate the deployment of capabilities to the warfighter in the regions while also being well-hedged against possible unexpected developments in the threat.

That pointed to a particular set of capabilities; in other words, to seek capabilities that could be surgeable, adaptive, flexible to go where crisis required in time. That is the construct in which we came to our question then, the fourth, I think it was, on your list, of what to do about missile defense in Europe. And you have read our thinking about this. We have explained it in great length. I have tried to boil it down for myself into a few very short points.

I think there are six criteria that guided our thinking on this topic. The first is for prompt protection. The pathway we were on with third site would have put initial capabilities on the ground in 2017 or 2018. We have a threat that exists today; we have capabilities we can put on the ground in 2011. Why wait?

Second criterion: complete protection. Under the former approach we had not complete protect on of our allies. We have the means to protect all of our allies. There had been talk of protecting all of our allies, but no plans in place to do so. Why not protect all of our allies when we have the means to do so?

Third criterion: effective protection. Why deploy a system that is capable against a salvo launch of only five missiles when we need to, and can, scale it up to deal with the expected increases in missile threats from the Middle East? We have the means to do that. Why shouldn't we do that?

The fourth criterion: cost effectiveness. If we expect to have to scale up to meet the demands of a growing threat, why rely on ground-based interceptors at roughly $70 million apiece when we can acquire roughly comparable capabilities in the SM–3s, but acquiring six or seven for the same price of one?

Fifth criterion: cooperation with allies. We have the opportunity to work within the NATO framework. NATO's views of missile de-

fense have evolved in recent years. They are eager to join us. We are trying to persuade them of the virtue of declaring this territorial defense as a NATO mission. We see positive indicators that they are interested in so doing. Why not work with allies to share these benefits and burdens?

And, lastly, flexibility. Why rely on a system that involves fixed assets that can't be moved when we know we are not going to have enough to deal with the threat globally, and we should have some ability to relocate and surge capabilities while they remain scarce in our arsenal?

So beginning with our view of the threat environment, beginning, then, with our view of how to balance our future investments across this homeland defense and regional problem space, we looked at the third-site approach to missile defense in Europe and found it wanting on these criteria. So the President chose an approach that is more flexible, more adaptive, more cost-effective, enables more international cooperation, more sharing of burden.

That would be the five-minute answer, I think, to the question.

Mr. LANGEVIN. Thank you, Dr. Roberts.

General O'Reilly, yesterday the subcommittee received a briefing on MDA's Integrated Master Test Plan conducted with the Office of Testing and Evaluation.

First of all, I really want to commend you for the excellent job that MDA and Operational Test and Evaluation (OT&E) have done, and especially General O'Reilly for bringing high quality oversight and a serious testing regime to our missile defense programs. Well done on that front.

Unfortunately, MDA's testing progress has been hindered by target missile failures such as with the THAAD intercept test in December. And I am sure that even with that failure, though, we have learned a great deal. You can certainly touch on some of those things that we have learned. But in particular, what was the additional cost incurred from the target failures, and what measures is MDA taking with its contractors to ensure high quality testing is accomplished on schedule?

General O'REILLY. Sir, unfortunately the THAAD test in December we did not learn very much. The target itself was about $15 million. It was a first-time use of that particular configuration, so another 15 was invested. We spent around $12 million for the range and the test preparations. And then there is the impact on the program that wasn't able to be tested, the THAAD program, where we had the delay in restructure activities. Sir, it was in excess of $50 million, perhaps even $60 million, because of the quality control errors we found in the installation of the target into the aircraft. So that was a significant setback to the program.

Because of that, I then made—we had a failure review board, and that failure team was very experienced from both industry and government, and came back and found that there was a systemic problem with the quality control in the areas of that target. And, therefore, I made the decision not to use air-launched targets until we have reset with our contractors, either expanded the number of contractors which we use so we can induce competition, which I believe is part of the solution to quality control issues.

It is not that these were poorly-built systems. The precision required of missile defense systems is very high, and it is achievable, but it requires a specific discipline and experience base and investment in testing that—in-plant testing that is required. And so to motivate that, I have delayed any new scope to that particular company so that—until they satisfy that they have made corrective actions in management structure and in approaches to targets and so forth. And also, at the same time, I have taken the planned work that I was going to use with that company in 2012 and put that scope on another contract that I have with another company and asked that second company to develop an air launch capability so that we have true competition, to emphasize the fact that it is an absolute requirement in the missile defense business that you have the highest repeatable quality. It is a condition on which our contracts should be set.

Also, we have—as I said in my statement, we have other competitions now that we have instituted so that we buy targets in lots which allow themselves to have quality control issues applied or techniques and procedures on a lot of a buy, rather than buying them individually, which we were in the past, which was much more expensive.

Mr. LANGEVIN. Very good, General. Thank you very much.

And finally, Dr. Gilmore, can you describe the key tests and criteria that you believe would have to be met before the Department can make an informed deployment decision for the first phase of the European PAA Missile Defense System?

Dr. GILMORE. The testing that is going to be possible between now and the fourth quarter of fiscal year 2011 is driven, in large part, by the availability of targets. But the revised IMTP incorporates four flight tests, two THAAD tests, and then also an operational test involving both THAAD and Aegis.

The Aegis test, which is called Flight Test Mission (FTM) 15, I think it is in the third quarter of fiscal year 2011, will be key because it will be the first test of an Aegis SM–3 Block IA missile and the Aegis fire control system and radar, as well as testing out the launch capability that might be necessary to engage an MRBM- or IRBM-class threat fired from Iran. So that test, that operational test, will be key. Then, of course, there will be additional tests that take place after the end of fiscal year 2011, leading up to another large operational test event in fiscal year 2012, which will have a number of missiles simultaneously in flight that will have to be intercepted and that will be crossing multiple sensors and will challenge the battle management command-and-control system to sort all of that information out, provide firing solutions to the various platforms.

So those are the tests that are scheduled. To some extent the number of tests is limited by the number of targets, but conducting those tests will be key, and the results will be key to informing us on the performance of PAA Phase 1.

Mr. LANGEVIN. Thank you, Dr. Gilmore.

I want to thank you, gentlemen.

And now turning to—the ranking member is recognized.

Mr. TURNER. Dr. Roberts, one of the problems that we have in this whole missile defense discussion and in trying to get bipar-

tisan support is really an issue of credibility. And I am very, very concerned by the question that our chair asked and your response. And I want to go through the elements of what you gave us as your response because there is an essential, fundamental misrepresentation that is made within your answer, and that is assuming that the third site, Poland and Czech Republic sites, had to be scrapped so that the PAA could be adapted.

When you compare a system of Aegis ships and SM–3s to a system of ground-based interceptors and present it as a false choice, that one had to be scrapped in order for the pursuit of others, when, I mean, everyone in this room who has put any effort into this issue understands that that is not a necessity, we start a problem of having a difference of being able to evaluate the information that you are providing us.

Now, it may be that, when we are finally done with the PAA and it is provided to us, we might have enough information to see that it has benefits, too. But there are a number of things in comparing them that are just not very accurate. You said, first, we wanted to do something prompt. We can do it by 2011. Why wait? But you know you are not doing the same thing and I know you are not doing the same thing, so why don't we just—you know, just say that?

When you said the ground-based interceptors are not going to be available until 2017 or 2018, we all know, of course, that the original schedule was they would have been completed by 2013. But I will give you—I will give you the 2017 and the 2018. Even if I give it to you, the PAA doesn't provide the same level of protection to the United States until 2020 by your plan, not 2011. So when you say "prompt" and "why wait," mainland United States is not protected by that system, which the ground-based system would have provided in Poland and Czech Republic.

If you are going to do a comparison, apples to apples, that system versus the other system, you are comparing 2017 and 2018, not 2011. Now, I know you say, "Oh, well, we have the 30 other interceptors that provide us our complete coverage." Of course, there were going to be 44 until the Administration cut them. And I don't think that the threat itself represents something that we all believe is diminishing, but yet the interceptors that were planned by the Administration are diminishing.

Then you go on to say that it is not going to provide—it will not have provided complete protection to our allies. Well, neither are you by 2011. I mean, if you look at the coverage in the plan and how it has unfolded and what has happened with London and Paris, I don't think you can provide information saying by 2011 we have done it promptly, we now protect our allies.

And the false choice issue is the one that really falls in your other points of effectiveness, five launchers versus the shift that we are having in the number of missiles there. It is not necessary that one be scrapped in order to pursue another, which was all part, before—part of the smorgasbord of the availability of technology and assets that we were all pursuing. And the same issue with the cost effective.

And then cooperation with the allies. The one that I really find amazing there is that—and mind you, I am not a big fan of how

the Poland and Czech Republic sites were handled with respect to our allies. But you are aware that, of course, NATO did endorse that plan at Bucharest, and we are all aware that Romania was an announcement that occurred without NATO participation. It is one of those ones where, after the fact, this Administration, almost in the same vein as we have Poland and the Czech Republic, made an announcement that then we all have to fall back on trying to clean up how that announcement was handled.

And the flexibility of fixed or moved. Again, this was supposed to be a smorgasbord. This was not supposed to be a one-off exclusive, that once we do Poland and Czech Republic, we are stuck. That is why MDA had so many things that we were developing so, in fact, we could have this multiple use.

But the thing that concerns me, which I would really appreciate your thoughts on, considering your position, is that the concern—especially when we get to the issue of the credibility and the dialogue of—you know, many people were concerned that the Polish and Czech Republic sites were compromised by this Administration as a result of their concession to Russia. No secret to anybody that Russia didn't like this. The President announces his intention to reset. Even the letter went off, I believe, if I am correct, that said to Russia: We would consider our view of missile defense based upon your participation and assistance with Iran. I think the Poles and the Czechs were very taken by surprise with how the rug was pulled underneath them and the manner in which that was done. They were walked out onto the world stage and then not really given the appropriate attention as this was diminished.

But the START agreement. The START agreement includes the preamble language that recognizes the relationship between the strategic and the defensive, and Russia has made statements that they might consider withdrawing from START if the United States vigorously pursues missile defense.

The Phased, Adaptive Approach is something this Administration has announced. We don't have all the details, but it is something, certainly, that even Secretary Tauscher says that its effect is on the Web. You can look on the Internet and see what the effect is.

Is the Administration confident that the Phased, Adaptive Approach doesn't already violate what the Russians' intent is in saying they will withdraw from START if we vigorously pursue missile defense? And this new restart relationship, has the Administration received assurances that the Phased, Adaptive Approach is not a violation of the concept of the preamble of START?

Dr. ROBERTS. Well, it is clear we are going to disagree on the dichotomy of choices. I didn't misrepresent to you the choice made by the Secretary, which was: Go forward with third site, or go forward with phased, adaptive. This is the unanimous recommendation of the Secretary, the Chairman, and the military leadership to the President, was on the basis of this choice. It wasn't a false dichotomy.

The constraints in New START: our position is very clear that we see no development in our missile defense posture that is threatening to the viability of Russia's strategic deterrent. Russia is not—Russian experts are not particularly happy with Phase 4 of PAA because they don't fully understand what Phase 4 entails and

what it might imply in the way of capability against Russia. Our view is that, from a technical perspective, there is no capability in Phase 4 that could be jeopardizing to their deterrent. It is a simple matter of physics and geography.

So they have made it clear throughout the negotiating process that they are unhappy about developments in the U.S. strategic posture of multiple kinds—the development of ballistic missile defenses, the development of non-nuclear strike capabilities. But their bottom line has been that they will support and implement New START, so long as we don't do something we have no intention of doing, which is jeopardizing—this is a limited defense of the homeland, and there is nothing in the PAA and Europe that can be effective against their strategic deterrent.

Mr. TURNER. And thank you for that clarification. And I need to ask you the question again with the additional way that you framed it.

The concern is—you just said that there are some things in Phase 4 that they may have objection with. The concern is, is that, has the Administration, when it began the discussion—the Phased, Adaptive Approach was a policy the Administration was already pursuing. START was something that the Administration was already pursuing. The Administration concedes to language being in START that includes missile defense.

Has the Administration received assurances from Russia that Phase 4 of the Phased, Adaptive Approach doesn't violate the now, as Secretary Tauscher points out, unilateral statements that Russia is making with respect to their interpretation of the language in START? Because—and the concern is this, is that because we know that Russia objected to the Poland and Czech Republic sites, and now this Administration are not pursuing those, the concern is, is if the Administration is faced with Russia objecting, pursuant to START, to Phase 4, will it weaken the Administration's support for Phase 4 as it did the Administration's commitment to the Poland and Czech site?

Dr. ROBERTS. The inference of your question was that Russian objections to the third site were a driving factor in the decision. They were not. I have made the case——

Mr. TURNER. And then the question? The question being, is there that assurance?

Dr. ROBERTS. Is there an Administration assurance to Russia?

Mr. TURNER. From Russia. Has Russia communicated with the Administration that Phase 4 is not that violation that Russia believes would occur to its strategic deterrent by the——

Dr. ROBERTS. I have no basis.

Mr. TURNER. The Administration has not addressed that with Russia, then?

Dr. ROBERTS. To my knowledge, no.

Mr. TURNER. Okay. Thanks.

General O'Reilly, two-stage ground-based interceptor. The Ballistic Missile Defense Review states that it will continue to be developed, and we assessed as a hedge strategy. I believe that is correct; is it not? Could you please describe to me what that hedge strategy is? I mean, a hedge against what? A hedge for what? What

would the expectation be in looking at the ground-based interceptor as a hedge?

General O'REILLY. Sir, we are going to continue to develop the two-stage ground-based interceptor. In fact, we will be flight testing it in June for the first time. That capability, what it gives us if we deploy, it would be additional time and additional opportunities to defend the United States from locations such as Iran or North Korea.

So, specifically, when you have a three-stage missile, it burns for over four minutes, and there is a set amount of time it takes before it is ready for an intercept. A two-stage is ready much earlier; and, therefore, if you had a failed intercept from a three-stage, you have another opportunity with a two-stage.

Mr. TURNER. I mean, currently there is no plans for its deployment; is that correct?

General O'REILLY. Sir, we currently have no request from the combatant commanders for that capability to deploy it in that manner.

Mr. TURNER. So the word "hedge" is the one I keep stumbling over. What scenario—since that is in the Missile Defense Review, it is a policy statement. What are the circumstances under which that it would satisfy as a hedge? I am assuming that means in some form of deployment.

General O'REILLY. Yes, sir. We can actually—with the utilization of a two-stage, in some geometries, we have the ability to better utilize our inventory of GBIs. In other words, one shoot doctrine is to fire multiple GBIs at one target. With the capability of having a later intercept opportunity, then you can actually launch one, determine whether it is successful, launch a second. And in this case, you would have an additional shot opportunity.

So if what we thought was a larger number of ICBMs than what we see today, another option would be to add additional two-stage—or to in-place two-stage GBIs so that, in fact, you have a larger number of missiles you can engage with the 30 that we are deploying.

Mr. TURNER. Airborne Laser Test Bed. People are very concerned about the amount of cuts that has occurred as it goes from two to the test bed: 2009, $384 million; $182 million in 2010; $98.7 million for this upcoming year. Could you please describe to us—and you just gave us a classified briefing previously. Can you describe to us now, in an open setting, how those budgetary dollars will support the Airborne Laser as a test bed and as a research project?

And one of the things that would be really helpful, I think, because I don't think there has been enough horn blowing, is if you could do a commercial right now for how great the test was and how accomplished—what an accomplishment it is that the Airborne Laser accomplished what it did in its test.

General O'REILLY. Sir, twice this year now we have engaged, for the first time, the destruction of a ballistic missile defense early in its flight using a laser onboard an aircraft. This is—the technology of just producing a laser and the fire control system is a watershed event for military capability. But the details of how this system worked, there was a litany of scientific achievements which were accomplished, and they have been accomplished over the last two

years in a repeated fashion with the ABL to give us confidence that we certainly understand how to generate this type of laser energy and how to impart it on a target in a very, very quick fashion. We destroyed the missile in the second launch at half the time that we had calculated. So this also indicates we have a lot to learn from this in the area of beam propagation and in the lethality mechanisms. It is a very, very promising way to destroy a large number of ballistic missiles launched in a short period of time.

However, we do recognize that there is additional engineering and additional research involved, number one, to validate our models. And, number two, this aircraft, with the fantastic performance it had, was actually based on designs that were over a decade old. And we have technologies today where we have made progress in our laboratories over the last 10 years that indicate that there is even a greater capability with future airborne systems. And the 747-based Airborne Laser is a very good platform we have already invested in. It has multiple—it has the capacity to carry more than one laser system, so that it is a very good research platform, and that is what we have intended it to do.

The budget last year was larger than this year's, the fiscal year 2010 request, because we were still completing the construction of the optical beam line. We have completed that work. And now, when you are focusing on the research, we believe we have an adequate budget in which to operate the aircraft and to complete the large amount of unknown scientific exploration that is necessary to occur for us to have a very effective military system.

Mr. TURNER. One more question, General. The Aegis SM–3. The bulk of the funding comes in out-years. It creates a near-term production gap and inefficiencies, perhaps, for industries. An example shortfall is the Aegis SM–3 interceptor. The Administration wants an inventory of 436 interceptors by 2015, yet it is only buying 8 interceptors this year and, looking in the forward years, MDA plans to buy 66 in fiscal year 2012; 72, I guess, in fiscal year 2013. Is there a better way to manage this ramp-up, and do you have concerns as to how you are going to get to the inventory of 436?

General O'REILLY. Sir, first of all, the SM–3 IB, the newest version, has the same ordnance stack that the current version has. It has a new seeker, a much more capable seeker that is the particular distinguishing characteristic of this missile. So the production gap which we have is part of a large family of missiles. So we will continue to produce the ordnance stack that we have to propel the SM–3 IB just like we do the IA.

In the case of the IB, though, again, it goes back to the Ballistic Missile Defense Review, the tenet that we will fly first before we go into production. Therefore, we have a series—working with the operational test communities and the other test agencies—a series of agreed-upon tests that must occur before I will go to the Under Secretary of Defense for Acquisition, Logistics, and Technology and request a production decision.

I have procured 30 missiles for research and development at this time, and so those 30 will more than adequately demonstrate the capability and validate the new production lines for the new kill vehicle. But to go beyond that, we will need to complete the testing

which we have planned for the next year and a half, and that does delay the start of a full-rate production.

Mr. TURNER. Thank you.

Thank you, Mr. Chairman.

Mr. LANGEVIN. I thank the ranking member.

Before I go to Mr. Larsen, on the third site, since we are talking about some of the specifics in your analysis of alternatives, could you just for the committee talk about the cost involved of the fiscal structure for erecting the sites in both Poland and the Czech Republic?

Dr. ROBERTS. I cannot. I am happy to take the question for the record.

[The information referred to was not available at the time of printing.]

General O'REILLY. On the order of—this is preliminary work, sir, as we are working through our cost estimates and the design of the first Aegis Ashore site. Was that the question?

Mr. LANGEVIN. The third site.

General O'REILLY. The budget request that we had made last year was based on a $4.2 billion cost for the third site.

Mr. LANGEVIN. For a third site. And that did not include the cost of the interceptors, right?

General O'REILLY. It did include the cost of the interceptors of the missile field in Poland and the radar in the Czech Republic, the battle command and control, and the initial startup.

Mr. LANGEVIN. So how many of the GBIs?

General O'REILLY. Ten were in there, sir, at a cost of about $70 million apiece.

Mr. LANGEVIN. It is my understanding if there is an incoming target, you would fire not just one at the target, you would fire multiple.

General O'REILLY. To achieve our probabilities of protection we try to achieve, our typical shot doctrine, and in a very constrained environment like in Europe, the region, we would need to salvo two for every one. Our preferred approach is to launch one missile, determine if there is an intercept, and, if you have enough time, launch a second missile. But in the case of Europe, because of the closing velocities in which we are flying it and the size of the theatre, we would need to salvo two, as a minimum, for every missile coming in.

Mr. LANGEVIN. So $140 million for the two missiles being fired versus $10 million to $15 million a shot for the SM–3.

General O'REILLY. Yes, sir.

Mr. TURNER. Mr. Chairman, how do those numbers compare to Alaska? Because that would be the comparable. It is not really the SM; it is really GBI to GBI, because as you were not disputing in the testimony, they really aren't shot at comparable targets. It really would be Alaska; would it not? I think that is what Dr. Roberts was indicating, that would have the ability to protect the mainland.

Are the costs significantly different between Poland and Alaska?

General O'REILLY. The interceptors would be the same cost. It is the same design of the intercept. The operation is a little more expensive because it is a remote site. We have missile assembly

buildings and other infrastructure in Alaska that we wouldn't have there. The missile field itself would be slightly less than what we spent in Alaska, because the first time you do a construction, you develop it, it is more expensive, and we have a learning curve.

Mr. TURNER. Thank you.

Mr. LANGEVIN. Very good. Thank you, General O'Reilly.

The chair now recognizes Mr. Larsen for five minutes.

Mr. LARSEN. Thank you.

General O'Reilly, the PAA has been presented as a missile defense architecture, and it is focused mainly on our allies in Europe. I think in your testimony you discussed how this approach might be applied to other regions. Can you get into a little more detail for us on that?

General O'REILLY. Yes, sir. There is very attractive attributes of the Phased, Adaptive Approach. First of all, with our investments and our growth of capability of the Aegis system, you have a mobile system that you can surge into certain regions. But what it distinguishes in the Phased, Adaptive Approach as we looked at the different potential weapons systems that could provide defense against missiles, the idea of taking the Aegis system and putting it on the land, which we already test parts of the Aegis system at White Sands, New Mexico, and at other sites on the east coast. So this is not an infeasible capability. We would make it to have a military capability of hardening it and so forth, but that capability would allow us to place in remote sites, high-value areas of the world where we have forward bases and so forth, you effectively have a permanent defense equivalent to what Aegis has.

We already have the Aegis Logistic System and Training Base that has already been established. It allows us to manage a larger pool of interceptors for both land-based and sea-based use. So the operational commanders have more flexibility.

And again, for remote sites around the world, it does give you defense. The defense of the first generation is on the order of 1,000 kilometers protected area. So it is a significant capability, and it can be removed in the future if it needed to, and what would remain behind would just be the concrete. We have said in the past that to relocate it would be on the order of about four months.

Mr. LARSEN. Thank you very much for getting into that. I think, again, getting to the PAA approach, the Phased, Adaptive Approach, does provide a little bit more flexibility for us not just in the European theatre, but in other areas that you have noted.

Dr. Gilmore, a few more questions about testing. First, with regard to the Airborne Laser Test Bed and the recent successful tests, in your testimony—I think it is your testimony—you have outlined some of the issues, though, with the test. For instance, the detection and tracking system wasn't available for the test; therefore, the aircrew utilized the aircraft's Wide Area Surveillance System for knowledge of the threat missile launch location, timing, and aim point.

I guess, in the end, you said, "If the Department should determine at a future time that it is appropriate to develop and field an Airborne Laser system, an extensive program of additional developmental testing culminating in realistic operational testing would be needed." It is a short way of saying it is not ready. But are there

things in the testing regimen that would get us closer to that or not?

Dr. GILMORE. Well, you would have to do additional tests, but also, as pointed out in my testimony, and I also in January submitted a report on the Airborne Laser to the Congress. I was required by law to assess the operational effectiveness of the Airborne Laser, and the thrust of the report was I can't do that at this point because there has been insufficient testing. But also, the aircraft, as it exists, is a test bed; it is not an operational—doesn't compose an operational combat capability for some of the reasons that you just mentioned that were in my testimony.

You would also, in addition to additional capabilities on the aircraft, the additional sensors that would enable you to detect in real time and track large numbers of threat missiles that you might encounter. One of the principal things you would also need is, in all likelihood, a higher-powered laser to stand off against modern air defenses, because you can't assume the aircraft can penetrate in the airspace and would be able to survive if it did that. So you would have to demonstrate the capability to engage missiles at substantially larger ranges than we have done at this point.

