HEARING TO RECEIVE TESTIMONY ON BALLISTIC MISSILE DEFENSE POLICIES AND PROGRAMS IN REVIEW OF THE DEFENSE AUTHORIZATION REQUEST FOR FISCAL YEAR 2013 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, APRIL 25, 2012

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

The subcommittee met, pursuant to notice, at 12:56 p.m. in room SR–222, Russell Senate Office Building, Senator E. Benjamin Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Nelson and Sessions.

Majority staff members present: Jonathan S. Epstein, counsel; and Richard W. Fieldhouse, professional staff member.

Minority staff member present: Daniel A. Lerner, professional staff member.

Staff assistant present: Brian F. Sebold.

Committee members' assistants present: Ryan Ehly, assistant to Senator Nelson; and Lenwood Landrum, assistant to Senator Sessions.

OPENING STATEMENT OF SENATOR E. BENJAMIN NELSON, CHAIRMAN

Senator NELSON. Senator Sessions will be just a little bit late and he's asked that I go ahead start, so it won't matter if we start a little bit early. We might have a couple more minutes to have the hearing.

The subcommittee is now in session and is meeting today under somewhat unusual circumstances. Since the Senate will have a series of votes throughout this afternoon, we had to move up the hearing to start early. Otherwise we wouldn't have been able to hold the hearing before our committee marks up the National Defense Authorization Act for Fiscal Year 2013.

And since the votes will start at 2 o'clock, we'll have a highly compressed hearing. Probably that doesn't break your hearts, to have to have a little bit less time in the hearing. But we won't be making the ordinary, normal opening statements. Instead we'll put all the opening statements in the record, together with your other prepared testimony, in order to maximize our time.

We'll also give members an opportunity, when Senator Sessions gets here, to submit statements and questions for the record, which will remain open until the end of next Tuesday, to make certain we get the complete transcript, complete record in the transcript. We would greatly appreciate if we could respond promptly and easily to the questions so that we can answer some of the questions that are so important.

I want to thank all of you today, each of you, for your service, for your flexibility and understanding of our need to start the hearing early. Our witnesses today are: the Honorable Michael Gilmore, Director of Operational Test and Evaluation; Dr. Brad Roberts, the Deputy Assistant Secretary of Defense for Nuclear and Missile Defense Policy; Lieutenant General Patrick O'Reilly, the Director of the Missile Defense Agency; Lieutenant General Richard Formica, the Commander of the U.S. Army Space and Missile Defense Command; and Ms. Cristina Chaplain, the Director of Acquisition and Sourcing Management at the Government Accountability Office.

I thank Senator Sessions and his staff for being able to accommodate the rescheduling of the hearing today.

What we'll do is we'll begin the question and answer period. We'll try seven-minute rounds. I'll use all the time that I can until Senator Sessions gets here and then we'll recognize him right away.

In terms of homeland defense as a priority—and this is a question for Dr. Roberts and our two generals—General O'Reilly's prepared statement says that "Defense of the homeland is our highest priority," end of quote, which is consistent with the Ballistic Missile Defense Review. But some have questioned whether it is the top missile defense priority or suggested that we have to choose between homeland defense and regional missile defense.

Can each of you tell us if homeland defense is the administration's top missile defense priority and if you believe we can and should and do provide both homeland defense and regional missile defense capability simultaneously in a balanced manner that meets our warfighter's needs?

Dr. Roberts.

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

Dr. ROBERTS. Thank you, Mr. Chairman.

The Ballistic Missile Defense Review actually sets out six priorities and we would continue to hold to all of them. Top of the list, the first priority, is the protection of the homeland. But it's a false choice between the first priority and the other priorities. We have it within our means and within the current budget to do everything we need to do to advance our commitment to both homeland defense and regional defense.

The perception of an imbalance of investment here has been reinforced by some inaccurate information that was put into play earlier. My reading of the budget in front of you is that roughly one-third or 37 percent can be uniquely associated with regional missile defense and the remaining two-thirds is either uniquely associated with homeland defense or reinforces both sets of commitments, for

example investments in command and control, investments in the PTSS sensor system.

So we see—we don't see that our investments are skewed heavily away from homeland defense. We see a robust set of investments in addressing the reliability problems in the GBI, strengthening the sensor system, taking additional steps to strengthen the defense of the homeland. And the budget permits us to do all of those things in a balanced manner with acceptable risk.