As General O'Reilly mentioned, this was a real technical achievement, but it was necessary—but not sufficient—to the demonstration of a combat capability. You would also have to demonstrate that the system had high reliability. There were some problems during the tests. You have to have a system with high reliability because you don't know when the threat will launch. You can't have the system go down. You would have to have at least two aircraft per orbit, because when the aircraft are turning, sometimes they can be in a position where they couldn't engage a threat. So the analysis that I have seen done would indicate you would need at least two aircraft per orbit in order to assure you could intercept launches from a particular area you were interested in intercepting launches.

To have those two aircraft on orbit continuously, which you would need to do because you don't want to give the enemy a choice of when to fire their missiles, because they might well see when an aircraft had to leave an orbit, you would need another three to five aircraft per orbit. You might need only one or two orbits in the case of North Korea, but in the case of a larger country like Iran, there would be certain areas in Iran from which launches could occur that probably couldn't be intercepted by any number of orbits of Airborne Lasers if they have to stand off outside the border of the country.

So there are all those kind of issues that would have to be addressed in adding capability to the aircraft, perhaps, for example, as General O'Reilly notes, taking advantage of modern technology to incorporate a higher-power laser that, in fact, would have effectiveness at larger ranges, as well as all these other things I have mentioned that would have to be done before you had an operational combat capability.

Mr. LARSEN. Thank you.

Mr. LANGEVIN. Mr. Franks is now recognized for five minutes.

Mr. FRANKS. Well, thank you, Mr. Chairman.

Thank all of you for being here.

Mr. Chairman, I have several questions, very limited time here, so I can't help but express some perspective on some comments by our ranking member Mr. Turner related to your testimony, Dr. Roberts. I think that I just want to be on record as suggesting there was indeed a false choice between two cases here. The notion that we could not have continued forth with the third site and that that foreclosed anything else we were doing is not something that reasonable people can embrace. And to suggest that our allies were well served by that, given the reaction by the Polish representatives that came after that announcement, and some of the people from the Czech Republic, they felt simply betrayed. So I don't know how we have served those allies' interests.

I suppose my biggest concern is the discussion related to the timing. I am fully aware that we have some raid issues related to only 10 interceptors. But whatever capability they represented will be nonexistent, perhaps in a critical time in Iran's calculus as they move forward with not only their missile systems but, potentially, their nuclear system. I think that that issue is, potentially, going to saturate the discussion of this committee in the future because of the seriousness of it. Any time or opportunities or additional margin that we could have purchased with the third site in Europe could prove to be something that we would regret not having in the near future.

So, with that, I just wanted to be on record with that, and I want to try to direct some questions to General O'Reilly in the short time that I have.

General, thank you for your service to this country. People like you carry freedom on your backs, and the rest of us just talk about it.

Recent news from the Middle East region has been troubling. I have already mentioned that the Iranian situation, I believe, continues to be a great concern to us, given their enrichment of uranium and their active space and missile development and testing program. There are varying estimates on when Iran will develop a nuclear weapon. I am told by the Secretary of Defense that is probably not anything to worry about. It could be one to three years, at least. I am not sure that that is something I would celebrate, that it is only two or three years away. In any case, I know that the Secretary of Defense is focused on that as much as he can be, and I think all of us should be.

Just yesterday there were news items describing that Syria provided Scud missiles to Hezbollah. These Scud missiles would be able to range much, if not all of Israel, with better accuracy than the Katyusha rockets and the Qassam rockets that have been almost a ubiquitous part of Israel's life.

Potential adversaries continue to develop and deploy larger numbers of increasingly advanced ballistic missiles, and they are also exercising concepts of operations involving larger raid sizes and multiple launch platforms. I guess my question to you, sir, is: How is the Missile Defense Agency's technology development program aligned to meet the ballistic missile threat 5 years from now, or even 10 years from now, given these concerns?

General O'REILLY. Thank you, sir. First of all, we need to have a greater effectivity of each one of the missiles we launch. So our

investment program in advanced technologies is designed to have better use of our sensors so we can track missiles early in their flight and pass that information to an interceptor and intercept missiles earlier. When we have large raids of missiles that, as you describe, sir, the threat is growing, I don't know of a technical reason why we won't be facing large raid sizes in the future of increasingly longer-range threats. We need to defeat those missiles early in flight, and key to that is having sensor systems and using all of our possible sensors—including unattended air vehicles—and, from space, have the ability to track and launch interceptors sooner.

So we have a significant investment in that area. Associated with that is a very rapid command-and-control system which could then pass that information so we could, in fact, have intercepts earlier, as soon as immediately after a boost. So that is one investment area we are making, and we are working on that very quickly.

In 2012, we have several demonstrations of intercepting missiles early in flight from an Aegis ship by using one unattended air vehicle and a second test which we will be tracking from space. So that capability will be available based on the success of the work we are doing right now, and that test to prove we have that, so that by the middle of this decade we will have an ability to start destroying missiles early in flight.

I have asked for the Defense Science Board to do an independent assessment of what I just said, and they have agreed to that, the Secretary of Defense has agreed to that, and they will be studying that this year for an independent report out in the late summer on, in fact, the capability and when we will have this early intercept capability, as I just stated.

Mr. FRANKS. Thank you, General.

Thank you, Mr. Chairman.

Mr. LANGEVIN. Thank you.

Mr. Heinrich is now recognized for five minutes.

Mr. HEINRICH. Thank you, Chairman.

General O'Reilly, I wanted to ask you that if North Korea or Iran were to develop intercontinental-range ballistic missiles capable of delivering a nuclear weapon to our homeland more quickly than what we currently anticipate, what options does MDA have for responding to this kind of threat?

General O'REILLY. First of all, sir, today, as we stated, we have 30 in-place—or will by the end of this year—we will have 30 in-place GBI interceptors. In the case of North Korea, looking at the geometries of the tests we have already conducted and the geometries of a launch coming out of North Korea and interceptors coming out of Alaska, we have demonstrated that capability to intercept that.

I believe the question, though, would be what we could do to enhance our Ground-Based Midcourse Defense System is, again, structuring our sensor system and linking it together in a way—and we are doing this, and we proved it in our flight tests in 2008—the ability to have very, very accurate sensor data that we could launch and improve the performance of each GBI that we launch so that we could do intercepts as far out and as early as possible. And if we miss, then we would launch second interceptors.

That, in effect, would give us greater capability with the 30 that we will have currently in place this year.

Mr. HEINRICH. Okay. I am going to shift gears real quick to the Airborne Laser Test Bed. And, once again, congratulations for the very successful test that we saw recently. Certainly, I am looking forward to the result of some of the upcoming activities.

Given what we have learned from the Airborne Laser program, I wanted to ask if you foresee any near- or medium-term applications for directed energy weapons in the ballistic missile defense architecture.

General O'REILLY. First of all, sir, I appreciate your recognition. I would like to recognize the work of the folks from industry and government—in this case, for many years—of what they have accomplished. There were a lot of experts that said couldn't be, and they had the persistence. I am very interested in maintaining that knowledge base and those experts that this country has that are unique to us so that we can, in fact, continue on directed energy research. I think that is extremely important.

For near-term applications, the concern as we have in missile defense is that we need to be—with the current powers, we believe we need to be close enough in order to have an effective range that, in fact, puts us at a disadvantage with what we see as surface-to-air missiles. And so, therefore, we are actively involved in this next generation of lasers and looking forward and funding work so that we can, in fact, significantly increase the power that that aircraft has in an actual smaller package.

Mr. HEINRICH. Speaking of maintaining that knowledge, how many—if you look at the Administration's current budget, how many experiments would that fund over the course of the fiscal year?

General O'REILLY. Sir, there is a study ongoing under the Office of the Secretary of Defense that is looking at all of our directed energy programs.

Mr. HEINRICH. This is the one that will be due out in June?

General O'REILLY. Yes, sir. In that study it is a broad view of all of our work that is going on. And part of that is looking at the testing aspect; what needs to be tested. In the area of ABL, I would say first is beam propagation; second would be lethality mechanisms; and third would be other ways to make it more difficult for us to use a laser to destroy a missile.

In that regard, if we go down this path of testing that I expect to, to answer your question, would be 10 tests over the next year with smaller sounding rockets, because we don't have to do the more expensive, larger tests in order to gain valuable data into the areas that I just discussed.

Mr. HEINRICH. The current numbers would support 10 tests over the course of the next year?

General O'REILLY. Against the type of target that I just talked about. Against the larger target sets, which we have been doing in the past and will do next month, no, it wouldn't.

Mr. HEINRICH. Okay. I will yield back the rest of my time, Mr. Chair.

Mr. LANGEVIN. Thank the gentleman.

Mr. Spratt is now recognized for five minutes.

Mr. SPRATT. Sorry to be late, but I had the benefit of a briefing a few days ago. Having followed this program a long time, I have the feeling it has come to fruition. I commend you all for making this happen. As we scrape up scarce resources to apply them to the best outcome, there are some systems we have supported for a long time in alliance with our allies—the Arrow and the Medium Extended Air Defense System (MEADS). What can those systems do that we couldn't otherwise accomplish using the SM–3 or Aegis Ashore, the THAAD, the PAC–3, the Patriot; our existing systems? Couldn't they perform the mission more or less as well as the two systems we are developing—the MEADS system? And I know MEADS mobility is an issue. Is it necessary to push forward with those systems at the cost of these other systems?

General O'REILLY. Sir, the MEADS system is a low-altitude interceptor, and its purpose is to intercept cruise missiles, air breathers, unattended air vehicles, aircraft, and low-altitude missile defenses similar to what a Patriot would do. That capability is what we call a lower-tier capability. I developed the upper-tier, and what we focused on for defense of Europe and the discussion we have had are upper-tier systems.

Mr. SPRATT. The Patriot can't take on that mission, then, because of the altitude?

General O'REILLY. It is a very similar mission to the MEADS, sir. The THAAD program is much higher altitude of intercept. MEADS has—in its objectives has much greater mobility than what a Patriot system would have, as you pointed out, sir. That is the most significant difference between the two. And for the Arrow system, sir, it is a fixed system, but it actually intercepts higher than the altitude of a Patriot and literally intercepts up into outer space. So it operates in a different regime than what a Patriot system would be. And Arrow would have an opportunity for at least one intercept, maybe more, before Patriot would then engage it.

Mr. SPRATT. So they are worth the buy.

General O'REILLY. They both have attributes, sir. Whether or not they are worth the buy, I am not in a position—I don't manage either one of those programs.

Mr. SPRATT. One of the programs you do manage, I think, still is the Satellite Tracking Surveillance System (STSS), now to be called the PTSS. Before that it was the Space-Based Infrared System (SBIRs) Low, SBIRs High. Number one, what does PTSS do that STSS—how do you distinguish those two programs? Number two, what do they add to the quality and capability of the missile defense that we have for national defense?

General O'REILLY. Sir, the Space Tracking Surveillance System, the STSS, which was an outcome of the old SBIRs Low, we launched it this year, or actually September of last year, both satellites are on orbit. They are the first satellites that have the ability to track a missile over its entire flight. So they are doing groundbreaking work.

Actually, the PTSS is a smaller satellite. It is focused on certain parts of the Earth, and it will stare at certain parts of the Earth at a much simpler system than what the STSS had because we have found there are regions of the world where we are most worried about in missile defense.

And so one of the problems we have found in building satellites in the past is their complexity. So the PTSS system is actually significantly less complex than the STSS satellites we are flying today. We believe, again, it would be more affordable, and it is more—once you put a constellation up, you can quickly reconstitute it if you ever had a problem with a satellite on orbit. And it is an entire system. STSS is a satellite. The Precision Tracking Space System, PTSS, also incorporates the command and control system and the communications system all the way through a fire control system, such as Aegis or THAAD.

Mr. SPRATT. Do you still propose to go forward with deployment of the STSS?

General O'REILLY. No, sir. The STSS is a fantastic capability we have today that is providing us design information. But we believe the PTSS, which is a smaller satellite, can, in fact, perform the mission that we need in missile defense.

Mr. SPRATT. Thank you very much.

Mr. LANGEVIN. I thank the gentleman.

We are going to go for a brief second round of questions.

If I could, General, let me ask you, since the START Treaty was just signed recently. Obviously, there has been a lot of talk about this and its effect on MDA's work. Can you describe how implementing the treaty would affect MDA's testing?

General O'REILLY. It will allow us to test—let me start again, sir. In the Pacific, the greatest concern we have for testing missile defense is our hazard areas, the debris that it causes, and to conduct that safely. So we do a lot of testing in the Pacific. The issue we run into is where to launch the targets from. In the previous treaty, we were restricted by launching targets from airborne targets, from aircraft, or from waterborne targets. So under the new treaty, we do not have those restrictions, and that gives us much greater flexibility in conducting long-range testing in the Pacific. In the past we have tested 1,000 kilometers. Now we will be testing 2-, 3-, 4,000-kilometer threats against our systems. And the New START Treaty allows that without any constraints.

Mr. LANGEVIN. Very good. Thank you.

I would like to turn, if I could, to the issue of radar. MDA has been an excellent innovator at driving advanced technology, especially in the sensor arena. I have two issues of concern, however, related to MDA's radar technology plans. Maybe you can clarify it for me.

The first issue was the Army Navy/Transportable Radar Surveillance (AN/TPY–2) radars. These radars are slated to play an important role in the President's Phased, Adaptive Approach plan for European missile defense and other regional defense plans for the Middle East and East Asia. They are also the radar system for the THAAD fire control units. With such high demand for these radars, I am concerned about potential production schedule shortfalls. How does your fiscal year 2011 request address the growing need for AN/TPY–2 radars, and does MDA have a plan for addressing any production shortfalls?

General O'REILLY. Sir, the plan that we were on when we submitted the budget for the TPY–2 would allow us to have two radars available in their forward-based mode and match the delivery

schedule for our THAAD units. So we will deliver one THAAD unit this year and be able to deliver a THAAD unit per year until we have nine total THAAD units. So we had synchronized the delivery and the purchases of our TPY–2s in order to achieve that.

We have several radars that are in testing today that we were going to refurbish so they can, in fact, be used for THAAD radars or forward-based radars. We took that refurbishment into account. We have found an opportunity we have right now because we actually accomplished the testing sooner of the radars, and they performed very well. So we are now putting them in refurbishment earlier so that, in fact, we will have an additional radar in the near-term available that we hadn't planned on. But we were taking advantage, managing very carefully, the success we have had with that radar.

Mr. LANGEVIN. Thank you.

Secondly, I wanted to address the issue of investment in optical sensors versus radar sensors. I am concerned about the lack of funding for next-generation advanced radar technology. I know we spoke a little bit about this recently, but maybe you can clarify this.

I realize that MDA's Sensors Directorate funds existing radars such as the previously discussed AN/TPY–2 radar, but there are new radar technologies that could significantly increase radar coverage at the same cost as existing systems. How will MDA continue to encourage development of these new radar technologies?

General O'REILLY. Sir, in our innovative technology area, we have invested about $110 million a year in Small Business Innovation Research and university programs. There is a lot of work going on at that level in the area of substrates and electronics for radars. We also have several other programs that are looking at advancing the use of the algorithms on the radar. So there are two areas of radar development; one is in the area of the software and the algorithms so we can improve the discrimination capability in particular; and then, also, in the areas of having much more robust, more powerful radars in the size of a current radar. In fact, we recently signed an agreement working between our universities and in the Czech Republic on how to develop greater, more efficient performing substrates for our radar technology. So we are very interested in continuing on radar development work, but at the same time, we are finding that there is significant contribution, also, in the infrared. We need them both. The reason is because if you are relying on one type of sensor, you are vulnerable for that sensor to be countered in some way. And the more sensors we have, and the more different phenomenology we use, the much more difficult it is for an adversary in order to interfere with our sensor system.

Mr. LANGEVIN. Very good. Thank you, General.

The ranking member is now recognized.

Mr. TURNER. Last year when we received the Obama Administration's defense budget from which we could learn of its missile defense policies, $1.2 billion was recommended cut in the budget, which this Congress implemented. One of the things that was done in that budget was to cut completion, construction of Missile Field Number 2 in Alaska. When our National Defense Authorization Act (NDAA) came forward, I offered an amendment which I offered

that would have restored the funding for Missile Field 2. Unfortunately, we did not have the support of the Democrat members on the committee, and the amendment did not pass. Not one member of the Democrat side voted for it.

Oddly, the Administration then reversed its position, after the NDAA and after Congress did not put the money back, and decided to complete Missile Field 2. So we are going to go ahead and spend the money that this committee voted not to spend in completing that.

However, we are also learning, though—again, I want to digress for just a moment that this is the missile field that Dr. Roberts indicates is our primary response for North Korea and Iran, and will be continuing our primary response, I believe, until 2020 by the Phased, Adaptive Approach, because that is when the Administration's announced Phased, Adaptive Approach plan in 2020 provides alternative, or additional, coverage to the United States for our mainland United States.

I am concerned, though, of course, that what we learn is that Missile Field 1 is now considered to be decommissioned. And considering whether or not this Congress may also want to reconsider that and then wondering whether or not the Administration might subsequently reverse its decision on that, it would probably be helpful for us to have information on it.

General O'Reilly, rather than decommissioning Missile Field 1 at Fort Greely, Alaska, what would it take to upgrade it, including necessary hardening and technology, to further leverage it as a hedge capacity, which would take us back to the original plan of 44 interceptors instead of the—I believe we are going down to 30?

General O'REILLY. Sir, first of all, again, through the assessments that were done through the Ballistic Missile Defense Review, that is when it was determined that, in fact, it would be beneficial to have a hedge. That was part of the results of the review. We did not have that at the time last year when we submitted the budget. Working closely with combatant commanders, the determination was, for the foreseeable future, we saw that 30 missiles would be sufficient, and that is why the decision was made. It was made in consultation with the combatant commanders.

However, as part of the result of the Ballistic Missile Defense Review, one of the tenets is that we must be flexible against future intelligence estimates, and because of that, the most straightforward way to gain that flexibility would be to have the potential—or to reconstruct or complete the construction of the missile field. Due to the number of GBIs that we have, in fact, you would have a capability you could reconstitute for the next decade in that missile field.

You asked me about Missile Field Number 1. The reason it was decommissioned or it is planned to be decommissioned is that it was designed to be a test bed, and it did not have the hardening, as you say, sir. But not only that, it has environmental issues and things that occur when you have a construction—underground construction like we have in Missile Field 1. So we would need to remediate that. We would need to actually remove almost all of the active components of that missile field and replace them with newer ones. The timeframe with that would be on the order of two

years. The costs that we have looked at in the past when we looked at different options would be on the order of—and this has been done several years ago, sir, so the costs are somewhat approximate—would be on the order of $200 million.

Mr. TURNER. Thank you, General.

Dr. Roberts, when you were doing your comparison of the GBI proposal for the two-stage at the third site in Poland and Czech Republic, including the radar in the Czech Republic, you indicated 2011, we need to get everything done faster. One of the things that I understand about the previous proposal is that it would have provided—and this was well-known figures that were established and discussed—75 percent coverage for Europe, and then also the coverage for mainland United States. Seventy-five was the number that was discussed openly with even our European allies. So there were discussions about what are we going to do with the gap and then discussions with NATO-ization.

Do you have the figures for Phase 1 of the Phased, Adaptive Approach of the percentage of Europe that will be covered?

Dr. ROBERTS. I do not.

Mr. TURNER. I assume if you don't have it for Phase 1, you don't have it for Phase 2, Phase 3, or Phase 4 either.

Dr. ROBERTS. Phase 4 and 3 are 100 percent.

Mr. TURNER. One hundred percent? And what is the year that you hit that?

Dr. ROBERTS. Phase 3 is roughly 2015.

Mr. TURNER. And Phase 3, you are projecting 100 percent.

Dr. ROBERTS. I believe so.

Mr. TURNER. And for the United States mainland?

Dr. ROBERTS. With our current position—I mean, that is not changing materially as a result of Phases 1, 2, or 3 in Europe.

Mr. TURNER. Meaning that there isn't coverage. That coverage arrives in 2020 with Phase 4.

Dr. ROBERTS. Correct.

Mr. TURNER. But Phase 1 and Phase 2, you don't have the figures as to what the percentage of coverage for Europe, because obviously that is important for NATO-ization. It is important for us, an evaluation. Can you provide those to us for another time?

Dr. ROBERTS. I am happy to do that.

[The information referred to was not available at the time of printing.]

Dr. ROBERTS. I would like to address a concern of yours, I think, and sparked by a comment from Mr. Larsen about phased, adaptive being an architecture. Phased, adaptive is a policy. What we have been doing since the announcement of the policy is turning it into the elements of each of the four steps. We knew in the analytical work conducted in July and August that we were headed towards an adaptive capability that required two locations for shooters—interceptors—in Southeastern Europe and somewhere in Northern Europe, and to a forward-based radar capability.

We did not do detailed architectural work. We looked in detail at alternative architectures with the support of the Missile Defense Agency, but we did not choose an architecture in September. We chose a policy approach that would be phased and adaptive involving improving technology as we could acquire it, tested and proven,

and into Europe as quickly as possible. We heard immediately from vulnerable allies in the 70 percent equation, 75 percent equation—those left out—that they were looking for protection early because they were the ones who were the most vulnerable early. We wanted to meet their demands for protection and scale the capability as the threat develops and as our capabilities improve.

So the architecture—we did not have an architecture in September that we did not brief you on. We briefed you on the elements of the policy. We provided materials on notional coverage that would go with the different phases, based on assumptions about where things might be deployed. And what we have been doing subsequently is working with our partners to determine—both within the multilateral context within NATO and separately to determine how to bring the pieces together. So we have been bringing forward the details as they have turned into details, but we did not choose an architecture in September that we have been privately working out.

Mr. TURNER. As you look at the Phased, Adaptive Approach and the different phases, are there Aegis and THAAD that are dedicated assets to United States European Command? And then the reason why I am asking this question is because, as part of the Phased, Adaptive Approach, is it that the assets are dedicated, or do they flow in and out? How is that going to work with respect to Aegis and THAAD? Are they dedicated, or do they at times leave and go do other tasks?

Dr. ROBERTS. This is a question for the Joint Staff to determine through its Global Force Management Project. When there are too few assets available for the combatant commanders, the Joint Staff is responsible for having a plan for adjudicating competing demands.

Mr. TURNER. So when we ask the questions about coverage, I guess part of the information that we need in coverage is depending upon what assets are there and what assets are not.

Dr. ROBERTS. Correct.

Mr. TURNER. Thank you, Mr. Chairman.

Mr. LANGEVIN. I thank the ranking member.

With that, I just want to thank our panel for their outstanding testimony today and for being here. We look forward to, obviously, continued vigorous oversight in this area, obviously, as we go forward with ballistic missile defense. It is going to be vitally important to the Nation. We look forward to being active partners with you in that effort.

With that, some of the members may have additional questions that they will submit for the record, and I would ask the panel to respond expeditiously in writing.

Mr. LANGEVIN. With that, this subcommittee is adjourned.

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

A P P E N D I X

APRIL 15, 2010

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

APRIL 15, 2010

Opening Statement of Chairman James R. Langevin

Strategic Forces Subcommittee

The Report on the Ballistic Missile Defense Review and the Fiscal Year 2011 National Defense Authorization Budget Request for Missile Defense Programs

April 15, 2010

Good afternoon. This hearing of the Strategic Forces Subcommittee will come to order. Today we will take testimony on the Ballistic Missile Defense Review and the FY 2011 Budget Request for Missile Defense Programs.

Let me begin the hearing today by welcoming our three distinguished witnesses. First, we have Dr. Bradley Roberts, Deputy Assistant Secretary of Defense for Nuclear and Missile Defense Policy. Dr. Roberts was responsible for coordinating the Department's Ballistic Missile Defense Review. Prior to his current duties, Dr. Roberts helped former Secretaries Perry and Schlesinger write the report of the Bipartisan Congressional Commission on the Strategic Posture of the United States. Dr. Roberts holds a bachelor's degree from Stanford University, a master's degree from the London School of Economics, and a doctorate from Erasmus University in Rotterdam, Holland.

Next, Lieutenant General Patrick O'Reilly, Director of the Missile Defense Agency, has agreed to appear before the subcommittee to discuss his agency's programs and budget. General O'Reilly is a graduate of the U.S. Military Academy and has three Masters Degrees: one in Physics, one in National Security and Strategic Studies, and one in Business. As a scientist, and through his skills as a program manager of highly technical projects, he has been instrumental in the success of many of MDA's most important programs, including its directed energy work, Patriot, THAAD and the Ground-based Mid-course Defense system.

Finally, we will hear from Dr. Michael Gilmore, Director of Operational Test and Evaluation about the operational status of our ballistic missile defense systems. Prior to his confirmation, Dr. Gilmore served as the Assistant Director for National Security at the Congressional Budget Office. Dr. Gilmore has worked in the Pentagon before, having served for 11 years in the Office of Program Analysis and Evaluation. Early in his career, Dr. Gilmore worked for the Lawrence Livermore National Laboratory on magnetic fusion energy. He is a graduate of MIT where he earned a B.S. in Physics. And he earned his Masters and Ph.D. in Nuclear Engineering from the University of Wisconsin. I want to thank each of you for being with us here today.

As ballistic missile technology proliferates across the globe and increases in capability, the potential threat to our nation and our allies grows as well. Continued developments in both Iran and North Korea are our most urgent concerns.

While recent intelligence assessments have highlighted the growing number of short- and medium-range missiles being developed by these nations, both of these rogue states continue to work on ICBM technology that could lead to missiles which directly threaten our homeland.

This past September, President Obama announced his plan for strengthening missile defenses in Europe through a phased, adaptive approach to deploying defenses against the threat of Iranian ballistic missiles.

On February 1st, with the release of the budget, the Department submitted its first-ever Ballistic Missile Defense Review. The Administration's Review established six clear objectives to guide ballistic missile programs:

First, the U.S. will continue to defend the homeland against the threat of limited ballistic missile attack. Second, the U.S. will defend against regional missile threats to U.S. forces, while protecting allies and partners and enabling them to defend themselves.

Third, before new capabilities are deployed, they must undergo testing that enables assessment under realistic operational conditions. Fourth, the commitment to new capabilities must be fiscally sustainable over the long term. Fifth, BMD capabilities must be flexible enough to adapt as threats change. And, finally, the U.S. will seek to lead expanded international efforts for missile defense.

The BMDR also endorsed applying the new phased, adaptive approach across the board, including to the defense of South Korea, Japan and our allies in the Middle East.

This new approach links missile defense deployments more directly to the current threat, provides for flexible responses to future threats and signals to the Russians, the Chinese and the world, that we are serious about maintaining strategic stability.

As we all know, ballistic missile defense is sometimes a controversial subject. But I believe there is much greater consensus on this matter than meets the eye.

In 1999, an overwhelming bipartisan majority of the House of Representatives voted to deploy a National Missile Defense system capable of defending the territory of the United States against limited ballistic missile attack.

Since that time, Congress has appropriated over $90 billion for missile defenses and the Pentagon has delivered 30 ground-based interceptors effective against long-range missiles that might be launched by Iran or North Korea; 52 batteries of Patriot short-range missiles—44 of which are capable of launching the advanced PAC-3 missile; 2 Terminal High Altitude Air Defense (or THAAD) batteries and 16 interceptors; and 55 medium-range SM-3 interceptors. The program has also converted 20 Aegis ships to use these SM-3 interceptors.

And, this year, the President's budget provides another $9.9 billion for missile defense programs, an increase of $670 million over the FY 2010 appropriated level.

The consensus that paved the way for these developments is rooted in the basic principles that missile defenses should discourage rogue nations from developing threatening systems and that deployment of U.S. defenses protect us against these threats but should not create strategic instability or increase the risk of nuclear war.

Yet a new strategy alone will not be enough. The Administration must convince Congress that it has an effective plan for ensuring that our defensive systems are thoroughly tested, and that sufficient resources will be allocated to make sure our missile defense systems are available when we need them. That said, we are eager to hear from each of you this afternoon.

Dr. Roberts, I am especially interested in your thoughts about how we should balance our efforts to defend the homeland with the challenges of building regional defenses against short- and medium-range missile threats.

General O'Reilly, would you focus on how the BMDR and the Phased, Adaptive Approach have modified the MDA's plans for testing and deployment over the past year?

Finally, Dr. Gilmore, we look forward to hearing your assessment of the operational capabilities of each of the components of the ballistic missile defense system.

Opening Statement of Ranking Member Michael Turner

Strategic Forces Subcommittee

The Report on the Ballistic Missile Defense Review and the Fiscal Year 2011 National Defense Authorization Budget Request for Missile Defense Programs

April 15, 2010

Thank you Mr. Chairman. I would also like to welcome Dr. Roberts, Lieutenant General O'Reilly, and Dr. Gilmore. We have a lot of ground to cover today, so let me dive right into some of the key issues that are of concern to me.

First, I am greatly disturbed by recent comments from Administration officials that, essentially, Congress has everything it needs to know about the Phased Adaptive Approach (PAA). As Under Secretary Tauscher said at our hearing yesterday in reference to PAA details: "it's on the Internet."

Unfortunately, the Internet does not provide sufficient details on the four phases of the PAA. Nor does it provide a description of the options considered by the Administration—in addition to the PAA—and the analysis to support why it was chosen as the preferred approach.

Let me share a few examples of information the committee does not have:

- Phase 1 of the PAA calls for the deployment of a forward-based radar in Europe by the end of 2011. We are considering the Fiscal Year 2011 budget request yet we don't know where this radar will be located or how long host nation negotiations might take. Right now, this would appear to be a high schedule risk item.

- We do not know the numbers of ships, interceptors, and sensors that will be required for each Phase, nor do we know the estimated costs or acquisition strategies for each Phase.
- We have minimal information on the technical feasibility, expected performance, and cost of the SM-3 Block 2A and 2B interceptors—which Senator Lieberman called "paper missiles" last year. Many in Congress do not understand why the Administration believes that they would be a better solution than the more mature two-stage GBI.
- And lastly, while we have positive statements from the NATO Secretary General, we have yet to see details on the "NATO-ization" of the PAA, its integration with NATO's missile defense architecture, and any allied contributions.

If the Department can't adequately define the four PAA phases, how can it evaluate the merits of the PAA and identify the resources necessary to implement it? Furthermore, without such information, how can the committee conduct effective oversight?

These are not unreasonable requests. The committee asked similar questions of the previous Administration's European missile defense proposal. There is an opportunity to gain bipartisan support on these plans, but the committee must have confidence that the PAA is the best approach for protecting the United States and our European allies.

Second, the 30-percent increase to the Ground-based Midcourse Defense (GMD) program is welcome—after last year's reductions—as is the Department's decision to finish construction on Missile Field-Two in Alaska. However, it is unclear whether

MDA has planned and budgeted for a sufficient number of ground-based interceptors (GBIs) to support reliability flight-testing through 2030 and to accommodate test failures or surge scenarios. The health of the industrial base supporting the GMD program remains a concern and the last thing any of us wants to see are GMD options limited because suppliers went cold.

In addition, the BMDR states that the U.S. "will continue development and assessment of a two-stage ground-based interceptor" as a hedging strategy for defense of the homeland. How does MDA plan to make it a viable hedging strategy, particularly when the budget request removes some two-stage GBI flight tests and delays others? I am concerned that such delays may preclude the two-stage GBI from being considered as a viable hedge.

Third, the Ballistic Missile Defense Review (BMDR) states that the Phased Adaptive Approach will be tailored to other regions. We know, qualitatively, that these new regional missile defense architectures will have significant force structure and inventory implications. However, and again, without a detailed understanding of these plans—basing locations, inventory requirements, and costs—it is difficult to assess whether MDA's budget is sufficient.

One thing is clear: demand exceeds supply. Despite plans for Aegis and THAAD inventory growth, the bulk of the funding is planned for the out-years. This creates near-term production gaps and inefficiencies for industry. An example shortfall is Aegis SM-3 interceptors. The Administration wants an inventory of 436 interceptors by 2015, yet is only buying 8 new interceptors in this year's budget. Industry is sized to build 48 interceptors a year. Why were such decisions made?

Fourth, we need to see a long-term commitment towards a robust research and development program. I worry that we're giving up on some promising technologies

while rushing to pursue others. The Airborne Infrared (ABIR), PTSS, and SM-3 Block 2B are interesting concepts that I would like to see succeed, but I also recognize that they are still unproven technologies. Meanwhile, the Airborne Laser recently demonstrated a successful missile shoot-down, yet the budget request appears insufficient to maintain the aircraft, conduct flight experiments, and fund further development of innovative directed energy technologies.

Fifth, I remain concerned that Russian officials suggest their adherence to the New START Treaty would be conditional upon U.S. missile defense deployments which may have the potential to self-constrain U.S. missile defense activities. After all, the U.S. scrapped plans to deploy GBIs in Poland and a radar in the Czech Republic to "remove an irritant" in U.S.-Russian relations. It's important for the Administration to clarify its missile defense plans—for Congress, American people, our allies, and the Russians.

Lastly, we know the threat is changing and our missile defense plans must be flexible to those changes. A year ago, the Administration concluded that the long-range threat was not materializing as rapidly as once thought. However, since then, new details are emerging on both North Korea and Iran's long-range missile programs that should be grounds for the Administration to revisit the assumptions behind its policy changes.

I am pleased with the restoration of some funds in the budget request after last year's hasty $1.2 billion cut. It is a welcome indication that the Administration took note of concerns expressed by many of us that a topline increase was necessary to accomplish all that was being asked of MDA—homeland missile defense, PAA, regional missile defense architectures, expanded inventories, increase testing, and continue investments in science and technology.

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THE HOUSE ARMED SERVICES COMMITTEE

STATEMENT OF

DR. BRAD ROBERTS
DEPUTY ASSISTANT SECRETARY OF DEFENSE FOR NUCLEAR AND
MISSILE DEFENSE POLICY

BEFORE THE HOUSE ARMED SERVICES COMMITTEE

APRIL 15, 2010

NOT FOR DISTRIBUTION UNTIL RELEASED BY
THE HOUSE ARMED SERVICES COMMITTEE

Chairman Langevin, Ranking Member Turner, Members of the Committee, thank you for inviting me here today to testify on the Department's Ballistic Missile Defense program. Ballistic Missile Defense is a key strategic issue for the United States and I look forward to testifying and answering your questions about our policies and plans.

In February, the Department of Defense published the report of the first-ever Ballistic Missile Defense Review (BMDR). The review comprehensively considered U.S. BMD policies, strategies, plans, and programs in the context of current and emerging ballistic missile threats to the homeland, our deployed forces, and our allies and partners. It provides a clear and sensible path forward for U.S. missile defenses.

We are here today to testify on the President's Fiscal Year 2011 request for Ballistic Missile Defense and how it is aligned with the policies and strategies reported in the BMDR. We have taken many steps to ensure a close alignment of budgets with the Defense Department's strategic reviews—not just BMDR but also the Quadrennial Defense Review and the Nuclear Posture Review, as it was being developed.

I will first review the key recommendations of the BMDR, and then describe our actions to implement it. The Committee has also asked that I address the European Phased Adaptive Approach in some detail.

Ballistic Missile Threat

In charging the Defense Department with the responsibility to conduct a BMDR, last year's legislation clearly specified the starting point: an updated threat assessment. Accordingly, the review began with a review of the ballistic missile threat and key trends.

The ballistic missile threat is increasing both quantitatively and qualitatively, and is likely to continue to do so over the next decade. Current global trends indicate that ballistic missile systems are becoming more flexible, mobile, survivable, reliable, and accurate, while also increasing in range. A number of states are also working to increase the protection of their ballistic missiles from pre-launch attack and to increase their effectiveness in penetrating missile defenses. Several states are also developing nuclear, chemical, and/or biological warheads for their missiles.

The threat to the Homeland from states like North Korea and Iran continues to develop. Although neither has yet acquired or deployed intercontinental ballistic missiles (ICBMs), both are working to acquire and/or develop long-range ballistic missile capabilities, a threat that has proven to be inherently difficult to predict.

Of particular concern, North Korea has demonstrated its nuclear ambitions, and it appears that Iran is determined to continue its long-standing defiance of its international obligations on its nuclear program.

The threat from short- and medium- range ballistic missiles has developed rapidly over the past decade. Both Iran and North Korea present a significant regional missile threat.

Iran has developed and acquired ballistic missiles capable of striking deployed forces, allies, and partners in the Middle East and Southern Europe. It is fielding increased numbers of mobile regional ballistic missiles and has claimed that it has incorporated anti-missile-defense tactics and capabilities into its ballistic missile forces. Iran has flight-tested a new solid-propellant medium-range ballistic missile (MRBM) with a claimed range of 2,000 kilometers. Iran is also likely working to improve the accuracy of its short-range ballistic missiles (SRBMs).

North Korea has developed a solid-propellant SRBM, and is developing a mobile intermediate-range ballistic missile (IRBM). It has also conducted test launches of multiple theater ballistic missiles, demonstrating a capability to threaten U.S. and allied forces.

Strategy and Policy Framework

The BMDR set the following policy priorities based on Presidential guidance:

1. The United States will continue to defend the homeland against the threat of limited ballistic missile attack.

This remains the top priority for U.S. missile defenses, with a focus on the threat from limited ballistic missile attack by regional actors such as North Korea or Iran. The United States does not intend to affect the strategic balance with Russia or to undermine strategic stability with China. The United States seeks to dissuade states such as North Korea and Iran from developing

an ICBM and, failing this, to deter them from using it or to defeat their attacks should deterrence fail.

2. The United States will defend against regional missile threats to U.S. forces, while protecting our allies and partners and enabling them to defend themselves.

This policy has guided the development of U.S. capabilities since the emergence of the missile proliferation problem in the 1980s. The security of our deployed troops, and our allies and partners, requires this.

3. Before new capabilities are deployed, they must undergo testing that enables assessment under realistic operational conditions.

We believe in "fly before you buy." Flight testing under realistic operational conditions is needed and cannot be conducted from facilities not equipped or properly located for this purpose. This will result in a posture based on proven technology with improved reliability, confidence, and cost control.

4. The commitment to new capabilities must be fiscally sustainable over the long term.

Our investments in this area must be managed to ensure that there are sound capability improvements at reasonable cost and in overall balance with other defense priorities.

5. U.S. ballistic missile defense capabilities must be flexible enough to adapt as threats change.

Building capabilities that are mobile and modular ensures we can successfully adapt as the threat evolves, and our own technology advances. Hedging against potential changes in the threat is essential given the uncertainty associated with the ballistic missile capabilities of potential adversaries.

6. The United States will lead expanded international efforts for missile defense.

We will work with allies and partners to strengthen regional security architectures. This theme cuts across all of the Department's policy and posture reviews. Cooperative efforts are essential to the credibility of extended deterrence and assurance of U.S. allies and partners. Our

commitment to seeking strategic stability with Russia and China means that engagement with them is also needed.

Defending the Homeland

The U.S. homeland is currently protected against the threat of limited ICBM attack, as a result of investments made over the past decade in the system based on Ground-based Midcourse Defense (GMD). By the end of this fiscal year, the United States will deploy a total of 30 Ground-Based Interceptors (GBIs), at Fort Greely, Alaska and Vandenberg Air Force Base, California, along with the global architecture of sensors and command and control systems. The United States now possesses a capacity to counter the projected threats from North Korea and Iran for the foreseeable future.

At the same time, because the threat is unpredictable, the United States must be well hedged against the possibility of rapid threat developments. The focus now must be on maintaining the current level of capability while developing future capabilities that will enhance homeland defense if and as new threats emerge. We are taking the following steps to strengthen our hedging posture:

1. Continue the development and assessment of a two-stage Ground-Based Interceptor (GBI). The 2-stage GBI is only a development program and no decision has been made to acquire or deploy operational interceptors at this time.
2. Complete construction of Missile Field 2 at Fort Greely, Alaska, to the originally planned configuration of 14 operationally-capable silos. Finishing Missile Field 2 will allow us to replace older, inadequate silos from Missile Field 1, provide the most reliable and effective silo configurations to the warfighter, and establish a reserve capability to rapidly deploy up to 8 additional interceptors if needed.
3. Pursue advanced sensors to strengthen existing networks. MDA is currently developing air- and space-based sensors that will bring new capabilities to the fight by allowing us to detect enemy launches, handle larger raid sizes, and track them earlier and longer through all phases of their flight.
4. Invest in advanced technologies such as directed energy and its potential use for missile defense, early-intercept capabilities that allow us to engage threats earlier in their flight,

and the ability to launch interceptors and engage ballistic missiles based on information from external, forward-deployed sensors.

5. Implement Phase 4 of the Phased Adaptive Approach in Europe which will provide supplemental capabilities for the protection of Europe and the Homeland from Middle East threats.

Defending Against Regional Threats

Over the past decade, significant progress has been made in developing capabilities for protection against attack from short- and medium-range ballistic missiles. Critical new systems have begun to be deployed. But these deployments remain modest in number in comparison to the rapidly expanding regional threat. The BMDR reflects the commitment to significantly accelerate the acquisition and deployment of these mature systems and to invest in follow-on capabilities.

The benefits of improving capabilities are best ensured by tailoring regional deterrence and defense architectures to the unique requirements of each region. The effort to develop tailored approaches will be guided by the following key principles:

1. Regional deterrence must be built on a solid foundation of strong cooperative relationships and appropriate burden sharing between the United States and our allies. While missile defenses play an important role in regional deterrence, other components will also be significant. As the Nuclear Posture Review has made clear, the U.S. nuclear umbrella will remain in place so long as nuclear threats to our allies remain.
2. The United States will pursue a phased adaptive approach within each region that is tailored to the threats unique to that region, including their scale, the scope and pace of their development, and the capabilities available and most suited for deployment. A key feature of this approach is that it does not require a globally integrated missile defense architecture that incorporates allied capabilities into a uniform, global structure.
3. Because the potential global demand for missile defense assets over the next decade may exceed supply, the United States will develop capabilities that are mobile and re-locatable.

Let me further explain what we mean by "phased" and "adaptive." The phases are designed to implement the best available technology to meet existing and potential threats. As more capable interceptor technology is tested, proven, and available, we will phase that technology in to counter the increasing range and complexity of missile threats we face.

The approach is adaptive in that it relies largely on sea-based and other mobile capabilities that can be surged into troubled regions in times of political-military crisis. We must plan to surge for the simple reason that the demand for regional missile defense assets will exceed supply for years to come. Although the missile threat is developing at different rates in different regions, overall it is developing rapidly – both in quality and quantity. Today there are thousands of ballistic missiles and hundreds of launchers; roughly 90 percent of those missiles have ranges less than 1,000 kilometers. Against this threat, the United States currently has only a few hundred defensive interceptors deployed in multiple regions. To manage the supply/demand challenge, the military utilizes the Global Force Management process. This will help to ensure that our missile defenses can face the most pressing regional threats, and that we have capabilities that are responsive to changes in the threat environment.

The BMDR and the Budget

The Department's budget request aligns with the policies identified in the BMDR and reflects an increased emphasis on strengthening our homeland and regional missile defense capabilities. The Fiscal Year 2011 President's Budget requests approximately $500 million more than was appropriated in Fiscal Year 2010. Furthermore, our plan for Fiscal Years 2011 – 2015 is $3.2 billion above what was planned for last year. MDA Director O'Reilly will provide a more detailed overview of the programmatic investments in Fiscal Year 2011 and beyond.

The legislation mandating the BMDR specifically posed a question about the needed balance between investments in Homeland and regional defenses. Clearly, we need strong investments in both areas. We also need to be well hedged in both against sudden developments in the threat. We also need to accelerate the fielding and further development of capabilities to deal with regional threats because of the dramatic growth in that dimension.

We have emphasized the following key investment priorities for FY 2011 and the five year defense plan:

- To increase the inventory of near-term, mature systems, including interceptors, sensor networks, and command and control capabilities, in order to provide our military forces with what they need now.
- To rigorously test our missile defense systems as they are developed to ensure we are investing in operationally-effective and reliable sensors and shooters.
- To invest in advanced technologies and follow-on capabilities so that we continue to outpace new developments in our adversaries' ballistic missile capabilities.
- To maintain and improve existing capabilities.

We believe these increased investments are essential, and are consistent with a key principle of the BMDR, fiscally sustainable.

Missile Defense in Europe

In conducting the Ballistic Missile Defense Review, we were also specifically directed to assess the pathway forward for missile defense in Europe. Having reviewed the threat and set out our policy priorities, that pathway forward emerged clearly.

- The accelerating threat from short-, medium-, and intermediate-range ballistic missiles in the Middle East pointed to the need to accelerate missile defense protection of U.S. forces and allies in Europe.
- The inherently unpredictable nature of the threat pointed to the need for a missile defense approach with flexibility to adapt to developments in the threat.
- The need to hedge against future threats, whether to U.S. deployed forces, allies, or the Homeland, pointed to the need for an approach in Europe that could be adaptive to this purpose as required.
- The commitment to lead expanded international efforts pointed to the value of a broader alliance approach that would enable effective sharing of burdens and risks.

The "Third Site" approach scored poorly against these objectives. As we began the BMDR, we were constrained by the small number (10) of interceptors that were planned for deployment, meaning the system could be overwhelmed by the launch of as few as five missiles. The high expense of the interceptors made future capability growth doubtful. And the Third Site approach

did not include any specific components for defending our allies and forces from the threat posed by short- and medium-range ballistic missiles.

The BMDR developed a more adaptive approach, which utilizes proven technologies that are flexible and responsive to current and future threat developments. Based on the unanimous advice of the civilian and military leadership in the Department of Defense, the President endorsed the Phased Adaptive Approach to missile defense in Europe.

It is useful to recall here the four phases described in the BMDR:

- In Phase 1, out through the 2011 timeframe, existing missile defenses to defend against short- and medium-range ballistic missiles will be deployed. Phase 1 will be accomplished by deploying a forward-based sensor and utilizing BMD-capable Aegis ships carrying SM-3 Block IA interceptors.

- In Phase 2, in the 2015 timeframe, improved interceptors and sensors to defend against SRBMs and MRBMs will be deployed. The architecture will be expanded with a land-based SM-3 site in Southern Europe and the deployment of SM-3 Block IB interceptors.

- In Phase 3, in the 2018 timeframe, to improve coverage against medium- and intermediate-range ballistic missiles, a second land-based SM-3 site will be deployed in Northern Europe. This will include use of the more capable SM-3 Block IIA interceptors on land and at sea to cover all NATO Europe countries.

- In Phase 4, a decade from now, to address the threat of potential ICBM attack from the Middle East, the next generation SM-3 interceptor, the Block IIB, will be available for land-based sites. This interceptor, with its higher velocity, is intended to provide the ability to engage longer-range ballistic missiles and to intercept threats in their ascent phase.

Implementing PAA in Europe

Since the announcement of the new approach to missile defense in Europe in September 2009, the Administration has worked to engage allies, both bilaterally and multilaterally, to begin to

bring together the needed building blocks for this approach. Key milestones in this process to implement the European Phased Adaptive Approach (EPAA) are summarized below:

- In September 2009, the Czech Republic expressed its continued strong support for missile defenses and stated its interest in being involved with the EPAA. As we consider ways to cooperate on areas related to the PAA over the longer term, including through research and development activities, we are already in the process of working with the Czechs to establish a near-term arrangement for sharing information on ballistic missile launches.