Thank you, sir.

[The prepared statement of Dr. Roberts follows:]

Senator NELSON. Isn't it also true that this concept of dual protection isn't new with this administration? The previous administration introduced the idea of some regional defense mechanisms during the last administration; isn't that accurate?

Dr. ROBERTS. Yes, indeed, that's accurate. Our national commitment to both of these areas has been clear since the end of the Cold War. The Persian Gulf War woke us up to the fact of regional missile proliferation and long-range missile proliferation. So in the 1990s, first the Bush Administration and then the Clinton administration talked about theater missile defense and national missile defense. The Bush administration for the last decade set out a different set of shorthands, but the same basic concept, that we pursue a balanced approach. And we similarly have set out a balanced approach.

So yes, sir, we see continuity over the last three decades to our national commitment in this area.

Senator NELSON. Part of that would be consistent with the Phased Adaptive Approach that is under consideration right now; is that accurate?

Dr. ROBERTS. Yes, sir. The notion of bringing together regional defensive capabilities in tailored support of our commitments in individual regions goes back to the initial development of these capabilities in the 1990s. It would be—although our principal political debate has been focused on European Phased Adaptive missile defense, I would say there's a longer history of phasing and adapting missile defense in Northeast Asia, in partnership with Japan, and similarly in the Middle East in partnership with Israel and some others.

So we have a long history of adapting and integrating these capabilities as they emerged proven from the technology developers, and indeed that dates back a good number of years.

Senator NELSON. General O'Reilly?

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

General O'REILLY. Senator, I would also add that this budget that we've submitted is balanced, and the balancing occurred with the full participation of not only OSD Policy, but also Dr. Gilmore and considering the test needs, also warfighter priorities, the COCOMs, the Joint Chiefs, and the Services.

In that balancing and looking at both regional and homeland defense, we considered the intelligence. In the area of regional defense, there's a significant disparity between the number of missile defense systems we have and interceptors and the number of

threat missiles that we see in the regional content—or context, globally. We're not in that position with homeland defense. We want to stay in a position of strength, where we have a greater homeland defense than we do, that we see ICBMs facing us today from current regional partners.

Finally, technical progress. In the GMD program right now, we are addressing and are prepared to come back to flight testing, but we are paced by the flight test progress that we've had, and we've had two failures. No matter what budget we are dedicating, we have to get over those flight test failures. I don't think those failures would have been avoided if we would have had a larger or a lesser budget than we had. It's a matter of working through the flight environments and the other issues which we uncovered in testing.

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

Senator NELSON. Well, in terms of let's say even the regional defense mechanisms, aren't we finding that some of the Nations in connection with the regional defense are providing us help with their own radar and their own capacity for technology?

General O'REILLY. Yes, sir. We've had very extensive discussions in many theaters around the world, in the North Arabian Gulf and Europe and Northeast Asia. We participate with over 20 countries that work either on missile defense, working in analyzing architectures where they can contribute, as you said. They have lower tier systems, some of them have Aegis systems, Patriot, their own indigenous systems like the French SAM–T, and the Dutch and others have made declarations this year that they are investing in their own budgets to modify their ship radars so they can participate and we can utilize the data coming off those radars.

So we've had an extensive amount of cooperation in order to leverage their capability, which is primarily a lower tier, and we bring the higher intercept altitudes, the upper tier, to a missile defense architecture.

Senator NELSON. General Formica.

STATEMENT OF LTG RICHARD P. FORMICA, USA, COMMANDER, U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND/ARMY FORCES STRATEGIC COMMAND, AND COMMANDER, JOINT FUNCTIONAL COMPONENT COMMAND FOR INTEGRATED MISSILE DEFENSE

General FORMICA. Mr. Chairman, thank you for the opportunity to add to this discussion. From an operator's perspective, this really does come down to a balance of many competing priorities—homeland, region, operational risk, affordability. We recognize the six priorities laid out in the Ballistic Missile Defense Review and recognize that homeland defense clearly identifies the number one priority and protecting our forces, allies and friends abroad as our number two priority.