- In October 2009, Poland agreed in principle to host a land-based SM-3 interceptor site on its territory, as called for in the Phase 3 of the EPAA (2018 timeframe). This site will be located at the same former military installation in northwestern Poland that would have housed the GBI's under the "Third Site" plan. The U.S.-Poland Ballistic Missile Defense Basing Agreement was signed in August 2008. In February 2010, the U.S. and Poland concluded negotiations on an amendment to that agreement to allow the deployment of a land-based SM-3 site in Poland. Additionally, in 2010, the Polish parliament ratified the U.S.-Poland supplemental Status of Forces Agreement required for the deployment of U.S. forces in Poland, including personnel associated with missile defense.

- In February 2010, Romania agreed in principle to host the Phase 2 Southern Europe land-based SM-3 interceptor site in the 2015 timeframe. The U.S. is preparing for negotiations with the Romanian government concerning the details of hosting the site.

- We are currently in discussions regarding the potential location of the forward-based AN/TPY-2 radar, which we would like to deploy in Southern Europe in the 2011 timeframe. As these discussions mature, we will be able to provide more information.

- We are also working to coordinate our EPAA missile defense efforts with those of our NATO Allies that are seeking to counter shorter-range ballistic missile threats to deployed forces. Several NATO countries already possess or are acquiring such missile defense capabilities. For example, several have PATRIOT systems (Netherlands, Germany, and Greece). Some are working cooperatively with the United States to

develop the MEADS system (i.e., Italy and Germany). Others have expressed interest in acquiring systems like PATRIOT, SM-3, and sensor technology.

These bilateral efforts have been paralleled by multilateral efforts within NATO. The Administration is working to ensure the EPAA is implemented in a strong NATO context – meaning it has NATO's political support, complements current and future NATO efforts, and offers enhanced opportunities for cooperation.

- The EPAA closely aligns with NATO political guidance on missile defense, issued unanimously in April 2009 by Allied heads of state and government, which states that "missile threats should be addressed in a prioritized manner that includes consideration of the level of imminence of the threat and the level of acceptable risk." Accordingly, our NATO allies have responded positively to EPAA. NATO unanimously welcomed the PAA at its December 2009 Foreign Ministerial, a key first step in cooperation with NATO on European missile defense.

- NATO is also developing a command and control network that will allow Allies to link their missile defense assets together, called the Active Layered Theater Ballistic Missile Defense (ALTBMD) program, creating a more efficient architecture. The United States is working to ensure U.S. assets will be interoperable with NATO's ALTBMD program. NATO is also examining the implications and costs of potentially expanding ALTBMD to include command and control for territorial missile defense. ALTBMD and potential expansions for it would facilitate greater interoperability and shared situational awareness among Allied missile defense assets.

In combination, these efforts have helped to generate a significant new level of alliance commitment to missile defense. As a result, there is greater potential for cooperation with NATO on a potential Alliance-wide initiative to protect NATO territory from ballistic missiles.

It is important to understand that working to ensure protection of all NATO Allies does not give NATO a "veto" over the protection of the United States and our deployed forces. Interoperability with NATO command and control systems will not diminish our ability to defend U.S. deployed forces, our allies, and our partners.

All of these efforts represent significant progress towards implementing the BMDR and PAA in Europe -- in just over six months since the announcement of the new approach.

The PAA in Asia and the Middle East

The European PAA is representative of our new approach to regional missile defense. It shows how we plan to apply in practice those policy priorities that we established in the BMDR.

However, it is important to note that the regions differ in the range, scale, and technical sophistication of the existing and potential threat. This variation has important implications for how phased adaptive approaches to missile defense are applied in each regional context. The regions also differ in terms of the U.S. role. In Europe, the United States engages as a party to a multilateral alliance; in East Asia, the United States cooperates through bilateral alliances and with key partners; in the Middle East, the United States has a number of key partners. And the U.S. has deployed forces across the globe. Regional differences have important implications for the authorities under which the United States is able to operationally employ defenses in protection of local partners.

We are also working in East Asia and the Middle East to implement the phased adaptive approach to missile defense in these regions. As I mentioned earlier, these approaches must be tailored to the specific threat and geopolitical characteristics of each region.

- The United States and Japan have made considerable strides in BMD cooperation and interoperability in support of bilateral missile defense operations. Japan has acquired a layered integrated missile defense system that includes Aegis BMD ships with Standard Missile 3 interceptors, Patriot Advanced Capability 3 (PAC-3) fire units, early warning radars, and a command and control system. The United States and Japan regularly train together, and our forces have successfully executed cooperative BMD operations. One of our most significant cooperative efforts is the co-development of a next-generation SM-3 interceptor, called the Block IIA. This co-development program represents not only an area of significant technical cooperation but also the basis for enhanced operational cooperation to strengthen regional security. The U.S.-Japan partnership is an outstanding example of the kind of cooperation the United States seeks in order to tailor a phased adaptive approach to the unique threats and capabilities in a region.

- The United States also has ongoing discussions with South Korea and Australia related to missile defense and we look forward to further cooperation should either country make the decision to acquire missile defense capabilities.

- In the Middle East, we have a longstanding relationship with Israel on BMD. In addition to conducting a major missile defense exercise with Israel in November 2009, the U.S. and Israel continue to meet regularly and coordinate extensively on a wide range of missile defense issues. During a recent bilateral discussion in Tel Aviv in March 2010, ways in which elements of the BMDR would help our cooperative efforts to defend Israel were analyzed. This set of bilateral discussions on missile defense will be continued later this year in the United States. In addition to cooperating on plans and operations, our extensive support for Israeli missile defense programs continues to include the existing Arrow Weapons System and a new program for defeating short range ballistic missiles known as David's Sling. Improvements in the U.S. missile defense posture as a result of the BMDR benefits regional stability and benefits Israel's security.

- The United States currently has a robust mix of ballistic missile defense assets forward deployed to provide ballistic missile defense for our troops and facilities in the Persian Gulf Region. This includes the command and control equipment, and personnel necessary to direct BMD engagements. Currently, a series of bilateral MD agreements between the U.S. and host GCC nations exist. CENTCOM continues to work on establishing a Regional Integrated Air and Missile Defense (RIAMD) architecture for the GCC nations.

Cooperation with Russia

As noted in the BMDR, the Administration has given a special emphasis to renewing cooperation with Russia on missile defense. From discussions at the most senior levels, when Presidents Obama and Medvedev met at the July 2009 Moscow Summit, to technical discussions, we are making a concerted effort to identify areas where the U.S. and Russia can pursue meaningful cooperation. We are open to a wide-range of cooperative activities.

Some examples of cooperation that we have recently examined with the Russians include sharing data gathered by existing U.S. and Russian radar installations; conducting collaborative missile defense flight-tests; and undertaking experiments that would combine data from U.S. ground- and space-based sensors with data from Russian sensors such as the radars at Qabala, Azerbaijan and at Armavir, in southern Russia. Pursuant to President Obama's and President Medvedev's agreement at their July 2009 summit in Moscow, the United States and Russia are conducting a joint assessment of ballistic missile threats and challenges. Also, we are attempting to work with Russia to implement the 2000 Joint Data Exchange Center (JDEC) agreement. The JDEC agreement would establish a joint ballistic missile early warning center in Moscow.

Conclusion

In the BMDR we have a new policy document outlining the Administration's approach to missile defense. We have accordingly shifted budgetary requests, increasing investments in missile defenses in the fiscal year 2011 budget. We have already begun to execute those policies as demonstrated by our progress on the implementation of the PAA in Europe, and we are working closely with other allies and partners.

The threat posed by ballistic missiles is real, and it is growing. After years of development, our missile defenses today are also very real, and vital to coping with this growing threat. We look forward to working with Congress in ensuring continued progress.

Thank you and I look forward to your questions.

Unclassified Statement of

Lieutenant General Patrick J. O'Reilly

Director, Missile Defense Agency

Before the

House Armed Services Committee

Subcommittee on Strategic Forces

Regarding the

Fiscal Year 2011 Missile Defense Programs

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Lieutenant General Patrick J. O'Reilly, USA
Director, Missile Defense Agency
Before the
House Armed Services Committee
Strategic Forces Subcommittee
April 15, 2010

Good morning, Chairman Langevin, Mr. Turner, other distinguished Members of the Committee. It is an honor to testify before you today on the Missile Defense Agency's support to the Ballistic Missile Defense Review (BMDR) and our $8.4 billion Fiscal Year (FY) 2011 budget request to continue our mission to develop and field an integrated, layered, Ballistic Missile Defense System (BMDS) to defend the United States, its deployed forces, allies, and friends against ballistic missiles of all ranges and in all phases of flight. This budget request reflects the strategy and policy stated in the BMDR report and the prioritized missile defense needs of our Combatant Commanders and the Services as stated in the latest US Strategic Command's (USSTRATCOM) Prioritized Capabilities List (PCL).

The Missile Defense Agency has been operating in accordance with the principles outlined in last year's Weapons System Acquisition Reform Act. This includes establishment of formal baselines for the system component managers, Service participation through the USSTRATCOM-led Warfighter Involvement Process, and increased emphasis on competition at all phases of a program's acquisition life cycle. All of these steps, I believe, will maximize the return on the taxpayer's investment dollar.

Under the oversight and direction of the Missile Defense Executive Board (MDEB), chaired by the Under Secretary of Defense for Acquisition, Technology and

Logistics (AT&L), MDA proposes a FY 2011 program that is balanced to achieve the six strategy and policy goals documented in the BMDR report:

- Defend the homeland against a limited ballistic missile attack
- Defend U.S. forces, allies, and partners against regional threats
- Deploy new systems only after effectiveness and reliability have been determined through testing under realistic conditions
- Develop new capabilities that are fiscally sustainable over the long term
- Develop flexible capabilities that can be adapted as threats change
- Expand international cooperation

Defense of the Homeland against Limited Attack

The Ground-based Midcourse Defense (GMD) system forms the foundation of our homeland missile defense against limited ICBM attack today. We continue to upgrade GMD to increase reliability and survivability and expand the ability to leverage new BMDS sensors as well as test GMD to accredit our simulations. Since the beginning of FY 2009, MDA has delivered five new GBIs, upgraded Fire Control and Command Launch Equipment software, completed construction of a second GBI missile field at Fort Greely, AK, and delivered a new silo and an additional In-Flight Interceptor Communication System Data Terminal at Vandenberg Air Force Base, CA. Additionally, we are completing the missile defense upgrades to the Upgraded Early Warning Radar (UEWR) in Thule, Greenland, and we have transferred operation of the Cobra Dane Early Warning Radar and the Beale, and Fylingdales UEWRs to the Air Force. We are continuing planning and design work to upgrade the Clear, AK Early Warning Radar.

We are requesting $1.3B in FY 2011 for GMD to continue our GBI refurbishment and reliability sustainment programs to: help sustain the fleet to 2032 and support a

service life extension decision around 2027; procure an additional 5 GBIs; complete Missile Field 2 in a 14-silo configuration to accommodate a contingency deployment of eight additional GBIs; upgrade GMD Fire Control ground system software to ensure GMD leverages BMDS increased discrimination and tracking capability as sensor, data fusion and battle management network matures; and complete the installation of a second GMD command and control node at Fort Greely, AK. Additionally, we will continue operations and sustainment of the Sea-Based X-band radar (SBX) platform to prepare for transfer of the SBX operations to the U.S. Navy in 2012. Finally, we will continue development of technologies to enhance Standard Missile 3 (SM-3) variants to protect our homeland in the future by having the capability to intercept long-range ballistic missiles early in flight in the regions from which they were launched. To validate this concept, the Under Secretary of Defense (AT&L) requested the Defense Science Board independently assess the viability of developing capability for early intercept of ICBMs. Our GMD sustainment, refurbishment and test strategy gives us the flexibility to adjust to the uncertainty in the future ICBM threat. Although, we experienced a GBI vendor production break after the last procurement of GBIs in 2006, the purchase of 5 additional GBIs, and supplying "limited life" GBI components for refurbishments will sustain our production capacity until 2016 and beyond. We will conduct stockpile surveillance of GBIs by testing all limited life components as GBIs are refurbished through 2032. Data collected from future GMD flight tests, results from the aging surveillance program, and future intelligence estimates regarding the pace of ICBM growth will inform decisions on the need to procure additional GBIs.

Defense against Regional Threats

Our FY 2011 budget request balances the war fighter's needs to develop new capabilities and grow our missile defense capacity. An integrated deployment of Aegis BMD and Terminal High Altitude Area Defense (THAAD) forms an effective, layered, regional missile defense. The Aegis BMD is a mobile system, designed to defeat short- to intermediate-range missiles above the earth's atmosphere, and the THAAD is a rapidly deployable system, designed to engage short- to medium-range missiles both above and within the Earth's atmosphere. Aegis has more than twice the engagement range of THAAD. Additionally, Patriot Advanced Capability 3 can add an additional layer and point defense against Short Range Ballistic Missiles (SRBMs).

We are developing regional missile defense elements that can be adapted to the unique circumstances of each Combatant Command region. For example, we plan to deploy missile defenses in Europe in four phases as missile threats from the Middle East evolve over time. The Phase 1 capability (planned to begin deployment in 2011) will provide initial protection for southern Europe from existing short- and medium-range threats using sea-based interceptors and forward-based sensors. Phase 2 (~2015) deploys the SM-3 IB interceptor at sea and at an Aegis Ashore site. In collaboration with OSD Policy, USSTRATCOM, the Department of State, and United States European Command (USEUCOM), we are preparing to begin negotiations with Romania to locate an Aegis Ashore site on its territory in 2015. Phase 3 (~2018) employs SM-3 IIA on land and at sea to protect NATO from SRBM, MRBM, and IRBM threats. Poland has agreed to host this Aegis Ashore site. The Phase 4 architecture (~2020 timeframe) features the higher velocity land-based SM-3 IIB, a persistent sensor

network, and enhanced command and control system to intercept large raids of medium- to long-range missiles early in flight.

Since the beginning of FY 2009, MDA has delivered 27 SM-3 Block IA interceptors and upgraded 3 additional ships (for a total today of 20 Aegis BMD ships); upgraded the USS Lake Erie with the next generation BMD fire control software that increases the number of threat missiles that can be simultaneously engaged and more effectively uses data from missile defense sensors external to the ship. We have also delivered two THAAD batteries (the first unit is planned to be operationally accepted by the Army by the end of this year). We have separately deployed one U.S.-operated X-band AN/TPY-2 radar to Israel on a contingency basis. We have also installed C2BMC hardware and software upgrades at command and control nodes at U.S. Pacific Command, USSTRATCOM, U.S. Northern Command and USEUCOM and began C2BMC installation in the U.S. Central Command.

We are requesting $1.6B for Aegis in FY 2011. We will continue the design, qualification, and testing of the SM-3 IB interceptor; manufacture 30 SM-3 IB test and production verification interceptors (we plan to procure a total of 436 Aegis SM-3 IA and IB interceptors by 2015), and upgrade 3 additional Aegis BMD engagement ships (two Aegis BMD 3.6.1 destroyers and one 4.0.1 destroyer) for a total of 23 BMD capable ships by the end of FY2011 and 38 BMD capable ships by 2015. We will continue development and testing of the Aegis BMD 4.0.1 and 5.0 fire control system to launch SM-3 IB and IA interceptors against threat missiles when they are beyond the range of the ship's own radar. We also will continue the co-development of the SM-3 IIA interceptor with the Government of Japan to increase significantly the area defended by

the Aegis BMD system with its 21-inch diameter rocket motors, two-color seeker, and increased kinetic warhead divert capability. We also will continue to design the first Aegis Ashore battery that will be installed for testing at the Pacific Missile Range Facility in 2012.

We are requesting $1.3B for THAAD in FY 2011. We plan to deliver the second THAAD battery (we plan to procure 6 batteries by 2015), add a second launcher platoon to each battery to double the firepower to 48 interceptors, procure 67 interceptors (we plan to procure a total of 431 interceptors by 2015), and complete hardware and software upgrades to the communications suite to enable THAAD to use fused data from all BMDS sensors.

We are requesting $455M for sensors in FY 2011. We plan to upgrade the AN/TPY-2 radar software to facilitate its use as a surveillance radar or as a THAAD battery fire-control radar, optimize the radar's ability to leverage assistance by external sensors, and support the contingency operations of AN/TPY-2 radars deployed in Japan and Israel. We will continue to develop a Concurrent Test, Training and Operations capability to provide operational BMDS sensors (including the UEWRs, Cobra Dane and Sea-Based X-band radars) the capability to conduct training and testing while continuing to provide on-line missile defense, upgrade AN/TPY-2 and Sea-Based X-band radar discrimination and dense track management software, and conduct ground and flight testing to support accreditation of sensor models and simulations.

We are requesting $343M for Command and Control, Battle Management and Communications (C2BMC) in FY 2011. We plan to provide automated planners to aid a Combatant Command's deployment of BMD assets according to its concept of

operations and conduct ballistic missile defense battles according to its tactics, techniques, and procedures. Furthermore, we will develop and deploy an upgraded version of our C2BMC hardware and software to provide new battle management functions that enable shoot-look-shoot tactics between layers of U.S. and international partners' missile defense assets, control multiple BMDS radars, correlate and combine sensor data from multiple sensors tracking the same threat into one system track, provide real-time awareness of the battle as it develops in accordance with a Combatant Command's concept of operations, and enable engagement coordination among BMDS elements in accordance with regional Area Air Defense Plans. Additionally, C2BMC will participate in and analyze results of ground and flight tests to support accreditation of models and simulations and support war games and exercises.

MDA played a significant role in the conduct of the Ballistic Missile Defense Review. The agency provided technical analysis and data as required by the leaders of the review to support their effort to answer the questions posed by Congress. Preliminary analytical results were then presented to the departmental leaders, including the Secretary and Chairman, who then made recommendations to the President. Although MDA provided these architecture assessments, it is important to recognize the decision to deploy the recommended European PAA architecture was not based solely on detailed performance predictions. Rather, the decision to deploy an Aegis SM-3-based architecture to Europe was based on the need for a flexible defense against an uncertain threat. First, the previously proposed European missile defense architecture lacked a sufficient number of interceptors to defend against the current and emerging numbers of medium-range ballistic missiles (MRBMs) being fielded by Iran.

Simply put, with a notional two interceptor shot doctrine, the 10 GBI interceptors proposed for Poland would easily be overwhelmed by a raid size of 6 threat missiles launched towards European targets. Second, with the European PAA, we can deploy a missile defense capability to Europe earlier than the previous Program of Record, with GBIs in Poland and an X-Band Radar in the Czech Republic. NATO Europe is threatened by a short-range and medium-range ballistic missile threat now, so this was an important variable in the decision. Upon the completion of testing in 2011, we could begin the deployment of proven capabilities to defend against the MRBM threat. Third, by creating a re-locatable, land-based version of our most capable regional missile defense system, the Aegis Ballistic Missile Defense (BMD) system, Combatant Commanders could have the capability to adjust their missile defense architectures to address the uncertainty of future missile threats without the need to develop a new missile defense system. These systems can be deployed in any theater in a reasonably short period of time. Fourth, the increased defended areas and larger raid size capacity resulting from planned enhancements to the Aegis BMD system are expected to increase the cost-effectiveness of a European missile defense against the growing missile threat over this decade. Finally, while we currently have a limited defense system against potential Intercontinental Ballistic Missile (ICBM) threats originating in the Middle East or Northeast Asia, there is no technical reason to indicate that this system would not be further enhanced by the deployments envisioned in Phase 4 of the PAA. It is important to note that the missile defense capability needs identified in the BMDR are consistent with capability needs listed in the recently approved,

independently developed, classified USSTRATCOM missile defense Prioritized Capability List.

Proving the Ballistic Missile Defense System Works

A key tenet of the BMDR is to sufficiently test the capabilities and limitations of a missile defense system before we begin procurement, or we will "fly before we buy." As such, missile defense projects are subject to production decisions by USD (AT&L). Additionally, we use the Services' standard material release and operational certification processes that also rely on developmental and operational test data prior to formally fielding initial capability. Both THAAD and AN/TPY-2 have production decisions by USD (AT&L) and Army Material Review Boards planned for this year. We are requesting $1.1B in FY 2011 to provide targets and support to missile defense projects to test new capabilities under developmental and operational conditions, including the use of actual threat missiles, to support accrediting our models and simulations and production decisions by USD (AT&L). In collaboration with the Services' Operational Test Agencies, USSTRATCOM, and the Director, Operational Test & Evaluation, we submitted a comprehensive Integrated Master Test Plan (IMTP) in March that describes our plan through FY 2015 to conduct over 150 test events to obtain specific data necessary to accredit our models and simulations and support operational assessments. The IMTP also describes our testing to support European PAA deployment decisions. To support a Phase 1 decision in 2011, we have completed 10 Aegis BMD intercept tests of short range targets. We will conduct an Aegis BMD test against an intermediate-range ballistic missile target prior to the Phase 1 deployment. Likewise, there are system level ground tests, exercises, and simulations to test system

effectiveness and interoperability. The IMTP also describes our testing of the two-stage GBI and several GMD intercept tests against long-range targets. I concur with the January 2010 DOT&E January assessment that "if MDA can execute the IMTP as planned, successful VV&A of BMDS models and simulations should result, enabling quantitative and objective rather than subjective assessments of the BMDS capability in the future." I further agree with the DOT&E conclusion that "objective assessments of the BMDS capability are still a number of years in the future."

Our recent flight test results have been mixed. From October 2008 through today MDA achieved 5 of 7 successful hit-to-kill intercepts and a number of "firsts" in BMDS testing. In December 2008, the GMD system engaged an IRBM target launched from Kodiak Island, AK, using a GBI launched from VAFB in the most operationally realistic test to date that demonstrated our ability to fuse sensor data from five on-line sensors. Unfortunately, the target in that flight test failed to release countermeasures. In March 2009, with soldiers operating the system using tactics, techniques, and procedures developed by the U.S. Army, we conducted THAAD's first dual salvo endo-atmospheric engagement of a threat-representative separating ballistic target. The Navy conducted an intercept using an Aegis SM-2 Block IV (terminal defense) in February 2009, and we conducted an SM-3 IA intercept in July 2009. In October 2009, we supported Japan's intercept test of an SRBM using the Japanese destroyer JS MYOKO.

Although we have had three intercepts out of three previous attempts using the GMD system, our newest variant of the kill vehicle, relying on data from the Sea-Based X-band (SBX) radar, failed to intercept a target in January 2010 during a flight test to

measure GMD's performance at its maximum operational intercept range. The GBI launched successfully from VAFB and the newly designed LV-2 long-range target successfully flew for the first time out of the Reagan Test Site in the Kwajalein Atoll 7,500 km away. It was a very valuable test because we collected extensive data on the performance of the SBX and GBI, the advanced exo-atmospheric kill vehicle (EKV), and the target. We discovered new failure modes for the SBX, the EKV flew more than twice the distance it had flown in previous tests, and we collected significant new data on the EKV's ability to acquire, track, and discriminate the target. The failure investigation is expected to continue for several more months before root-cause is determined and verified. It is my intent to immediately correct any deficiency and repeat the test as soon as feasible. In contrast, the most recent attempt to conduct a THAAD test last December was of no value because of a target missile failure. The THAAD interceptor was not launched and the system was not exercised. Despite the cost of more than $40M for that test and subsequent program delays, we gained no new information on the performance of the THAAD system.

The two largest challenges to executing the U.S. missile defense program is acquiring a cost effective set of reliable targets and improving quality control. Over the past year we have initiated steps to acquire a new set of targets of all ranges, including Foreign Material Acquisitions, to verify the performance of the BMDS. Our new target acquisition strategy, initiated in FY 2009, procures targets in production lots to increase competition, quality control, reduce costs, and ensures the availability of backup targets starting in 2012. For the next three years, we must continue to rely on an intensive inspection and oversight process to motivate mission assurance.

Due to the precise nature of the operation of missile defense systems, very high standards of quality control and an enduring culture of disciplined mission assurance by the industry workforce is essential. We have had many successes in improving our prime contractor and supplier quality assurance. In each case, companies have been willing to identify shortfalls, invest in new capital assets and attain experienced leadership in changing cultures to establish the enduring discipline required to consistently deliver precision missile defense products. However, not all companies have sufficiently improved. Until we complete planned competitions, including the greater use of firm fixed price contracts, we will have to motivate greater attention by senior industry management through intensive government inspections, low award fees, the issuance of cure notices, stopping the funding of new contract scope, and documenting inadequate quality control performance to influence future contract awards by DoD.

Hedging against Threat Uncertainty

Missile defense technologies must be developed to adapt and upgrade our systems to counter future changing threats. In accordance with the PCL, we are focusing our future technologies in four areas: 1) developing more accurate and faster tracking sensors on platforms to enable early fire control solutions and intercepts; 2) developing enhanced command and control networks to link and rapidly fuse sensor data to handle large raid sizes of missile threats; 3) developing a faster, more agile version of our SM-3 interceptor to destroy long-range missiles early in flight; and 4) developing discrimination techniques to rapidly resolve Reentry Vehicles from other nearby objects. Additionally, we continue to research technologies for destroying boosting missiles with

directed energy. We are developing more mature technologies for mid-term deployment decisions around 2015 and conducting science and technology experiments for far-term (around 2020) advanced capability deployment decisions.

One of the highest priority capabilities requested by the war fighter community is a persistent and precise missile tracking capability. We are requesting $113M in FY 2011 for the Space Tracking and Surveillance System (STSS) and Near Field Infra-Red Experiment satellite operations. This space operations work will demonstrate the utility of remote missile tracking from space and reduce the risk of integrating the remote tracking data of future satellites into missile defense fire control systems. MDA launched two STSS demonstration satellites on 25 September 2009. We continue testing and operating the two demonstration satellites, including cooperative tests with other BMDS elements, and demonstrating these satellites against targets of opportunity and scheduled tests involving targets. We are also requesting $67M in FY 2011 for a new program start, the Precision Tracking Space System (PTSS), comprised of a network of remote tracking satellites, communications, and ground stations. Key attributes of the PTSS are its limited mission, uncomplicated design, lower costs, use of mature technologies, and integration with legacy data management and control systems to provide a persistent remote missile tracking capability of the areas of the earth that are of most concern for missile defense. Lessons learned from the two STSS demonstration satellites currently on orbit will inform decisions on the development of a prototype PTSS capability by the end of 2014. After validating the prototype design in ground testing in 2014, we plan to fly the first prototypes while we have industry teams compete to produce the remaining satellite constellation for initial constellation operations by 2018.

We are also requesting $112M for FY 2011for the development and testing of a remotely piloted vehicle (RPV) based missile tracking sensor system, or Airborne Infrared (ABIR) sensor system, to track large raids of ballistic missiles early in flight. We are completing an analysis of the optimum RPV platform and sensors to integrate into an effective early missile tracking system.

For FY 2011, we are requesting $52M for C2BMC enhancements to develop a net-centric, Service-oriented architecture, to rapidly fuse sensor data and provide data to distributed fire control systems to intercept enemy reentry vehicles early, optimize shoot-look-shoot opportunities, and economize the number of interceptors required to defeat a raid of threat missiles. We are pursuing enhanced C2BMC capabilities and experiments to integrate interceptor fire control systems with ABIR, STSS, and other new sensor technologies. We work closely with USSTRATCOM and the COCOMs to develop and deliver the optimum C2BMC architectures in their regions.

We are requesting $41M in FY 2011 to develop components that increase the speed of our SM-3 family of interceptors with advanced divert capability, faster boosters, and lighter kill vehicles. We are studying the use of a derivative SM-3 IB kill vehicle and derivatives of the first and second stages of the SM-3 IIA interceptor as part of the development of the SM-3 IIB long-range missile interceptor.

We are requesting $99M for FY 2011 to conduct continued research on high energy lasers. This past year we saw the significant accomplishments of the Airborne Laser Test Bed (ALTB) as it completed preparatory tests which ultimately led to two successful and historic experimental shoot-downs of a solid rocket on February 3, 2010, and a boosting, liquid-fueled, Foreign Material Acquisition (FMA) target on February 11,

2010. We are preparing for another test against an FMA, at nearly twice the distance, later this spring. We will continue to investigate multiple high energy laser technologies to characterize their performance while validating the modeling and simulation of long range directed energy beam propagation and beam control. Additionally, we are currently supporting the USD (AT&L)/Director for Development, Research and Engineering (DDR&E) comprehensive review of all DoD high energy laser programs to establish a department wide program for developing and applying high energy laser capabilities. We anticipate this review will define the ALTB's role in the future development of high energy lasers.

Develop New, Fiscally Sustainable Capabilities over the Long Term

MDA's preferred approach to developing new missile defense capabilities is to evolve and upgrade existing capabilities to leverage the cost-effectiveness of utilizing existing Service training, personnel and logistics infrastructures. The fiscal sustainability of missile defense systems is largely determined by the cost of operations and sustainment. Therefore, MDA executes "hybrid management" of projects with the designated lead Services by embedding "Service cells" in MDA joint project offices to make design and development decisions associated with Doctrine, Organization, Training, Logistics, Personnel and Facilities (DOTLPF) to assure MDA products efficiently align with Service processes and operational concepts.

MDA has established six baselines (cost, schedule, technical, test, contract, and operational baselines) to plan and manage the execution of missile defense projects. I approve the baselines of technology programs, but jointly approve with lead Service Acquisition Executives the baselines of MDA projects in product development. These

baselines not only assist in our cost-effective management of MDA projects, but also provide visibility to the MDEB and Congress on the progress of our execution. The baselines of all of our projects are established in spring and will be submitted to Congress in a Baseline Acquisition Report (BAR) in June. Finally, these baselines will form the basis for USD (AL&T) production decisions.

Expand International Missile Defense Cooperation

As stated in the BMDR and Quadrennial Defense Review (QDR), a key strategic goal is to develop the missile defense capacity of our international partners. We are currently engaged in missile defense projects, studies and analysis with over twenty countries. Our largest international partnership is with Japan. We are co-developing the SM-3 IIA missile, studying future architectures, and supporting their SM-3 IA flight test program. In Europe, we are participating in the NATO Active Layer Theater Ballistic Missile Defense (ALTBMD) command and control program and war games, continuing technology research projects with the Czech Republic, and planning for the European PAA deployments, which include the installation of Aegis Ashore sites, one each in Romania and Poland. Collaboration with Israel has grown to involve the development and deployment of the Arrow Weapon System, which is interoperable with the U.S. missile defense system. MDA has completed and the United States is now in the final negotiation of an Upper Tier Project Agreement with Israel for cooperative development of an exo-atmospheric interceptor and amending the US-Israel Arrow Weapon System Improvement Program agreement to extend the system's battle space and enhance its ability to defeat long-range ballistic missiles and countermeasures. MDA and Israel are also jointly developing the David's Sling Weapon System to defend against shorter

range threats, to include some ranges that the PAC-3 system cannot engage. Additionally, MDA is active in supporting the Combatant Commands through international symposiums, bi-lateral and multi-lateral dialogs, planning, and analysis with Allies and international partners to help them understand the benefits of integrated missile defense in their regions.

Conclusion

Missile defense is a key part of our national security strategy described in the BMDR to counter the growing threat of ballistic missile proliferation. The New START Treaty has no constraints on current and future components of the BMDS development or deployment. Article V, Section 3 of the treaty prohibits the conversion of ICBM or SLBM launchers to missile defense launchers, and vice versa, while "grandfathering" the five former ICBM silos at Vandenberg AFB already converted for Ground Based Interceptors. MDA never had a plan to convert additional ICBM silos at Vandenberg and intends to hedge against increased BMDS requirements by completing construction of Missile Field 2 at Fort Greely. Moreover, we determined that if more interceptors were to be added at Vandenberg AFB, it would be less expensive to build a new GBI missile field (which is not prohibited by the treaty). Regarding SLBM launchers, some time ago we examined the concept of launching missile defense interceptors from submarines and found it an unattractive and extremely expensive option. As the committee knows, we have a very good and significantly growing capability for sea-based missile defense on Aegis-capable ships.

Relative to the recently expired START Treaty, the New START Treaty actually reduces constraints on the development of the missile defense program. Unless they

have New-START accountable first stages (which we do not plan to use), our targets will no longer be subject to START constraints, which limited our use of air-to-surface and waterborne launches of targets which are essential for the cost-effective testing of missile defense interceptors against MRBM and IRBM targets in the Pacific area. In addition, under New START, we will no longer be limited to five space launch facilities for target launches.

MDA is working with the Combatant Commanders, Services, other DoD agencies, academia, industry and international partners to address the challenges and difficulties of managing, developing, testing and fielding new military capabilities to deter use of ballistic missiles and effectively destroy them once launched. Implementing these war fighter priorities takes time, since the production time for a missile and radar is over two years and establishing and training a unit to create and deploy a military capability takes an additional year. Our FY 2011 budget funds the war fighters' near-term priorities while building the foundation of a layered defense system with our partners and friends that can provide an adaptive, cost-effective strategy to counter ballistic missile proliferation in the future.

Thank you, Mr. Chairman. I look forward to answering your questions.

STATEMENT

BY

J. MICHAEL GILMORE

DIRECTOR, OPERATIONAL TEST AND EVALUATION

OFFICE OF THE SECRETARY OF DEFENSE

BEFORE THE

HOUSE ARMED SERVICES COMMITTEE

STRATEGIC FORCES SUBCOMMITTEE

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U.S. HOUSE OF REPRESENTATIVES
HASC – APRIL 15, 2010

J. Michael Gilmore
Director, Operational Test and Evaluation (DOT&E)
Office of the Secretary of Defense

Chairman Langevin, Congressman Turner, distinguished Members of the Committee, thank you for the opportunity to discuss the Ballistic Missile Defense System, or BMDS, its test program, recent results, and challenges. I will focus my remarks in three areas:

First, my assessment of current missile defense programs, the details of which are in my annual report submitted to you on February 12th;

Second, the major events from last year that will shape the course of future BMDS testing; and

Finally, the challenges to BMDS test and evaluation.

Current missile defense programs

Ground-based Midcourse Defense, or GMD, has not yet attempted an intercept of an intercontinental ballistic missile target. The intercept flight tests it has conducted on intermediate range missiles have been conducted under a limited set of operationally-realistic engagement parameters.

GMD flight test FTG-05, conducted in the first quarter of Fiscal Year 2009, was the third successful intercept using the currently fielded operational capability. It was the first flight test requiring the GMD fire control to correlate multiple sensor inputs and supply a weapons task plan to the exo-atmospheric kill vehicle. FTG-06 was conducted in January 2010; it was the first flight test of an

interceptor equipped with the Capability Enhancement II (CEII) Exo-atmospheric Kill Vehicle and was meant to demonstrate the use of the sea-based X-band radar to perform tracking and discrimination. The intercept attempt failed for reasons that the MDA continues to investigate.

Aegis Ballistic Missile Defense, or Aegis BMD, has demonstrated that it can detect, track, and engage simple non-separating and separating short range ballistic missiles (those with ranges below about 1000 kilometers). Using Aegis BMD 3.6 hardware and software and SM-3 Block IA hit-to-kill interceptors, Aegis BMD has demonstrated it is operationally effective for performing midcourse intercept of short-range ballistic missiles. Additionally, follow-on operational testing of Aegis BMD 3.6.1 hardware and software demonstrated Aegis BMD's capability to engage simple short range ballistic missiles in the terminal phase with modified SM-2 Block IV warhead interceptors.

During 2009, Aegis BMD completed two U.S. flight tests, Stellar Daggers and FTM-17. The two tests addressed midcourse-phase and terminal-phase engagement capabilities for Aegis BMD 3.6.1. Stellar Daggers performed a simultaneous engagement of a short range ballistic missile in the terminal phase of flight with a modified SM-2 Block IV interceptor, and a cruise missile target with a SM-2 Block IIIA interceptor. FTM-17 completed the planned follow-on operational test and evaluation flight testing phase for Aegis BMD 3.6.1. It also provided a venue for regression testing of midcourse-phase engagement capability following the upgrade from Aegis BMD 3.6 to Aegis BMD 3.6.1. The latter

introduced the capability for terminal intercepts and merged anti-submarine warfare functionality into the system software.

The *Terminal High Altitude Area Defense, or THAAD*, has demonstrated the ability to detect, track, and engage unitary and simple separating short-range ballistic missiles. In six flight tests, THAAD intercepted four of four unitary short range ballistic missiles, and two of two simple separating short range ballistic missiles. One flight test demonstrated a salvo engagement of two THAAD interceptors against a single threat, consistent with plans for actual tactical operations. THAAD has also demonstrated a capability to intercept threat missiles both inside and outside the atmosphere, the only BMDS element specifically designed with this capability. Although THAAD has demonstrated the ability to detect, track, and successfully engage a target exhibiting medium-range, ballistic missile characteristics, it has not yet been tested against a true medium range ballistic missile.

During 2009, THAAD conducted flight tests FTT-10a and FTT-11. In March, THAAD successfully completed FTT-10a, a salvo of two THAAD interceptors against a single separating short range ballistic missile. The MDA "cold conditioned" the first THAAD interceptor before the test to simulate operations in a cold environment. The test was a combined developmental and operational test, with minimal contractor involvement. FTT-10a was also a BMDS-level test, with Aegis BMD providing a cue to THAAD as part of the engagement. In December, THAAD attempted FTT-11, an exo-atmospheric

intercept of a complex separating short range ballistic missile. The target, planned as an air launch from a C-17 cargo aircraft, had a relatively low infrared signature and radar cross section. This was the first flight test to include all major tactical software builds planned for initial deployment, including radar advanced discrimination algorithms. Unfortunately, after the target was released from the C-17, it failed to deploy properly and was lost. DOT&E is assessing the extent to which the data that would have been collected during this test can be collected during subsequent testing.

Command, Control, Battle Management, and Communications, or C2BMC, has demonstrated the ability to command and control the AN/TPY-2 X-band radar in its forward-based mode, and provide track data to other BMDS elements for engagement support (GMD) and simulated launch-on engagements (Aegis BMD). C2BMC has provided situational awareness information to military command authorities during all three GMD flight tests. During the past two years, C2BMC has demonstrated Aegis BMD launch on Aegis BMD cueing in three ground tests, and simulated Aegis BMD launch on AN/TPY-2 cueing in four ground tests and two flight tests. THAAD does not currently have a launch-on-remote capability which will require modifications to the THAAD fire control software to achieve.

Major events

In the first quarter of Fiscal Year 2009, the MDA implemented an evaluation-based strategy for testing the BMDS, an approach that DOT&E has

been advocating for the past several years. This approach emphasizes testing under so-called Critical Engagement Conditions (CECs), and collecting the data on system performance under those conditions necessary to verify, validate, and accredit, or VV&A, the BMDS models and simulations to be used to assess overall BMDS capability. The MDA codified this approach in an Integrated Master Test Plan (IMTP) that documents their planned testing through the period spanning the Future Years Defense Program. The MDA staff, staff from the Combatant Commands, and the BMDS Operational Test Agency participated in developing the IMTP, as did staff from DOT&E.

In August 2009, when the President announced the phased, adaptive approach for the defense of Europe, MDA initiated a revision of the IMTP to incorporate the testing needed to support implementation. This four-phased approach uses Aegis BMD and forward-based sensors to defend Europe from short, medium, intermediate, and intercontinental range ballistic missiles as Aegis BMD evolves with increasing capability. While the MDA has adequately demonstrated current Aegis BMD capability to defeat short range ballistic missiles, the MDA test program has not yet demonstrated current Aegis BMD capability to defeat medium or intermediate range ballistic missiles. The MDA must successfully complete flight tests against these longer-range threats to demonstrate ballistic missile defense of Europe.

The revised IMTP, approved jointly by DOT&E and the MDA this past February, incorporates such tests. Phase 1 of the IMTP is the most detailed, as it

concentrates on testing and fielding near term defenses by the end of 2011. Both Aegis BMD and THAAD will conduct flight tests to demonstrate capability against intermediate and medium range ballistic missiles respectively. The MDA will also conduct ground testing of the command, control, and communications required to support Phase 1 implementation. U.S. European Command is working to develop the operations concept and the tactics, techniques, and procedures that will be used during these ground tests.

One other noteworthy event occurred recently. The Airborne Laser, now designated the Airborne Laser Test Bed, successfully engaged a boosting, threat-representative short range ballistic missile. This accomplishment demonstrates that it is technologically possible to "shoot down" a boosting, ballistic missile using a laser carried on a large aircraft. The program had to overcome difficult technological challenges, such as the effects of the atmosphere on the laser beam and the difficulty of holding the laser on the desired aim-point sufficiently long to cause the threat missile to fail. However, the engagement was not an operational test conducted under operationally-realistic conditions using an aircraft that is fully ready to conduct combat operations. For example, the Active Ranging System (ARS), a precision laser ranging system that is a key component of the detection and tracking system, was not available for the test. To compensate, the aircrew utilized the aircraft's Wide Area Surveillance System as well as a priori knowledge of the threat missile launch location, timing, and aim point; this approach generally could not be used during combat. The incorporation of the

ARS and numerous other capabilities would be necessary before the Airborne Laser could be evaluated for operational effectiveness, operational suitability, and survivability when performing missile defense. The Airborne Laser would need to incorporate a laser with sufficient power to successfully engage, at operationally realistic standoff ranges and without a priori knowledge, a variety of threat missile types using countermeasures designed to defeat laser effectiveness. It must demonstrate reliability, availability, and maintainability, particularly during missions performed from deployed locations. It must also implement basic survivability features, including self-protection systems and airframe modifications, to reduce the effects of damage caused by anti-aircraft weapons. If the Department should determine at a future time that it is appropriate to develop and field an Airborne Laser system, an extensive program of additional developmental testing culminating in realistic operational testing would be needed.

Challenges to future BMDS testing

Targets

Terminal High Altitude Area Defense (THAAD) flight testing has experienced target failures. The one flight test completed in 2009 was a successful repeat of a flight test first attempted in September 2008 that suffered a target failure. The second flight test attempted in 2009 also ended with a target failure. When the targets have flown successfully, THAAD has successfully intercepted and destroyed them. These target failures have prevented THAAD from

progressing to flight testing against threat-representative medium range ballistic missiles.

GMD also has experienced target failures. Flight test FTG-03a was a repeat of FTG-03 that suffered a target failure. The target used for flight test FTG-05 did not deploy the associated objects needed to accomplish important test objectives. The MDA delayed flight test FTG-06 due primarily to readiness issues associated with the first-time flight of a new longer-range target. This new target flew nominally and correctly deployed its associated objects when FTG-06 was flown this past -January.

The MDA recognizes that its targets are very complex. This complexity is a key factor contributing to the failures that have occurred. Such failures may well be a fact of life for several more years until the MDA can transition from using its legacy targets and field a new set of more reliable targets.

Executing the IMTP

The IMTP is a rigorous plan for obtaining the test information needed to assess BMDS performance quantitatively. However, I am concerned that it is success-oriented with limited schedule flexibility and no incorporation of repeat, or backup, tests to compensate for test failures. The ripple effects of a test failure, such as the recent GMD flight test FTG-06, can be significant. An Aegis BMD test failure in the next year could affect the full implementation and assessment of Phase 1 of the phased, adaptive approach for the defense of Europe, as Aegis

BMD would not have demonstrated capability against the longer-range threats that might need to be countered in that timeframe.

Test complexity

Realistic BMDS testing is difficult. Assessing the capability of each phase of the phased, adaptive approach will require some of the most complex testing ever attempted by the Department of Defense. The majority of the testing is planned to be conducted on the Pacific test ranges. The MDA will be challenged to replicate realistic radar acquisition and intercept geometries in the Pacific. In addition, testing of the command and control linkages and systems to be used for the first phase of European missile defense will have to be conducted using ground testing in the theater and surrogate testing elsewhere concurrent with development and implementation. Executing the first operationally-realistic combined test of Aegis BMD, THAAD, and Patriot in 2012 will tax MDA's capabilities for test planning and execution. In particular, performing the planning and marshalling the resources necessary to handle the safety requirements associated with what could be as many as ten missiles --- both targets and interceptors --- in flight nearly simultaneously will be a substantial challenge, as will executing the actual test.

Conclusion

The ability to conduct comprehensive and objective assessments of BMDS capability is still a number of years away. If the MDA can execute the revised

IMTP, the data needed to validate models and perform quantitative assessments of BMDS performance will become available. However, it will take as many as five to seven years to collect those data.

This concludes my remarks and I welcome your questions.

DOCUMENTS SUBMITTED FOR THE RECORD

APRIL 15, 2010

MICHAEL R. TURNER
3RD DISTRICT, OHIO

COMMITTEE ON ARMED SERVICES
RANKING MEMBER
SUBCOMMITTEE ON
STRATEGIC FORCES

COMMITTEE ON OVERSIGHT AND
GOVERNMENT REFORM

ASSISTANT MINORITY WHIP

Congress of the United States
House of Representatives
Washington, DC 20515

1740 LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-6465

DISTRICT OFFICES:

120 WEST 3RD STREET
SUITE 305
DAYTON, OH 45402
(937) 225-2843

61 EAST MAIN STREET
WILMINGTON, OH 45177
(937) 383-8831

April 15, 2010

Lt. Gen. Patrick O'Reilly
Director, Missile Defense Agency
7100 Defense Pentagon
Washington, DC 20302-7100

Dear Lt. Gen. O'Reilly:

In our classified briefing yesterday you agreed that there was additional information which should be provided to Congress for the evaluation of the Administration's Phased Adaptive Approach (PAA) to missile defense. Specifically, I am concerned that the portions of the proposed system that are intended to protect the mainland United States are not yet defined to support sufficient evaluation of its merits and the resources necessary to implement it.

Details such as system and inventory requirements, research and development milestones, independent assessments, technology maturity levels, coverage and performance analysis, program schedules, acquisition strategies, cost estimates, deployment plans, timelines for host nation agreements, operational plans, and NATO integration plans, would be vital to supporting such an evaluation. Also, the options considered and how those options were assessed would also be important information for Congress to review. However, as the missile defense acquisition expert, I seek your judgment and input on what information you believe is necessary for Congress to conduct its oversight and evaluation of the PAA.

As Iran continues to represent an emerging threat, Congressional oversight and evaluation of the Administration's proposal is imperative. Further, since the Administration scrapped a plan that would have provided missile defense coverage for the mainland United States, the Administration's proposal should be evaluated within the context of the missile defense protection provide to the United States mainland. Congress must be confident that the PAA is the best approach for increasing the protection of the mainland United States; but to have this confidence requires information.

I look forward to your diligence in providing such information as necessary for this evaluation.

Sincerely,

Michael R. Turner
Member of Congress

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

APRIL 15, 2010

QUESTIONS SUBMITTED BY MR. LANGEVIN

Mr. LANGEVIN. The BMDR notes that defense of the homeland may be aided by the development of new technologies and concepts. These include intercepting long-range missiles early in their flight, launching interceptors based on remote sensor information, and strengthening ballistic missile sensors. Specifically, this might include launching SM–3 Block IIB missiles "which should provide some capability to intercept long-range missiles" by 2020. MDA will continue development and assessment of a two-stage GBI, including a flight test planned for June 2010, and research on the potential of directed energy systems for missile defense. With the exception of continued development and testing of the two-stage GBI, new technologies for homeland defense are at the concept development stage. Continued development of the 2-stage GBI is meant as a hedge in case the SM–3 Block II missile, intended for Europe, encounters significant developmental delays.