My assessment is that was appropriately discussed and adequately represented in the discussions that led to the approval of the MDA's budget that you have in front of you. It also recognizes that there's never going to be enough missile defense to satisfy all of the warfighter's demands. But this budget I believe is an appro-

priate balance, homeland defense, regional capability, operational risk, and affordability.

[The prepared statement of General Formica follows:]

Senator NELSON. Thank you.

General O'Reilly, our missile defenses must provide force protection for our forward-deployed military personnel and that's an overarching national priority referred to by General Formica, and it's a responsibility to our troops as well. If we were just trying to provide protection for our military forces deployed in Europe, wouldn't that require some missile defense capabilities very similar to our planned European Phased Adaptive Approach, with the number of troops that we have stationed and the number of bases that are located within that area?

General O'REILLY. Yes, sir, it would. As I said before, we provide primarily the high altitude intercepts. Because of the nature of that intercept, occurring exoatmospherically or up in the higher parts of our atmosphere, you get a very broad area coverage for that layer of defense. If we only isolated on U.S. bases or U.S. interests in the region, you still would cover a very large portion of Europe, because the coverage extends beyond just the particular asset you're trying to protect. Under article 5 of our NATO agreement, we are committed to, if we have the opportunity, we will defend another threatened portion of NATO.

Senator NELSON. And our troops' force protection has to be among the highest priorities, together with protecting the homeland, as General Formica said. So in a sense we get two areas of protection, one of our allies and the other is for our own troops, with this regional or theater protection system; is that accurate?

General O'REILLY. Yes, Senator.

Senator NELSON. Thank you.

General O'Reilly, in previous testimony you've indicated that the missile defense program and budget request were reviewed, and General Formica has made reference to it as well, by an array of senior decisionmakers at the Missile Defense Executive Board, with the participation of the Joint Chiefs of Staff, the services, combatant commands, the deputy secretary of defense, and finally the Secretary of Defense.

Can you tell us, did they review and approve the current budget request for missile defense?

General O'REILLY. Yes, Senator, they did. The process involves typically at least a half a year of me returning to that board, presenting different options, getting guidance from them. It is a very rigorous process, very iterative process, as they balance the intelligence and the other needs to formulate a final budget.

I would also add, Senator, that Dr. Gilmore is part of that board, too, and our testing represents a large part of the budget every year in order to give the combatant commanders confidence that we have the capability and also to support and address any issues which my programs may reveal based on previous testing.

Senator NELSON. Dr. Gilmore, could you give us your perspective on this process of review and the conclusions that were drawn?

STATEMENT OF HON. J. MICHAEL GILMORE, PH.D., DIRECTOR, OPERATIONAL TEST AND EVALUATION, DEPARTMENT OF DEFENSE

Dr. GILMORE. It's a rigorous review, and to support the reviews that are actually done by the MDEB, General O'Reilly and I and our staffs participate in a number of reviews, as the two versions that are done each year of the integrated master test plan, that lays out all the testing for all the elements of the BMDS, is developed, and we have a good technical interchange and sometimes robust debate about what the content of the test program ought to be, and we always reach good conclusions about what it ought to be.

The plan in my opinion that was recently submitted this year is a very rigorous plan. In fact, in the 20 years I've been dealing with missile defense, the most rigorous plans for testing ballistic missile defenses that I've seen are the ones that General O'Reilly has produced when he started with the IMTP process.

I'd note that the testing for ground-based missile defense, the defense of the homeland, in the most recent IMTP, the pace of that and the content of it has been preserved despite the budget cuts that the Department has taken to comply with the Budget Control Act, and the pace and content of GMD testing is essentially the same as it's been for the last two or three years since I've been involved in this, in this process.

The focus of the testing is on doing flight testing to discover the problems that have been discovered, which are very important—actually, sometimes you learn a lot more from the failures than you do from the successes—but also on validating and accrediting the models that are going to be actually very just key, in fact the only way to build high confidence in the performance of the system, because none of these elements, including GMD, are actually going to be able to be tested in all aspects across the full battle space and in totally operationally realistic conditions, just because of real world constraints, like we can't fire out of the Russian information flight region when we do tests.

So I'm very happy with the process that's in place and the plan I think is very rigorous and defensible.

[The prepared statement of Dr. Gilmore follows:]

Senator NELSON. Thank you.