Secretary Roberts, can you describe how the Ballistic Missile Defense Review was shaped by, and provides guidance for, the contingency that either North Korea or Iran, or both, more rapidly develop ICBM-type systems?

Dr. ROBERTS. The United States is currently protected against the attacks that North Korea or Iran would be able to launch if they were to develop an ICBM capability. This protection is a result of investments made over the past decade in a system based on ground-based midcourse defense (GMD). Because of continuing improvements in the GMD system and the number of ground-based interceptors now deployed, compared to potential North Korean and Iranian long-range ballistic missile capabilities, the United States possesses a capability to counter the projected threat from North Korea and Iran for the foreseeable future.

Preserving this capability as these threats continue to develop is essential. Toward that end, the Administration is continuing to sustain and improve the GMD system through a variety of means, including a rigorous flight-testing program. The United States is also pursuing several other hedging strategies to maintain the currently favorable position over the long term. For example, the United States will continue development and assessment of a two-stage ground-based interceptor. We will also pursue multiple paths to develop and deploy ballistic missile sensors, including both airborne and space-based detection and tracking systems. Although the Airborne Laser (ABL) program has been restructured, the Department will continue to research the potential of directed energy systems for missile defenses, including the establishment of a directed energy research program inside MDA.

The Department also plans to complete the construction of Missile Field 2 in Fort Greely, Alaska to a 14 silo configuration and to decommission Missile Field 1. (Missile Field 1 was designed as a test bed only and was not built to current operational specifications and is not sufficiently reliable for long-term operational deployment.) These improvements will provide a reserve capability to deploy rapidly up to 8 additional GBIs from the pool of interceptors currently designated for testing. Although the Department does not currently foresee a need for more than 30 deployed GBIs, eight extra operational silos will provide an additional hedge against future uncertainty.

Mr. LANGEVIN. Secretary Roberts, can you explain why the Department decided to complete all 14 GMD silos in Missile Field 2 at Ft. Greeley, Alaska when the original plan announced with the budget last year was to stop construction on the missile field? Is there a specific development which motivated the Department to adopt this hedge strategy?

Dr. ROBERTS. The completion of all 14 silos in Missile Field 2 provides a reserve capability to deploy up to eight additional GBIs from the pool of interceptors currently designated for testing. Although the Department does not currently foresee a need for more than 30 deployed GBIs, these extra operational silos provide an additional hedge against future threat uncertainty.

Missile Field 2, currently under construction at Fort Greely, is planned for a 14 silo configuration and will be available for GBI emplacements by the end of FY 2012. Once Missile Field 2 is completed and fully available for emplacing GBIs, we plan to transfer six GBIs currently deployed in Missile Field 1 to Missile Field 2 and to decommission Missile Field 1. Missile Field 1 was designed as a test bed only

and was not built to current operational specifications and is not sufficiently reliable for long-term operational deployment.

Mr. LANGEVIN. According to the BMDR, the Administration plans to tailor its Phased, Adaptive Approach to other regions such as East Asia and the Middle East. These "regional missile defense architecture" plans are still in development, so the inventory and resources requirements for Aegis BMD ships, SM–3 interceptors, THAAD, Patriot and further host nation/basing support are not certain. Recognizing the "regional demand for U.S. BMD assets is likely to exceed supply for some years to come," the Joint Staff and STRATCOM are developing "a comprehensive force management process."

Secretary Roberts, the new Phased, Adaptive Approach (PAA) to missile defense is likely to have significant force structure implications—have these requirements been quantified yet?

Dr. ROBERTS. The Department will rely on the Global Force Management process to assist in decisions on the allocation of missile defense forces among the geographic combatant commands.

This process adjudicates competing requirements for missile defense assets from the various combatant commands. The requirement to allocate scarce resources underscores the value of developing capabilities that are flexible, adaptive, and relocatable, so that they can be surged into troubled regions in times of political-military crisis.

It is important to note that the Phased, Adaptive Approach (PAA) is an approach to regional missile defense that will be adjusted continuously as risks and threats evolve, and as such, there is no final architecture or a specific set of force structure requirements for each region. The guidance from the Ballistic Missile Defense Review (BMDR) will help to inform combatant command requests for missile defense assets and guide the Global Force Management adjudication process for addressing competing requests.

Mr. LANGEVIN. In 2007, the Joint Capabilities Mix Study II, approved by DOD's Joint Requirements Oversight Council, concluded that combatant commanders required at least twice as many SM–3 and THAAD interceptors as were planned at the time. General O'Reilly, are you confident that the President's Budget contains sufficient resources to procure new SM–3 and THAAD interceptors to meet predicted inventory needs of the PAA?

Dr. ROBERTS. The Joint Staff is leading a review which includes an examination of how the Global Force Management process will incorporate the updated missile defense policy and planning guidance contained in the Ballistic Missile Defense Review. The review will be completed in the summer of 2010. Additionally, the Joint Capability Mix–3 study will determine inventory levels of BMD assets by spring 2011.

Mr. LANGEVIN. How might the regional plans for the Middle East and East Asia affect requirements for BMD ships, batteries, and interceptors?

Dr. ROBERTS. The Department will rely on the Global Force Management process to assist in decisions on the allocation of missile defense forces among the geographic combatant commands.

This process adjudicates competing requirements for missile defense assets from the various combatant commands. The requirement to allocate scarce resources underscores the value of developing capabilities that are flexible, adaptive, and relocatable, so that they can be surged into troubled regions in times of political-military crisis.

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Mr. LANGEVIN. Secretary Roberts, given the fact that regional demand for U.S. BMD assets is likely to exceed supply for some years to come," when do you think that the comprehensive force management process be completed to allocate these scarce resources?

Dr. ROBERTS. The Joint Staff is leading a review of the current Global Force Management process to incorporate updated missile defense policy and planning guidance contained in the Ballistic Missile Defense Review. The review will be complete in the summer of 2010. Additionally, the Joint Capability Mix–3 study will determine inventory levels of BMD assets by spring 2011.

There is no final configuration for the system. It is clear that an effort to match one-for-one the potential deployments of short-range missiles within the regions would be prohibitively expensive. Accordingly, the United States must pursue a

comprehensive approach to risk management. Missile defenses are an essential element of the U.S. commitment to strengthen regional deterrence architectures against states acquiring nuclear weapons and other weapons of mass destruction in contravention of international norms and in defiance of the international community.

Mr. LANGEVIN. According to current plans, in ten years the United States is expected to have many sea-based interceptors capable in principle of intercepting long-range missiles.

Secretary Roberts, what steps will be taken to make sure that this system does not lead China to increase its number of long-range nuclear missiles as a way of preserving its retaliatory capability in the face of such defenses? And what steps are being taken currently to reassure Russia that U.S. missile defense plans do not result in a destabilizing capability that could be used to intercept Russian ICBMs (launched from Russian missile sites west of the Urals)?

Dr. ROBERTS. As the President has made clear, both Russia and China are important partners for the future, and the United States seeks to continue building collaborative and cooperative relationships with them.

The United States will continue to seek to discuss missile defense and strategic stability matters with China. The Administration is committed to substantive and sustained dialogue with China, with the goals of enhancing confidence, improving transparency, and reducing mistrust on strategic security issues. At the same time, it is important that China understand that the United States will work to ensure protection of our forces, allies, and partners in East Asia against all regional ballistic missile threats.

With Russia, the Administration is pursuing an agenda aimed at bringing the strategic military postures of our two countries into alignment with our post-Cold War relationship—no longer enemies, no significant prospect of war between them, and cooperating when mutually advantageous.

To address stated Russian concerns over our future BMD capabilities, we plan to continue to engage Russia on a broad range of cooperative initiatives as well as transparency and confidence building measures. As part of this effort, we provided Russia with a briefing demonstrating that the interceptors we are planning as part of the European Phased, Adaptive Approach (PAA) will not have the capability necessary to intercept Russian ICBMs heading to the United States.

Mr. LANGEVIN. In previous years, Congress had established limitations on funding for and deployment of the Bush Administration's European missile defense plans pending the satisfaction of certain criteria, including: signed and ratified host nation agreements, independent analysis of alternatives, and Secretary of Defense certification that the system has undergone operationally realistic testing.

Secretary Roberts, would you agree that the deployment of missile defenses in Europe should be held to the same standards that the Congress established for the previous plan?

Dr. ROBERTS. It is essential that systems be deployed following operationally realistic testing. This is a key theme of the Ballistic Missile Defense Review and is reflected in the budget for FY2011. The Administration is committed to deploying capabilities that have been proven under extensive testing and assessment and are affordable over the long term. To strengthen the testing program, a number of steps are being taken. Working in close partnership with the Director of Operational Test and Evaluation, as requested by Congress, the Missile Defense Agency announced a new approach to testing in June 2009. This program sets forth test activities over the full course of each system's development, not just two years into the future as under the former program. These activities include a comprehensive set of ground and flight tests designed to demonstrate operational performance and validate models used to support an evaluation of system effectiveness. The new master plan is to be reviewed and updated semiannually. This new approach will be evaluated after one year of experience (June 2010), and any necessary adjustments will be made at that time. We do not, however, see a need for supplemental certification from the Secretary of Defense.

In addition, we need to have agreements with our allies to allow us to proceed to deployment. In fact, many of those agreements are in place already. U.S. efforts to implement the European Phased, Adaptive Approach (PAA) have proceeded at a rapid pace and we have made significant progress since the September 2009 announcement of the new approach.

Mr. LANGEVIN. According to press reports, the tri-national Medium Extended Air Defense System (MEADS) co-development program may not meet the requirements of the Army's Integrated Air and Missile Defense (IAMD) architecture and joint operational concept. The Army's IAMD architecture relies on the IAMD Battle Command System (IBCS) to provide battle management and command and control (C2)

across all Army air and missile defense sensors and shooters. IBCS also provides the interface to other air and missile defense battle management and C2 systems such as the Missile Defense Agency's Command and Control, Battle Management, and Communications (C2BMC) and the Navy's Cooperative Engagement Capability (CEC), which enables access to their sensors and interceptor systems. However, the MEADS program, as currently planned, does not include the IBCS. Staff understands that the United States requested a restructure of the MEADS program in the fall of 2008 and has proposed substituting IBCS as the MEADS battle manager.

While the Army will not be represented in the hearing, staff understands that the Army has considered asking MDA to take responsibility for the MEADS program.

Secretary Roberts, can you describe OSD's views about the role of the MEADS program in our efforts to establish greater international cooperation on missile defense? And what course should the United States pursue to ensure that the resulting system will meet Army requirements as well as the international objectives?

Dr. ROBERTS. The MEADS program, under co-development in a partnership among the United States, Germany, and Italy, is the only active missile defense development program the United States currently has with NATO partners. We believe that honoring U.S. commitments to our cooperative program partners is critical.

Although there have been numerous schedule delays and cost growth in the MEADS program, the program is being restructured so that it can better meet its cost, schedule, and performance goals.

When ready, MEADS will offer a replacement for the Patriot system that is more capable, more easily sustained, and more mobile. It could be an important part of a NATO missile defense effort.

Mr. LANGEVIN. Secretary Roberts, given the cost and schedule problems the Army has encountered in the MEADS program, is the Department considering revamping this international cooperation program?

Dr. ROBERTS. Discussions regarding a possible transfer to the Missile Defense Agency (MDA) have occurred; however, no decision has been made to date.

Although there have been numerous schedule delays and cost growth in the MEADS program, the program is being restructured so that it can better meet its cost, schedule, and performance goals.

The Department of the Army currently has program support and budgetary responsibility for the MEADS programs. The Army and the Under Secretary of Defense for Acquisition, Technology, and Logistics can better discuss our specific efforts to ensure the affordability of the program.

Mr. LANGEVIN. The BMDR notes that defense of the homeland may be aided by the development of new technologies and concepts. "These include intercepting long-range missiles early in their flight, launching interceptors based on remote sensor information, and strengthening ballistic missile sensors. Specifically, this might include launching SM–3 Block IIB missiles "which should provide some capability to intercept long-range missiles" by 2020. MDA will continue development and assessment of a two-stage GBI, including a flight test planned for June 2010, and research on the potential of directed energy systems for missile defense. With the exception of continued development and testing of the two-stage GBI, new technologies for homeland defense are at the concept development stage. Continued development of the 2-stage GBI is meant as a hedge in case the SM–3 Block II missile, intended for Europe, encounters significant developmental delays.

General O'Reilly, what are MDA's plans for the 2-stage GBI? Has MDA identified a key milestone or date upon which a decision would be made to continue with the SM–3 Block II missile or switch to the 2-stage GBI "hedge"?

General O'REILLY. The Department of Defense is investing in new missile defense capacity and capabilities to hedge against future uncertainties in both the ballistic missile threat and the technical risk inherent to our own development plans. One such hedge effort is the development and testing of a 2–Stage Ground Based Interceptor (GBI). While there are no plans to field this interceptor at this time, maintaining a 2-Stage GBI development and testing program preserves national policy options to field missile defenses in a timely and effective manner.

The availability of the demonstrated 2-stage GBI will also serve to reduce the risk and required development time to incorporate this alternative asset in the BMD architecture if deemed advantageous in the future. We will be flight testing the 2-stage GBI for the first time in June 2010. During Booster Vehicle Test (BVT)–01. By conducting the first test event in FY10, early critical data will be available to support future technical trades. In FY12 we will test a 2-stage GBI on Flight Test Ground (FTG)–08. Twelve of the thirteen planned Critical Engagement Conditions (CEC) and Empirical Measurement Events (EME) for 2-stage development are col-

lected with BVT–01 and FTG–08 flight tests. The remaining CEC/EME is collected in FY 2016 with FTG–17.

There are two planned versions of the SM–3 Block II, the SM–3 Block IIA and the SM–3 Block IIB. The SM–3 Block IIA is planned for use aboard ships first, and then used ashore until the Block IIB is developed and available. The Aegis BMD ship-based SM–3 Block IIA remains an operational need independent of decisions related to developing and producing two-stage GBIs or Block IIB's.

At this point in time MDA is engineering the systems and maturing the technologies for the SM–3 Block IIB. The technical maturity will be determined through a series of knowledge points (KPs) that ties achievement of critical information to reducing developmental risk and increasing confidence in meeting the desired capabilities. These knowledge points will build confidence in the SM–3 Block IIB.

It is important to note that the Department does not view the SM–3 Block II and the 2-Stage GBI as either/or programs. The Department plans to invest in SM–3 Block II interceptors for operational use and the 2-Stage GBI solely for development and testing at this time. Any future decision to pursue an operational 2-Stage GBI would not preclude the option to continue efforts for the SM–3 Block IIB interceptors, and vice-versa.

Mr. LANGEVIN. According to the BMDR, the Administration plans to tailor its Phased, Adaptive Approach to other regions such as East Asia and the Middle East. These "regional missile defense architecture" plans are still in development, so the inventory and resources requirements for Aegis BMD ships, SM–3 interceptors, THAAD, Patriot and further host nation/basing support are not certain. Recognizing the "regional demand for U.S. BMD assets is likely to exceed supply for some years to come," the Joint Staff and STRATCOM are developing "a comprehensive force management process."

General O'Reilly, given the fact that regional demand for U.S. BMD assets is likely to exceed supply for some years to come," when do you think that the comprehensive force management process be completed to allocate these scarce resources?

General O'REILLY. The Joint Staff is leading a review of the current Global Force Management process to incorporate updated missile defense policy and planning guidance brought on by the Ballistic Missile Defense Review. The review will complete in the summer of 2010. Additionally, the Joint Capability Mix–3 study will determine inventory levels of BMD assets by spring 2011.

Mr. LANGEVIN. To enhance the effectiveness of all missile defense systems, and to reduce reliance on land and sea-based sensors, MDA has created a new program this year, Precision Tracking Space System or PTSS.

General O'Reilly, given the ongoing challenges in space acquisition, can you assure the committee that the PTSS program can be delivered in a timely way at a reasonable cost?

General O'REILLY. Yes. Challenges and problems associated with past satellite development programs indicate that a stable baseline and risk reduction is necessary to improving development timelines. Developing prototypes prior to making production decisions will ensure that proper Technology Readiness Levels (TRL) are achieved, thereby improving our development timelines. The PTSS acquisition strategy is to develop a prototype system with Johns Hopkins University's Applied Physics Laboratory before awarding production development contracts to industry. Additionally, we will award contracts to several industry participants during concept development and exploration to insure the prototype can be readily produced by industry. Industry engagement during the prototyping phase will greatly improve the level of understanding by the contractors and reduce risk for PTSS production. This partnership between industry and the scientific community will ensure our understanding of requirements before we award production development contracts.

The MDA also intends to leverage heritage, high TRL space system components for the PTSS. This approach focuses on component reuse and integration and minimizes the need for new technology development and custom design which will drive costs up and increase development timelines.

Mr. LANGEVIN. What actions is MDA pursing to ensure the program establishes a realistic baseline and only uses mature technology? What technology and other lessons learned is the PTSS program taking from the STSS demonstration satellites? Finally, can you explain why MDA is planning to acquire a satellite capability when the Air Force has the primary expertise for space systems?

General O'REILLY. Challenges associated with past satellite development programs indicate that a stable baseline is necessary to improve development timelines. To that end, MDA will establish the requirements baseline upfront and early and discourage future growth without operational necessity. MDA also intends to leverage heritage, high Technology Readiness Level components and subsystems for the PTSS. This approach focuses on component reuse and integration and minimizes the

need for new technology development that may drive costs up and increase development timelines.

MDA is further incorporating lessons learned from the STSS demonstration satellites to inform our decisions on the development of PTSS, specifically in the areas of phenomenology and fire control. STSS phenomenology data (i.e., infrared scene collections such as atmospheric backgrounds, clouds, earth limb observations, etc.) will be used to anchor models essential to the missile tracking mission. In the case of PTSS, this category of collections is planned to be used in payload design, and validate the selection of optics, focal planes, wavebands of interest and data processing. STSS uses on-board processing to autonomously generate missile target tracks and pass that data to the ground control system. The PTSS program will analyze STSS processing performance to determine the level of on-board processing required, from a system-wide perspective for PTSS.

The development of PTSS is in line with MDA's charter to develop, integrate and test all missile defense capabilities, including and not limited to missiles and sensors. PTSS is more than a satellite development program—it is an integral part of the extended Aegis fire-control system. The development of space-based remote sensing and the integration of the data into Ballistic Missile Defense (BMD) fire-control architectures are integral to early intercept capability (a key focus of MDA). The objective of the PTSS program is to address the ascent-phase, midcourse tracking challenge facing the joint warfighter.

MDA is collaborating with key Air Force stakeholders including Air Force Space Command, the Space and Missile Systems Center and the appropriate members of the Air Staff on specific roles and responsibilities. MDA is collaborating with the Air Force to establish a Service Cell within the PTSS Hybrid Program Office which will ensure the PTSS operations and data management systems are consistent with Air Force initiatives. MDA is also teaming with critical technical expertise within the Navy and its Aegis cadre for integration of the PTSS into Aegis Combat System fire control design and development. Acting as a pathfinder, STSS will characterize the challenges of closing the fire control loop with Aegis BMD, addressing problems such as latencies, interfaces, accuracies, and biases. Using the same Navy expertise, PTSS will build upon the STSS launch-on knowledge, to continue with an engage-on campaign, expanding the battlespace for operational ships along with larger defended areas.

Mr. LANGEVIN. According to press reports, the tri-national Medium Extended Air Defense System (MEADS) co-development program may not meet the requirements of the Army's Integrated Air and Missile Defense (IAMD) architecture and joint operational concept. The Army's IAMD architecture relies on the IAMD Battle Command System (IBCS) to provide battle management and command and control (C2) across all Army air and missile defense sensors and shooters. IBCS also provides the interface to other air and missile defense battle management and C2 systems such as the Missile Defense Agency's Command and Control, Battle Management, and Communications (C2BMC) and the Navy's Cooperative Engagement Capability (CEC), which enables access to their sensors and interceptor systems. However, the MEADS program, as currently planned, does not include the IBCS. Staff understands that the United States requested a restructure of the MEADS program in the fall of 2008 and has proposed substituting IBCS as the MEADS battle manager.

While the Army will not be represented in the hearing, staff understands that the Army has considered asking MDA to take responsibility for the MEADS program.

General O'Reilly, we understand that the Army is concerned about the direction of the MEADS program, and the possibility that it will not work well with the broader Integrated Air and Missile Defense command and control system. Can you share with us your views on the status of the MEADS program, and any thoughts about whether it might more appropriately be situated in the Missile Defense Agency?

General O'REILLY. The Missile Defense Agency (MDA) is currently focused on developing and fielding upper tier capabilities such as the Terminal High Altitude Area Defense and Aegis BMD systems. The integrated deployment of the lower tier MEADS and PAC–3 with MDA upper tier systems adds effective layered and regional missile defenses to the BMDS. Program support and budgetary responsibility for MEADS resides with the U.S. Army. I defer to the Army about the current status of the program. Discussions regarding a possible transfer to MDA have occurred; however, no decision has been made to date.

Mr. LANGEVIN. General O'Reilly, could you provide an update on remedying past problems observed with the capability of the Patriot to differentiate between incoming missiles and the Identification Friend or Foe systems?

General O'REILLY. The U.S. Army has programmatic and budgetary responsibility for the Patriot program. I defer to the U.S. Army's senior leadership on questions pertaining to the system's technical and operational performance.

Mr. LANGEVIN. Director Gilmore, can you describe the process of developing and approving the Integrated Master Test Plan? How has this process differed from the way that the MDA and DOT&E have worked together in the past?

Dr. GILMORE. My staff, along with the Missile Defense Agency (MDA), the Combatant Commands, and the Ballistic Missile Defense System (BMDS) Operational Test Agency participated in the development of the Integrated Master Test Plan (IMTP). DOT&E has been involved in the evaluation-based strategy underpinning the IMTP since General O'Reilly initiated its development in December 2008. In addition to detailed and day-to-day staff involvement in the formulation of the IMTP, I personally participated in a number of executive-level reviews and provided comments and guidance to the MDA. I approved the IMTP, which includes plans for operational testing. I expect that as the IMTP is executed, I will continue to review and approve the detailed test plans that support all significant BMDS testing, and that the realism of the testing conducted will increase over time.

A significant difference between the current IMTP planning process and previous efforts is that the IMTP is now a requirements-driven process, while previous efforts were not. In the IMTP, each test is now designed to collect Verification, Validation, and Accreditation (VV&A) data for the models and simulations and the IMTP is reviewed and updated every six months. If successfully executed, the IMTP should lead to validated and accredited models and simulations, which may be used to support evaluations of the BMDS.

Mr. LANGEVIN. Director Gilmore, you mention in your 2009 report that DOT&E has begun an evaluation of the President's new Phased, Adaptive Approach to missile defense in Europe. Would you describe to the committee your plans for evaluating the PAA and any finding you can share from the review to date?

Dr. GILMORE. The IMTP includes plans for dedicated operational testing. Operational testing, both ground and flight testing is planned for each phase of the Phased, Adaptive Approach (PAA). In FY12 (post Phase 1), the MDA intends to conduct a system-level operational test, FTO–1, featuring three ballistic missile targets to be intercepted by Aegis Ballistic Missile Defense (Aegis BMD) (version 3.6.1), Terminal High Altitude Area Defense (THAAD), and Patriot. FTO–2 is planned for FY–15 (Phase 2) and is a BMDS operational system-level flight test against five ballistic missile targets to be intercepted by Ground-based Midcourse Defense (GMD), Aegis BMD, THAAD, Aegis Ashore, and Patriot. FTO–3 is planned for FY18 (Phase 3) and is a BMDS operational system-level flight test against five ballistic missile targets employing the same elements as FTO–2 but in their upgraded configurations. The IMTP does not currently address Phase 4 testing that would be conducted in FY20.