General Formica, you made some reference to the amount of time and the number of individuals doing the review. Are you satisfied that the review was appropriately undertaken and that the conclusions drawn are the best conclusions that could be drawn?

General FORMICA. Mr. Chairman, again thank you for the chance to comment. I'm new to this business. 24 months ago I didn't know what an MDEB was. So I haven't had an opportunity to participate in the system. I walk away with confidence in the system as it is laid out and in the way and manner in which it was applied in the development of this budget.

It started with the requirements of the demands that the combatant commanders have brought forward, synthesized by U.S. STRATCOM in a prioritized capability list. Every time that MDA brought forth a budget proposal, what we call the POM and a series of alternate POMs—and there were several iterations—and we

also considered alternatives that weren't necessarily done by the Missile Defense Agency, to look at a full range of budgeting options, program options.

We compared those against the prioritized capability list. The operators, both deputy commander of U.S. STRATCOM and I, were at the Missile Defense Executive Board to provide that operational assessment. U.S. NORTHCOM was generally represented there, the services. And there was, as you heard in this testimony, healthy discussion and debate, and it is my assessment that this budget that you have in front of you is a reflection of an appropriate balance of affordability versus risk, and again homeland versus region, and we discussed all of those tradeoffs in this process.

Senator NELSON. Thank you.

Ms. Chaplain, the report you issued last Friday focuses on what you assess to be high levels of concurrency in a number of MDA programs. Although DOD has agreed with almost all of your recommendations, I take it that General O'Reilly has a maybe perhaps different view on concurrency, and I'd like to explore the issue.

Ms. Chaplain, you acknowledge that some concurrency is acceptable and probably inevitable under the circumstances. What do you believe constitutes an acceptable level of concurrency and perhaps you could give us an example that would be helpful?

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

Ms. CHAPLAIN. Yes. You can look at concurrency in terms of a spectrum and not as an on and off switch in terms of when it gets bad or isn't bad. A lot of programs need to buy some long lead items, for example, that represent some concurrency in a program and that's okay to do. Where we get concerned is where we see what we believe to be pretty extreme levels of concurrency, for example if you're testing and producing assets at the same time, and therefore when you find problems you're going to have to do a lot of expensive retrofits. We've seen that in a couple of the programs. That's where we've highlighted concerns.

I don't believe we had really acknowledged enough that some concurrency was okay in our draft and General O'Reilly was responding to some of that.

Another example, though, where we see concurrency as being a little bit more on the extreme side is with the lining up of knowledge for making a long-term program commitment. We'd like to see a preliminary design review inform that decision to make a long-term commitment to a program, because that review helps ensure that you can match resources to requirements, your technologies are well understood, and that you can get something done within the resources you have.

In a couple of cases we've seen that particular review come after that commitment. So we've already made a long-term commitment to something and yet you don't have that knowledge that you need, that we believe you need, to make that commitment.

[The prepared statement of Ms. Chaplain follows:]

Senator NELSON. Well, General O'Reilly, what do you believe would be an acceptable level of concurrency, and have you been taking steps to reduce the level of concurrency in the programs?

General O'REILLY. Yes, sir. We agree in large part with what the GAO report contained from the point of view of it's very high risk, as far as cost goes, to deploying a missile system, for example, that hasn't gone through what we call ground qualification testing, testing all the environments and the components.

I do believe there has to be some concurrency, first of all from an industrial base point of view. What we typically do is develop prototypes or early production models, and those are the items which we fly. However, if we do not sustain the production base during that period—and a lot of times our test programs take more than two years or more—we actually raise risk to the program by not continuing to produce at a low level.

I think the best balance is to ensure you have very good ground qualification to convince yourself that we have no inherent problems in the designs, and then move to flight testing, but continue at a low production rate, which most programs do. Unfortunately, missile defense programs, there's very few end items in the end because we're limited in the number of missiles we procure, and the budget. So we have to be very careful of sustaining some production while we're going through testing.

We have in fact reduced a significant amount of concurrency. I did not concur with the level of concurrency in the current programs when I became the director. We reviewed them we added approximately a year to the test program and the design phase of the program for the 1B, and we also added approximately two years to the 2A program to address concurrency. That was prior to the GAO report, and we do balance that. And it also depends on the maturity of the technology.