Additionally, Aegis BMD will conduct flight test FTM–15 in 3QFY11 and THAAD will conduct flight test FTT–13 in 2QFY11. Both of these are operationally realistic flight tests planned to demonstrate capability against intermediate and medium range ballistic missiles, respectively, and to support my assessment of the PAA Phase 1 capability prior to the planned FY11 deployments of these systems to the European theater. The MDA also plans to conduct ground testing of the command, control, battle management, and communications system in FY11 to support the Phase 1 implementation.

To assess performance of the Phased, Adaptive Approach, as well as the BMD system as a whole, I have begun to apply proven statistical techniques that generate quantitative results from the integration of many different sources of information. The use of these techniques is necessary because BMD test results will be drawn from a variety of sources, including live flight tests as well as modeling and simulation. These techniques are similar to those currently used to certify the effectiveness and safety of our nuclear stockpile.

Mr. LANGEVIN. Director Gilmore, your 2009 report says that, to date, "GMD has demonstrated a limited capability against a simple threat." Can you explain to the committee what level of confidence DOT&E currently has in the effectiveness of our homeland defense system? How do you see this level of confidence changing in the future?

Dr. GILMORE. I will evaluate confidence as much as possible on a statistical, quantitative basis, not on a subjective basis. Because the majority of the testing providing the data needed for quantitative assessment will be due during the next five to seven years, I cannot provide a quantitative estimate of confidence in the performance of the missile defense system now. The estimate I provide in the future will depend on the outcome of all the events that can provide information. As there are insufficient end-to-end live tests that by themselves could conclusively characterize Ballistic Missile Defense System (BMDS) effectiveness, my evaluation will

embrace additional pertinent information sources—including smaller-scoped developmental and operational testing observations, engineering and system-level knowledge, data on related systems and processes, and modeling and simulation. We will conduct detailed and fully documented integrated analyses for the individual constituent systems and performance functions (e.g., detect threat launch, tracking and discriminating, engagement planning and authorization, weapon launch, fire control, fly out, end game) that comprise BMDS architectures under varying threats and environments. Extensive sets of preeminent subject matter experts (SMEs), internal and external to DOT&E, will be integral to these analyses. Formal elicitation techniques and synthesis methodologies will be utilized to construct quantitative representations of test results to translate these to overall estimates of BMDS performance capabilities and associated uncertainties. The calculus of probability and the use of likelihood functions and likelihood ratios will be used to fuse information in much the same manner as target tracking and sensor fusion. This approach is comparable to that used to certify our national nuclear stockpile and to variants that have been applied in industry and in various risk assessment settings—including counter-terrorism and homeland security studies. Additional assurance for and calibration of the specific application of these methods to the evaluation of BMDS will be obtained by systematically comparing recorded SME portrayals to new test results and related information that will emerge as the BMDS program schedule advances and additional testing is conducted.

Mr. LANGEVIN. Director Gilmore, your 2009 report says: "the Aegis BMD provides a moderately well characterized capability against a majority of its theater-level missile threat set and its operational battlespace." Is this level of confidence sufficient to ensure that the first phase of the PAA will be operationally effective? If not, what steps will be required to achieve such effectiveness?

Dr. GILMORE. Aegis BMD capability versus Short Range Ballistic Missile (SRBM) threats (that is, those that fly less than 1000 km) is well characterized. Against these threats, the Aegis BMD has had numerous flight test successes, which resulted in the Commander, Operational Test and Evaluation Force declaring the system in October 2008, to be operationally effective and suitable. However, the Aegis BMD system has not yet conducted a flight test against a Medium Range Ballistic Missile (MRBM) target (a missile that flies greater than 1000 km). The Aegis BMD system has also not demonstrated a queued engagement during a live flight test using track data from a forward-based sensor such as the AN/TPY–2 radar. Therefore, while I assess the Aegis BMD to be effective against SRBM threats, performance against longer range threats has not yet been demonstrated.

The required steps to demonstrate this effectiveness are documented in the Integrated Master Test Plan (IMTP). For Phase 1, Aegis BMD will conduct flight test FTM–15 in 3QFY11. This operationally realistic flight test is planned to demonstrate capability against an intermediate range ballistic missile. It will exercise a launch on remote engagement using a forward-based AN/TPY–2 radar. In FY12, following the Phase 1 deployment, the MDA intends to conduct a system-level operational test, FTO–1, featuring Aegis BMD, as well as THAAD and Patriot in a multiple simultaneous engagement. The MDA also plans to conduct ground testing of the command, control, battle management, and communications system in FY11 to support the Phase 1 implementation.

Mr. LANGEVIN. Director Gilmore, can you detail the track record and any future plans for testing the system for deployment in Europe and the system to defense the Homeland in terms of including:

- Warheads and similarly-sized balloon decoys that will challenge the system's ability to discriminate?
- Tumbling warheads?
- Testing at night?
- Including multiple targets?

Dr. GILMORE. My office's Ballistic Missile Defense System (BMDS) annual reports over the past few years discuss the testing the MDA has completed for the various elements of the BMDS. These reports describe the varying maturities of the different elements that make up the BMDS. The current IMTP includes testing of the President's phased, adaptive approach for the defense of Europe as well as continued testing of the GMD for the defense of the Homeland. As systems mature, testing in the IMTP evolves to include complex target scenes, testing under varying environmental conditions, testing against multiple targets, and testing in a layered and integrated ballistic missile defense architecture. Each test has been designed to collect the data needed to verify, validate, and accredit the BMDS models and simulations that will be used to evaluate BMDS capability.

QUESTIONS SUBMITTED BY MR. TURNER

Mr. TURNER. Dr. Roberts, in the hearing on April 15, you stated that, to your knowledge, the Administration has not received assurances from Russia that phase four of the Phased, Adaptive Approach doesn't violate the new START. Please describe Administration's intent in seeking such assurance from Russia.

Dr. ROBERTS. The Administration is not seeking assurance from Russia that the European Phased, Adaptive Approach (PAA) does not violate the New START Treaty. The New START Treaty does not constrain the PAA, nor does it constrain the United States from deploying the most effective missile defenses possible; therefore, our missile defense plans for Europe pose no issue of compliance with the New START Treaty. We have, however, explained that the missile defense capabilities associated with the European Phased, Adaptive Approach will not affect the U.S.-Russian strategic balance.

Mr. TURNER. Dr. Roberts, please provide the figures for phases one through four of the Phased, Adaptive Approach (PAA), and the corresponding percentage of the U.S. homeland as well as Europe that PAA would provide? Furthermore, what asset allocations would be needed to provide the coverage?

Dr. ROBERTS. The coverage of Europe in each phase of the European Phased, Adaptive Approach (PAA) was briefed to the HASC in a classified setting on April 8, 2010. The United States is currently protected against limited ICBM attacks using the ground-based midcourse system deployed in the United States. The EPAA will enhance that coverage from a potential Iranian ICBM threat beginning in Phase 1 (2011 timeframe).

The coverage in Europe is designed to cover the areas closest to and within range of existing and developing near-term threats first, with improved coverage in each phase. By Phase 3 (2018 timesframe), coverage will be extended to all NATO Allies in Europe. For more detailed information about asset locations and coverage, we can provide a briefing to you or your staff in a classified setting.

Mr. TURNER. Dr. Roberts and General O'Reilly, at what point do you believe the Department needs to reevaluate its reductions to homeland defense (e.g., reducing the number of GBIs from 44 to 30) because the threat has changed? What policy and planning assumptions would have to change?

Dr. ROBERTS. Given the continuing improvement in the Ground-Based Missile Defense (GMD) system and the number of ground-based interceptors currently deployed compared to potential North Korean and Iranian capabilities, the United States now possesses a capacity to counter the projected threats from North Korea and Iran for the foreseeable future.

Because of uncertainty about the future ICBM threat, including the rate at which it will mature, it is important that the United States maintain this advantageous position. But doing so does not require that the United States continue to develop these capabilities at the same accelerated rate as it has in recent years and accept the same level of risk in the developmental program. Rather, the United States will refocus its homeland missile defense plans to maintain our current advantage, while developing future, proven capabilities that will enhance homeland defense should a new threat emerge. This refocused approach was introduced in the FY 2010 budget submission, in which the Department of Defense proposed to hold the number of operationally deployed GBIs at 30, instead of the 44 originally planned. The completion of eight additional empty silos at Fort Greely, Alaska and the storage of test and spare GBIs will provide a hedge against unanticipated ICBM threat growth. We are also developing stronger sensor networks with additional land-based sensors and new airborne and space-based platforms, and investing in advanced capabilities such as the ability to intercept ballistic missile threats earlier in their flight. The missile defense assets needed to protect the homeland will be constantly evaluated as we continue to defend the homeland from missile defense attack, consistent with the first policy priority established by the BMDR.

Mr. TURNER. Dr. Roberts, Phase 1 of the PAA calls for the deployment of a forward-based radar in Europe by the end of 2011. We are considering the Fiscal Year 2011 budget request yet we don't know where this radar will be located or how long host nation negotiations might take. Does the Department have a plan and schedule for deploying this radar and will the 2011 timeframe be met?

Dr. ROBERTS. We are still in discussions with a potential host nation for the AN/TPY–2 radar at this time. However, the Department does have a plan for deploying this radar, and we expect the 2011 timeframe to be met. We will consult closely with Congress as we proceed.

Mr. TURNER. Dr. Roberts, the BMDR states that the Phased, Adaptive Approach will be tailored to other regions. When will the committee see the regional missile

defense architectures that are being developed? What force structure, inventory, and resource implications will these new regional missile defense architectures have?

Dr. ROBERTS. The United States will pursue missile defense regional approaches that are tailored to the deterrence and defense requirements of each region. These approaches will evolve over time in accordance with the threats and circumstances unique to each region. They could vary considerably and may not resemble the four-phased European Phased, Adaptive Approach (PAA). In some regions, our regional missile defense efforts are already underway. In these regions, the architecture will change as the threat evolves and as new capabilities become available. Each of the major regions outlined in the Ballistic Missile Defense Review (BMDR) differ in their geography, history, existing military relationships, and threat environment. Although the approaches will vary, they will be guided by common principles. We will pursue efforts to strengthen regional deterrence architectures, field capabilities that are tailored to the threat, and focus on flexible and mobile capabilities that can adapt as needed.

The Department will rely on the Global Force Management process to assist in decisions on the allocation of missile defense forces among the geographic combatant commands. This comprehensive force management process will adjudicate competing requirements of scarce missile defense assets from the various combatant commands. This approach underscores the value of developing capabilities that are flexible and adaptive and also relocatable, so that they can be surged into troubled regions in times of political-military crisis.

Mr. TURNER. General O'Reilly, last year, we asked several questions about the state of the GBI manufacturing line—was it hot or cold—and we were particularly concerned about 2nd and 3rd tier suppliers. Can you please update us on the status of the industrial base? And, more broadly, what impact does the recent NASA decision to terminate the Constellation program have on the missile defense industrial base? What do you believe needs to be done to stabilize the industrial base, particularly in the area of solid rocket motors and liquid rocket engines?

General O'REILLY. MDA's most recent purchase of GBIs was December 2006. Lower-tier GBI supplies began "production breaks" in 2007. The GBI 2nd tier supplier (Raytheon and Orbital) manufacturing lines are warm, and are expected to remain warm beyond 2016 through continued deliveries of on-contract GBIs, ongoing GBI refurbishments for operational and test GBIs, and the planned purchase of five (5) additional GBIs. As for the 3rd and 4th tier supplier manufacturing lines, all are expected to complete their deliveries in FY10 for on-contract GBIs with the exceptions of Aerojet and Rockwell Collins.

Additionally, MDA utilized the $50M FY10 Congressional Add to keep manufacturing lines warm for critical warm suppliers through the fiscal year. The following summarizes the content authorized to Boeing in January and April 2010:

- Booster Orion Motor Sets (ATK)—FY10 increment for eight (8) motor sets (completion and delivery of the motor sets will be continued under a separate future contract action)
- Booster Shrouds (Astech)—5 units
- EKV Communication Link Subsystem (Rockwell Collins)—FY10 increment for 3 units (completion and delivery will be continued under a separate future contract action)
- EKV Inertial Measurement Units (Northrop Grumman)—2 units
- EKV Laser Firing Units (L–3)—3 units
- EKV Electronics Units (Raytheon)—3 units
- EKV Electrical Conversion Units (Raytheon)—3 units
- EKV Structures (General Dynamics)—2 units.

These purchases along with the five (5) additional GBIs and planned refurbishment component purchases are expected to sustain GBI 3rd and 4th tier suppliers until FY13 and final GBI deliveries in 2016.

MDA Solid Rocket Motor (SRM) Industrial Base (IB) impacts (THAAD and GBI) from the termination of the Constellation Program could include the following:

- Increased cost
- Suppliers exiting the business causing requalification expenses
- Schedules could lengthen as new suppliers need to qualify lines to replace those that may exit the business
- Prime contractor (ATK) decisions to "right-size" to match demand and restructure

The impact to THAAD will be less than the impact to GBI since THAADs are being procured from Aerojet and Aerojet has already right-sized.

MDA's long-term plan to stabilize the high-tech SRM IB includes supporting the SRM IB Interagency Task Force development of a DoD Sustainment Plan. This plan would be inclusive of:

- Work with industry to "right size" and align capacity to reality
- Ensure long term viability of small and large SRMs (missile defense and tactical systems), and
- Closely monitor the already fragile critical sub-tier supplier base

This task force will provide solid rocket motor industrial base sustainment recommendations to the Secretary of Defense for a subsequent report to Congress in approximately September, 2010.

MDA also procures a small number of Divert Attitude and Control Systems (DACS) for the THAAD and EKV. These engines use a very small quantity of liquid propellant. The Industrial Base for both of these systems is healthy.

Mr. TURNER. General O'Reilly, please discuss the status of the SM–3 Block 2A and 2B interceptor development efforts. What are the highest risk areas that could affect the availability of the SM–3 Block 2A and 2B interceptors to meet Phase 3 and Phase 4 of the PAA, respectively?

General O'REILLY. The Joint U.S.–Japan Standard Missile-3 Block IIA Cooperative Development (SCD) Project is will conduct its Preliminary Design Review (PDR) in January 2011. The SCD Project has successfully completed the first four steps for the PDR as planned, including reviews of Japan's Second Stage and Third Stage Rocket Motors. The SCD Project is on track to accomplish flight testing in November 2014 and March 2015, to support deployment in 2018 as part of Phased, Adaptive Approach Phase III.

The SCD Project's highest development risk area is the Kinetic Warhead (KW). Particular areas of focus include the focal plane array production yield, the divert thruster survivability, and the KW dynamic body motion impact to image processing. The Project Team is actively engaged in defining and executing mitigation efforts to retire these risks prior to flight testing.

The SM–3 Block IIB, is in the initial phase of technology assessment and development. The technical challenges in developing the Block IIB are dependent on the missile architecture and associated technologies selected for incorporation on the Block IIB. In general, technical challenges will be related to our goal of developing a faster, more flexible missile, which requires propulsion upgrades, controllability enhancements, and lighter weight components. Investments will be made to raise the maturity of key component technologies, with the goal of achieving Technology Readiness Level (TRL) 6 by 2013, to support the SM–3 Block IIB development program for Phase IV of the Phased, Adaptive Approach in 2020.

To reduce risk on relevant technologies we will complete design trades, assess technology readiness and conduct technology demonstrations through 2010. Key activities will include technology assessments and missile architecture studies to define feasible missile concepts for the SM–3 Block IIB mission; investments in technologies that have the potential to provide higher velocity and energy management; mission analysis to determine the appropriate balance and trades between missile weapon systems and sensor capabilities leading to a definition of the Block IIB operations concept; and definition of the Block IIB acquisition strategy.

Mr. TURNER. General O'Reilly, at what point do you believe the Department needs to reevaluate its reductions to homeland defense (e.g., reducing the number of GBIs from 44 to 30) because the threat has changed? What policy and planning assumptions would have to change?

General O'REILLY. [The information referred to is classified and is retained in the subcommittee files.]

Mr. TURNER. General O'Reilly, Phase 1 of the PAA calls for the deployment of a forward-based radar in Europe by the end of 2011. We are considering the Fiscal Year 2011 budget request yet we don't know where this radar will be located or how long host nation negotiations might take. Does the Department have a plan and schedule for deploying this radar and will the 2011 timeframe be met?

General O'REILLY. The Department of Defense is considering locations in Southeast Europe for the forward-based AN/TPY–2 radar. It is difficult to predict exactly how long it will take to conclude the necessary host nation agreements once a country agrees in principle to host the radar. However, the Department is confident that agreements will be in place in time to support the 2011 deployment timeframe.

Concurrent to negotiations with potential host nations, the Missile Defense Agency will work with the Joint Staff and the European Combatant Commander to deploy the radar in Phase I of the European PAA.

Mr. TURNER. General O'Reilly, the BMDR states that the Phased, Adaptive Approach will be tailored to other regions. When will the committee see the regional missile defense architectures that are being developed? What force structure, inventory, and resource implications will these new regional missile defense architectures have?

General O'REILLY. Flexible and adaptable capabilities with global application to meet evolving threats are key attributes of the Phased, Adaptive Approach (PAA). As such, we are developing regional missile defense elements that can be adapted to address threats and the unique circumstances of each Combatant Command region.

Missile defense architectures are determined by the Combatant Commanders. System and inventory requirements are determined by the Joint Staff in collaboration with the Combatant Commanders. They also develop the assignment of missions, tasks and forces. As a material developer, MDA will be responsible for developing the systems for the services to fulfill their Title X responsibilities to train and equip the military to support a Combatant Commander's request for forces and equipment.

Mr. TURNER. General O'Reilly, please describe the current developmental status and technical maturity of the 2-stage GBI and the SM–3 Block 2A and SM–3 Block 2B interceptors. What are the expected performance differences?

General O'REILLY. The 2-stage Ground Based Interceptor (GBI) is a development and test program only. There are no plans at this time to produce or deploy operational 2-stage GBIs. Conversely, the Standard Missile 3 (SM–3) Block IIA and IIB missiles will be developed, tested and produced as operational interceptors.

Should the decision be made in the future to pursue an operational 2-stage GBI capability, its performance would vary from that of the SM–3 interceptors. The 2-stage GBI is a land-based, fixed-site interceptor whose performance is similar to the currently deployed 3-stage GBI.

The 2-stage GBI has completed System Requirement Review (SRR). The SRR examines the functional, technical, performance and security requirements for the system and the preliminary project plan. The project plan ensures the requirements and the selected concept will satisfy the system objectives. Currently, there are three 2-stage GBI flight tests planned (one 2-stage Booster Verification Test (BVT) and two 2-stage GBI flight tests). The first 2-stage GBI vehicle was delivered/emplaced in May 2010 in supported the fully successful initial flight test (BVT–01) on June 6, 2010. The remaining two 2-stage flight tests are scheduled for Fiscal Year (FY) 2012 and 2016.

- In a fully successful flight test, BVT–01 delivered a Capability Enhancement-I (CE–I) Exoatmospheric Kill Vehicle (EKV) to a predetermined aim point using a First Generation configuration 2-stage booster (test conducted on June 6, 2010). After separating from the second-stage booster, the kill vehicle executed a variety of maneuvers to collect data to further prove the performance of the kill vehicle in space.
- Flight Test GBI (FTG)-08 is an intercept flight test event of the 2-stage First Generation configuration avionics GBI with a CE–I EKV payload.
- FTG–17 is an intercept flight test event of the 2-stage Fleet Avionic Upgrade/Obsolescence Program configuration avionics GBI with a CE–I EKV payload.

The Aegis BMD/SM–3 Block IIA is a sea- and land-based rapidly mobile, deployed and logistically supported system. It defends against Medium Range Ballistic Missiles and Intermediate Range Ballistic Missiles.

The SM–3 Block IIA Cooperative Development (SCD) Project is executing section level Preliminary Design Reviews (PDRs) in 2010 in preparation for the missile system PDR in January 2011. The SCD Project has successfully completed the first four section PDRs as planned. The SM–3 Block IIA has completed System Concept Review (SCR). The SCR evaluates the scope, performance, cost, and risk, and determines a missile concept(s) and the employed technology. The program's SRR is scheduled for April 2011. The SCD Project is on track to accomplish flight testing in November 2014 and March 2015 and is scheduled to deploy by the end of FY18.

The performance of the SM–3 Block IIB is dependent on the missile concept selected. The SM–3 Block IIB will use many of the technologies and the manufacturing base of the SM–3 family of interceptors enabling reductions in both technical risk and cost. The SM–3 Block IIB is in the concept planning stage with several missile configurations being considered. It has not completed a SCR. The SM–3 Block IIB missile concept and employed technology are in the early stages of evaluation.

Initial results from system architecture studies and technology assessments show that a next generation SM–3 Block IIB missile using well understood technology can achieve the increases in burnout velocity and divert capability necessary to defeat ICBMs from forward based Aegis Ashore sites. MDA will leverage the SM–3 Block IA, IB, and IIA designs as well as propulsion investments made under the Kinetic Energy Interceptor and Multiple Kill Vehicle programs to develop the SM–3 Block IIB interceptor. The SM–3 Block IIB will also leverage the SM–3 Block IB kill vehicle to the maximum extent possible to reduce costs, schedule and risks for devel-

oping a new kill vehicle. We have planned eight years for technology development, system design, and integration and test prior to making a production decision in late FY18.

Mr. TURNER. General O'Reilly, why has MDA removed two planned flight tests of the 2-stage GBI from the budget request and delayed the first intercept test until 3 years after flight tests and delays. What is the rationale for this? Will such a delay preclude the 2-stage GBI from being considered as a viable hedge?

General O'REILLY. Two 2-stage Ground-Based Interceptor (GBI) flight tests were not removed from our current test plan. The current test plan contains three 2-stage configured flight tests (one 2-stage booster verification test and two 2-stage GBI flight tests). These flights will yield data for both demonstrating 2-stage capability and anchor development models and simulations for both 2-stage and 3-stage designs.

The 2-stage GBI builds upon the success of the 3-stage GBI and has 95% commonality of existing flight-qualified 3-stage GBI components, except the third stage is removed.

We tested the 2-stage GBI for the first time in June 2010 to verify differences between the performance of 2-stage and the 3-stage GBIs. After this test and evaluation of the results dealing with the subsequent intercept events, we will have characterized differences between the two and will be able to evaluate the performance of a 2-stage GBI using data collected from 3-stage testing as well.

The remainder of the test program is Exo-atmospheric Kill Vehicle focused (i.e., booster components are interchangeable). The 2-stage reuses existing flight-qualified components from its 3-stage counterpart. The most important component in a Ground-Based Interceptor is the kill vehicle. The kill vehicle for both the 2- and 3-stage interceptors are identical.

The 3-stage GBI is the operationally deployed configuration; therefore most testing is with the 3-stage interceptor, but could be 2-stage if required. As such, the 2-stage interceptor remains a potential hedge as defined in the Ballistic Missile Defense Review.

Mr. TURNER. Dr. Gilmore, please describe the current developmental status and technical maturity of the 2-stage GBI and the SM–3 Block 2A and SM–3 Block 2B interceptors. What are the expected performance differences?

Dr. GILMORE. The two-stage Ground-Based Interceptor (GBI) is a variation of the deployed three-stage GBIs; a variation that does not include a final third stage. The first two-stage GBI has been built and is scheduled to undergo the first-ever flight test in June 2010. This first flight test is a non-intercept test with no target and is intended to demonstrate two-stage GBI silo launch and flyout. The two-stage GBI, having never been flight tested, is less technically mature than the three-stage GBI.

The Standard Missile-3 (SM–3) Block IIA interceptor has been in cooperative development with Japan since June 2006. The Block IIA interceptor completed a system design review in June 2009 and under current plans will participate in a booster performance test in 1QFY14, which will be followed by three other interceptor-only (no target) tests before its first intercept test in 2QFY15. The Block IIA interceptor includes a number of technology enhancements over currently fielded SM–3 interceptors. These enhancements have not yet been fully developed or flight tested. Thus, the technical maturity of the Block IIA interceptor is likely low-to-moderate, as would be expected for a program roughly half-way through its development.

The SM–3 Block IIB interceptor is intended to have a smaller weight than that of the Block IIA interceptor, thereby increasing the flyout range and burnout speed. Although some of the Block IIB interceptor components from previous versions of the SM–3 may be applicable, many components will likely require completely new development. The SM–3 Block IIB interceptor is currently in the later stages of conceptual development. Thus, the SM–3 Block IIB has a lower technical maturity than that of the Block IIA interceptor. The current Integrated Master Test Plan does not provide a flight test schedule for the Block IIB interceptor.

Mr. TURNER. Dr. Gilmore, why has MDA removed two planned flight tests of the 2-stage GBI from the budget request and delayed the first intercept test until 3 years after flight tests and delays. What is the rationale for this? Will such a delay preclude the 2-stage GBI from being considered as a viable hedge?

Dr. GILMORE. The current Integrated Master Test Plan (IMTP) includes three flight tests of the two-stage Ground-Based Interceptor (GBI): a non-intercept first flight (BVT–01) in June of this year, an intercept flight test (FTG–08) in 4QFY12, and an intercept flight test (FTG–17) in 3QFY16. These tests are part of the overall IMTP objective to collect the data needed to anchor the GMD and BMDS models and simulation. These flight tests will characterize differences between the two- and three-stage GBIs and allow evaluation of the performance of a two-stage GBI using

data collected from three-stage testing. This approach is possible because the two-stage GBI uses many of the same components as the three-stage GBI. The most specialized and critical technology in a GBI is the kill vehicle, which is the same for both interceptors. Successful completion of these three flight tests, in conjunction with other ground tests, will provide information that could be used to evaluate the potential performance of the two-stage GBI if it were used to defend Europe against ballistic missile attacks.

QUESTIONS SUBMITTED BY MR. LARSEN

Mr. LARSEN. Dr. Gilmore's testimony reads: "I am concerned that it [the Integrated Master Test Plan] is success-oriented with limited schedule flexibility and no incorporation of repeat, or backup, tests to compensate for test failures." He goes on to note that even one test failure in the Aegis system could jeopardize the deployment schedule for Phase 1. Do you believe the development and testing schedule for the SM–3 Blocks IA, IB and IIA is realistic and adequately accounts for the possibility of test failures? What steps do you believe should be taken to mitigate the possibility of test failures for the various blocks of the SM–3 missile system? Are additional steps needed to account for the possibility of target failures as well?

General O'REILLY. The Integrated Master Test Plan (IMTP) is used to evaluate research and development milestones, technology maturity levels, and coverage and performance analysis. The Missile Defense Agency remains committed to successfully executing and completing the IMTP. The development and testing schedule within the IMTP is realistic and accounts for the possibility of testing anomalies. Within the IMTP, the test regime for the Standard Missile-3 (SM–3) variants follows the proven disciplines and procedures used during the Aegis BMD 3.6/SM–3 Block I/IA and Aegis LEAP Intercept Programs.

The IMTP establishes and documents test requirements for the variants of SM–3 with specific focus on collecting data needed for the Verification, Validation, and Accreditation (VV&A) of missile and threat models and simulations. Models and simulations permit repeated assessments of performance and provide a statistical determination of effectiveness of SM–3 capabilities. Ground tests using these high fidelity models and simulations test SM–3 capabilities across a range of threats and environments that cannot be affordably replicated in flight tests.

Testing of the SM–3 Block IA is complete after FTM–15. In order to obtain the necessary data to anchor SM–3 Block IB models, we plan to test as quickly as is technically and reasonably possible. While the SM–3 Block IIA is currently in the "planning" stages within the context of the existing IMTP, testing will be conducted to collect data whenever possible.

We will follow the same rigorous, practical and methodical approach to missile tests with each version of the SM–3 as we did with the earlier SM–3 variants. We will augment testing as necessary to overcome setbacks with remedial responses, including conducting additional tests to accelerate deliveries and enhancing instrumentation where required.

Mr. LARSEN. Dr. Gilmore, in your testimony you note: "I am concerned that it [the Integrated Master Test Plan] is success-oriented with limited schedule flexibility and no incorporation of repeat, or backup, tests to compensate for test failures." You go on to note that even one test failure in the Aegis system could jeopardize the deployment schedule for Phase 1. Do you believe the development and testing schedule for the SM–3 Blocks IA, IB and IIA is realistic and adequately accounts for the possibility of test failures? What steps do you believe should be taken to mitigate the possibility of test failures for the various blocks of the SM–3 missile system? Are additional steps needed to account for the possibility of target failures as well?

Dr. GILMORE. The currently-fielded SM–3 Block IA interceptor has flown in nine intercept flight tests (including three Japanese tests) against Short Range Ballistic Missiles (SRBMs) and a satellite shoot-down in February 2008. Prior to the PAA Phase 1 deployment, one Block IA interceptor test (FTM–15) against an Intermediate Range Ballistic Missile (IRBM) target is planned for 3QFY11. Given a flight test failure, there would be little time to repeat the test in FY11 and the loss of information could potentially affect the plans for deploying Phase 1.

SM–3 Block IB development is currently on-schedule for a 2QFY11 intercept flight test. Once started, the Aegis BMD intercept flight test program with the Block IB includes tests occurring about every three to nine months. That frequency of testing could provide some margin for recovery if failures occur. However, it is difficult to make definitive claims regarding the sufficiency of that margin given that the Block IB interceptor includes technology enhancements that have not yet been flight tested.

The developmental test schedule for the SM–3 Block IIA interceptor, as laid out in the Integrated Master Test Plan (IMTP), allows for about one year between an early booster performance test (1QFY14) and the first intercept test with the Block IIA (2QFY15). The current IMTP does not provide a test program beyond CY 2015; thus, it is not possible now to assess whether test plans beyond 2015 will provide margin for failures that could occur during developmental (or subsequent) testing.

Concerning steps that should be taken to mitigate potential SM–3 test failures, one approach is to ensure that quality assurance mechanisms remain in place. Interceptor failures during flight tests have often been related to reliability issues, some of which could have been mitigated by more robust quality assurance. The MDA has recently increased emphasis on its quality assurance program, which should decrease the number of interceptor failures. For targets, a way to mitigate test failures would be to include a backup target for each flight test. Many previous MDA flight tests have not included backup targets. The initial cost of testing would increase with the inclusion of backup targets, but many of the backup targets could be used in subsequent tests if they are not needed as backups. Provision of backup targets for future tests should become feasible as the MDA executes its revised approach for procuring targets.

QUESTIONS SUBMITTED BY MR. LAMBORN

Mr. LAMBORN. Dr. Roberts, what concerns you most about the industrial base? What actions have been taken and need to be taken to ensure an industrial base capable of producing the quality and quantity of product to meet current and long-term threats?

Dr. ROBERTS. What concerns me the most about the industrial base is its ability to produce effective and affordable systems to meet the policy and strategy priorities of the Ballistic Missile Defense Review (BMDR).

For specific questions related to the industrial base, I would defer to LTG O'Reilly and to the Under Secretary of Defense for Acquisition, Technology, and Logistics.

Mr. LAMBORN. Has the Administration completed a thorough analysis of worldwide missile defense architectures to support each phase of PAA? Please be specific with exactly what has been done in analyzing possible architectures and alternatives for these architectures for each phase of PAA. If the analysis has been done when will it be complete?

Dr. ROBERTS. The Department of Defense conducted the first-ever Ballistic Missile Defense Review from March 2009 through January 2010. Required by statute, and guided by a Presidential directive, the review comprehensively considered U.S. BMD policies, strategies, plans, and programs. The initial study focused on missile defense in Europe. During the course of that review, numerous potential architectures were evaluated, and the European Phased, Adaptive Approach (PAA) was chosen based on the unanimous recommendation of the Secretary of Defense and the Chairman of the Joint Chiefs of Staff that the "Third Site" plan be revised.

In terms of how this applies to other regions, we will pursue a Phased, Adaptive Approach within each region that is tailored to the threats unique to that region, including their scale, the scope and pace of their development, and the capabilities available and most suited for deployment.

The Department will rely on the Global Force Management process to assist in decisions on the allocation of missile defense forces among the geographic combatant commands. This process will adjudicate competing requirements of scarce missile defense assets. This approach underscores the value of developing capabilities that are flexible and adaptive and also relocatable, so that they can be surged into troubled regions in times of political-military crisis.

Mr. LAMBORN. General O'Reilly, the Ground-based Midcourse Defense (GMD) system is expected to have a lifetime of 20 years. How many flight tests per year do you believe are necessary to ensure the long-term reliability of the GMD system over its 20-year lifetime?

General O'REILLY. By the end of 2020, MDA will have tested 20 GBIs, including previous GBI flight tests, and there are SRP flight tests planned beyond 2020. MDA plans one flight test per year from FY11 to FY20, with the exception of FY18 when two are scheduled, for a total of 11 flights based on the current Integrated Master Test Plan (IMTP) dated 18 February 2010 and provided to Congress in March. This testing supports data collection for Critical Engagement Condition (CEC) and Empirical Measurement Event (EME) Model and Simulation (M&S) Verification, Validation and Accreditation (VV&A), and the Ground-Based Interceptor (GBI) Stockpile Reliability Program (SRP).

Beyond 2020, six GBIs are allocated for both operational spares and SRP flight testing. However, flight testing is only one part of the SRP. The GMD sustainment program will maintain and support an effective defensive system meeting Warfighter requirements over the expected 20-year life cycle and support a decision on potential Service Life Extension in 2027. Maintaining readiness of the GBI fleet will be accomplished through emphasis on key operational availability metrics, a comprehensive SRP that monitors the health and status of the fielded interceptors. For example, over a 20-year period MDA will conduct 4.3 million maintenance built-in tests, which monitor the health and status of fielded interceptors and verify and determine GBI fleet readiness.

The in-place Aging and Surveillance test program will improve estimates for interceptor reliability by testing aged hardware to determine natural degradation characteristics and to understand performance changes in the deployed fleet. By the end of 20 years, all known limited life items will be replaced in the GBI fleet. Refurbishments of operational and flight test interceptors also provide critical data points for the Aging and Surveillance Program. During the refurbishment process approximately 20 key samples (parts) are removed resulting in over 900 total samples taken. Another key activity of the Aging and Surveillance program is the static firing of eight motor stages (two 1st stages, three 2nd stages and three 3rd stages) and the dissection of two motor stages (one 1st stage and one 3rd stage) over the next 22 years.

A GBI rotation program will also be used which removes older assets from the operational fleet and replaces them with newer GBIs off the production line. This reduces the average age of the fleet and uses the older, refurbished GBIs for test or operational spare requirements. The surveillance flight testing provides the most operationally realistic method of evaluating interceptor reliability performance assessment by using older removed GBIs from the operational fleet during IMTP test events, which are designed to accomplish performance and surveillance test objectives concurrently.

The fiscal year 2011 President's Budget request lays out a plan that funds production start-up costs for cold GBI suppliers, and begins the acquisition of five additional GBIs. This planned acquisition will bring the GBI total to 52, and is consistent with the IMTP and stockpile reliability testing requirements to support the service life of the GMD element. A total of 52 GBIs completes the fielding of 30 operational GBIs and delivery of 22 additional GBIs for testing, stockpile reliability and operational spare requirements. Of the 22 GBIs, 16 GBIs are allocated to testing defined in the IMTP (two will be consumed in FY10) and by the end of 2020, six GBIs will remain for operational spares and SRP testing.

Mr. LAMBORN. According to MDA's budget documents, 14 GBIs will be available for flight testing. Do you believe MDA has programmed and budgeted for enough GBIs to support developmental and operational testing, as well as annual reliability flight testing?

General O'REILLY. Yes. The fiscal year 2011 President's Budget request lays out a plan that pays production start-up costs for cold Ground-Based Interceptor (GBI) suppliers, and begins the acquisition of five additional GBIs beginning in fiscal year 2011. This planned acquisition will bring the GBI total to 52. This quantity satisfies the Integrated Master Test Plan (IMTP) and stockpile reliability testing requirements to support the service life of the Ground-Based Midcourse Defense (GMD) element of the Ballistic Missile Defense System. The total provides for completing the fielding of 30 operational GBIs and delivering 22 additional GBIs for testing, stockpile reliability and operational spare requirements.

Of the 22 GBIs, 16 (not 14) are allocated to testing defined in the IMTP. The current IMTP v10.1, dated 18 February 2010 and provided to Congress in March, defines tests considered both Developmental Test/Operational Test (DT/OT) flight tests and Stockpile Reliability Program (SRP) flight tests given that critical data is collected in each test for both DT/OT and SRP purposes. The six remaining GBIs are allocated for both operational spares and stockpile reliability tests beyond 2020.

MDA worked with the test community and together we determined that by 2019, if the tests are successful, we will have the data necessary to confirm the performance of the GMD system and all anticipated flight regimes. In addition, we have designed a missile with a capability of maintaining its health and status. As part of system operations and maintenance we constantly maintain the health and status of these missiles, we also run periodic checks thoroughly to verify its performance and the proper functioning of all of the systems. We will conduct 4.3 million checks through Built-In Tests (BIT) of these 30 missiles over a 20-year period, plus 600 other tests where we remove the missiles, remove components from it, test those components and refurbish the missiles with brand new components.

Mr. LAMBORN. General O'Reilly, what concerns you most about the industrial base? What actions have been taken and need to be taken to ensure an industrial base capable of producing the quality and quantity of product to meet current and long-term threats?

General O'REILLY. With the exception of solid rocket motors and propulsion systems, the Missile Defense Agency's (MDA) industrial base is healthy. The Agency has taken several steps to ensure key industrial base suppliers remain viable, particularly with the Ground-Based Interceptor industrial base.

The most recent purchase of Ground-Based Interceptors (GBIs) by the MDA was in December 2006. Some third and fourth tier GBI suppliers began "production breaks" in 2007. All third and fourth tier supplier manufacturing lines are expected to complete deliveries in FY10 for GBIs currently on contract, with the exception of Aerojet and Rockwell Collins.

Congress provided an additional $50M in FY10 to assist in keeping manufacturing lines warm for critical suppliers through FY 2010 due to the fact that key suppliers are expected to complete deliveries in FY10 for GBIs currently on contract. Accordingly, MDA authorized Boeing in January and April 2010 to purchase:

- Booster Orion Motor Sets (ATK)—FY10 increment for eight motor sets (completion and delivery of the motor sets will be continued under a separate future contract action)
- Booster Shrouds (Astech)—5 units
- EKV Communication Link Subsystem (Rockwell Collins)—FY10 increment for 3 units (completion and delivery will be continued under a separate future contract action)
- EKV Inertial Measurement Units (Northrop Grumman)—2 units
- EKV Laser Firing Units (L–3)—3 units
- EKV Electronics Units (Raytheon)—3 units
- EKV Electrical Conversion Units (Raytheon)—3 units
- EKV Structures (General Dynamics)—2 units.

The new purchases above combined with the purchase of five additional GBIs and the purchase of planned refurbishment components are expected to sustain GBI 3rd and 4th tier suppliers until FY13.

GBI second tier supplier (Raytheon and Orbital) manufacturing lines are warm and are expected to remain warm beyond 2016 with continued deliveries of on-contract GBIs, ongoing refurbishments of operational and test GBIs, and the planned purchase of five additional GBIs.

Despite the general health of the industrial base, one area of general concern for MDA is the Solid Rocket Motor (SRM) industrial base. Concerns include the potential for:

- Increased cost
- Suppliers exiting the business causing costly requalification expenses
- Delivery schedules lengthen as new suppliers need to qualify lines to replace those that may exit the business

Much of THAAD and SM–3 SRMs are produced at Aerojet, which is right-sized. ATK, which produces GBI SRMs, has not "right-sized" to match demand.

MDA's long-term plan to sustain the high-tech SRM industrial base includes supporting the SRM Industrial Base InterAgency Task Force (IATF) development of a SRM Sustainment Plan. This plan includes:

- Working with industry to "right size" and align capacity to reality
- Ensuring long-term viability of small and large SRMs (missile defense and tactical systems), and
- Monitoring the fragile critical sub-tier supplier base

MDA also procures a small number of Divert Attitude and Control Systems (DACS) for THAAD and GBI Exoatmospheric Kill Vehicles (EKVs). These engines use a small quantity of liquid propellant. The industrial base for both of these systems is healthy.

Mr. LAMBORN. General O'Reilly, do you believe we should continue to develop and test the 2-stage ground-based interceptor (for example, as a hedge against a possible Iranian break-out)?

General O'REILLY. The Department of Defense is investing in new missile defense capacity and capabilities to hedge against future uncertainties in both the ballistic missile threat and the technical risk inherent to development plans. One such hedge effort is the development and testing of a 2-stage Ground Based Interceptor (GBI). A 2-stage interceptor has less burn time than the 3-stage version, enabling operation within a shorter engagement timeline. As such, 2-stage GBIs provide time for greater launch windows and additional shot opportunities to engage threat missiles in some scenarios.

While there are no plans to field this interceptor at present, maintaining a 2-stage GBI development and testing program preserves the option to field missile defenses for defense of the homeland in a timely and effective manner. Accordingly, we will be flight testing the 2-stage GBI for the first time in June 2010.

Mr. LAMBORN. General O'Reilly, Do you believe there should be a competition or clear criteria established for a down-select between the 2-stage GBI and the SM–3 Block 2A and Block 2B interceptors which are planned to provide defense of Europe and the U.S. in the new Phased, Adaptive Approach? Right now, it would appear that the Department has put all its proverbial "eggs" in the SM–3 Block 2A and Block 2B "basket."

General O'REILLY. [The information referred to is classified and is retained in the subcommittee files.]

Mr. LAMBORN. General O'Reilly, Many aspects of a truly joint and integrated training program for missile defense hinge upon the release of an Operations Concept for Ballistic Missile Defense. What is the current status of an Operations Concept for Ballistic Missile Defense? Who are the key players in writing the concept and what is MDA's role, if any? Is there a deadline for the Operations Concept?

General O'REILLY. The Commander, U.S. Strategic Command signed the Global Missile Defense Concept of Operations on February, 28, 2010. U.S. Strategic Command was assisted by the Joint Staff, Geographic Combatant Commanders, Joint Functional Component Command for Integrated Missile Defense, Services, and the Missile Defense Agency in writing the concept. Within the Concept of Operations, the MDA has been assigned several tasks that contribute to setting the conditions for missile defense operations by the Combatant Commands.

Mr. LAMBORN. General O'Reilly, I understand that MDA has a seat on the Integrated Missile Defense Training Working Group along with STRATCOM and Joint Forces Command. General Chilton testified in March that each Service is responsible for training their component of the Missile Defense System with the training for C2BMC yet to be assigned. How does the Integrated Missile Defense Training Working Group inject training recommendations into Service channels to address any shortcomings that arise during tests? How are training shortfalls in command and control at the Service and COCOM staff level resolved?

General O'REILLY. In accordance with a U.S. Strategic Command Instruction, Missile Defense Training Qualification and Certification Program, the Integrated Training Working Group (ITWG) serves as an inter-agency/inter-Service and international partner advisory group to provide oversight for training initiatives, ensure Service and component representation in decision-making, and arbitrate training issues. The ITWG serves as an advisory forum for all Integrated Missile Defense training matters and facilitates the training efforts of the entire Missile Defense community.

The ITWG does not inject training recommendations into Service channels. Training shortcomings that are identified during missile defense tests are injected into the Warfighter Involvement Process (WIP). The WIP is a multi-phased collaborative process linking combatant commands, international partners, Services, Defense Agencies, and the Joint Staff. Through this process stakeholders define desired (training) capabilities and evaluate enhancements to missile defense systems. Based on funding provided from Congress, the ITWG is conducting an independent training and education assessment of the Ballistic Missile Defense training and education needs across the Department of Defense. This study is being sponsored by the Joint Staff and overseen by a ITWG senior review panel.

Ballistic Missile Defense command and control, specifically C2BMC initial and spiral update training are scheduled and completed no later than 30 days prior to the MDA Program Control Board-approved software spiral release date. When refresher, crew rotation, or specific event training is needed, training is provided "on demand" by mobile training teams. The requesting organization contacts the C2BMC Program Office training manager to convey training requirements and schedule a mobile training team visit. All training (initial, refresher, spiral update, crew rotation, and specific event) is conducted at the requestor's location.

Mr. LAMBORN. Dr. Gilmore, the Ground-based Midcourse Defense (GMD) system is expected to have a lifetime of 20 years. How many flight tests per year do you believe are necessary to ensure the long-term reliability of the GMD system over its 20-year lifetime?

Dr. GILMORE. Continued flight testing will be necessary to assess GMD reliability over the lifetime of the system. The Air Force and Navy both conduct three to four flight tests per year for their Minuteman and Trident fleets respectively. These flight tests support large inventories of 350–450 missiles each. The number of flight tests conducted is based on a combination of statistical calculations, reliability experience to-date, and available funding.

It is the system sponsor's responsibility to establish a life-cycle reliability program designed to demonstrate to the user that what has been delivered continues to be a viable weapon system. Typically, the developing command, the MDA, would recommend to the operating command, U.S. Northern Command, a flight testing program for the ground-based interceptor to verify missile reliability throughout its projected life time. The recommendation could include both ground and flight testing. This recommendation would be based on a number of factors including: demonstrated reliability in the developmental and operational test programs leading up to fielding; estimated or demonstrated reliability of the various missile components; complexity of the missile system; experience with other similar missile systems; ongoing developmental testing that could substitute for or supplement reliability testing; availability of operational assets for testing or for replacement on operational status if missiles are expended during reliability testing; funding available to execute a reliability test program; and the risk the operating command is willing to assume. These are the same kinds of considerations that have been part of the development of the flight test program for Trident and Minuteman.

The GMD program will be in continual testing through 2020, the results of which will provide data on the system's reliability. I expect flight testing will continue beyond that time. The number of tests conducted will depend on the considerations described above.

Mr. LAMBORN. According to MDA's budget documents, 14 GBIs will be available for flight testing. Do you believe MDA has programmed and budgeted for enough GBIs to support developmental and operational testing, as well as annual reliability flight testing?

Dr. GILMORE. The GMD flight test program is based on the requirements defined by the three-phased process that the MDA used to create the new, five-year Integrated Master Test Plan (IMTP) that I approved last July. This approach emphasizes testing under Critical Engagement Conditions (CECs) and during Empirical Measurement Events (EMEs) to collect the data on system performance necessary to verify, validate, and accredit, the GMD and Ballistic Missile Defense System (BMDS) models and simulations to be used to assess overall capability. The IMTP is a rigorous plan for obtaining the test information needed to assess GMD and BMDS performance quantitatively. If the MDA can execute the IMTP, the data needed to validate models and perform quantitative assessments of GMD and BMDS performance will become available.

The MDA has programmed and budgeted for the GBIs needed to conduct the developmental and operational testing defined in the IMTP. Additional interceptors will be needed to conduct flight testing beyond 2020 to verify GMD performance, including reliability. The number of tests conducted will depend upon a number of considerations including: demonstrated reliability in the developmental and operational test programs leading up to fielding; estimated or demonstrated reliability of the various missile components; complexity of the missile system; experience with other similar missile systems; ongoing developmental testing that could substitute for or supplement reliability testing; availability of operational assets for testing or for replacement on operational status if missiles are expended during reliability testing; funding available to execute a reliability test program; and the risk the operating command is willing to assume.