Senator NELSON. Ms. Chaplain, do you agree with General O'Reilly's assessment there?

Ms. CHAPLAIN. I would make a couple points. I think in terms of what's the optimum amount of production numbers when you're in that phase trying to sustain an industrial base, where we've had disagreements is actually the amount that is being produced and is it too much, is it going beyond what you need for test assets. In that case I think MDA recently took action to sort of address that concern we had in the 1B program.

In terms of trying not to put in gaps in the industrial base, our concern is when there is too much concurrency and you have the need to retrofit and stop production, you're actually creating more disruptions to the industrial base. So there is a careful balance there.

Lastly, I would just also recognize, though, I think after our audit work MDA took a step on the GMD side to put off production until it has that flight intercept test, which we had a very specific recommendation about. So we were happy with some of the steps that were made that we weren't able to really recognize in our report because they were made after our audit work.

Senator NELSON. Well, I assume that you agree that the practical realities of production are such that you can't always have a line of production sitting idle, so that there are some requirements that

things continue to move. But your concern would be that they not move too quickly, so that you get ahead of your testing. Is that a fair statement?

Ms. CHAPLAIN. Yes. It's not ramping up too much before that testing is complete so that it becomes very expensive to make those adjustments.

Senator NELSON. By the same token, having a line idle is not very likely and that's costly as well.

Ms. CHAPLAIN. It's costly and you could lose key skills, which are difficult to find in this kind of system development. So it's a balancing act. We recognize that. We're not trying to be very black and white about this. But in the cases we've looked at it just—the concurrency there was more than we were comfortable with. It's resulted in problems. And our recommendations are just aimed at having DOD go back and look across the portfolio, see where concurrency could be reduced. I don't think it's realistic to expect it to be reduced across the board.

Senator NELSON. Well, I think it's safe to say that General O'Reilly will do his level best to keep concurrency at an acceptable level, recognizing the costly nature of getting ahead or falling behind. So we appreciate those thoughts.

Well, my friend and colleague has arrived, the ranking member. I've taken all of your time. We're just about——

Senator SESSIONS. I don't have anything left.

Senator NELSON. No, I think you do. But we compressed the time frame without opening statements, but you're entitled to an opening statement—I made one—if you choose. And we're in a seven-minute round of questions. I have answered—I have raised several questions and have several more. But at this point I'd say the floor is yours.

Senator SESSIONS. Thank you. Well, I had a very important engagement. I grew up in a little town, there were 30 in my senior class, and I just got to have lunch with my classmate of first through 12 grades, who's the president of the University of Alabama, who just got elevated. Of course, her brother's Congressman Joe Bonner from the House. We also have a lieutenant governor of Alabama who's a couple years ahead of us. So we're a pretty good little group, I guess, all things considered. So it was a real pleasure to see her.

Senator NELSON. I'll brag on mine next hearing.

Senator SESSIONS. It was a pleasure to see my classmate just after she's been selected to that important office. In Alabama that's a big deal. Next to the football coach or the President, it's pretty important.

General O'Reilly, General Formica, and Dr. Roberts: the fiscal year 2013 MDA budget creates an imbalance, an underfunding, it seems, underfunding the procurement, sustainment, and modernization of the proven capabilities, it seems to me, the things that we worked on and got ready to deploy, to pay for developing efforts necessary to fulfil the President's vision for a new kind of defense of Europe.

We had a plan for a number of years that would have provided a lower risk option to augment the defense of the homeland against a long-range Iranian threat and also Europe. So now we're using

moneys from those programs to help pay for the more high risk programs—you and I have talked about it, so this is not a surprise—but to pay for the SM3 Block 2B, which is I think not developed, just beginning to go forward, and the risk factor in a lot of different areas is great.

The budget proposes a reduction of more than $3 billion, it looks like to us, across the future years defense program for the procurement of THAAD and the AN/TPY–2 portable radars, two high demand systems that the Joint Staff-led joint capability mix study justified in past budgets.

So is it true—I guess yes or no: Is it true that this budget reduces the number of planned THAAD battery purchases from nine to six? Who wants to be first on that? General?

General O'REILLY. Sir, it has been reduced from nine to six. There was a process that we went through of many different budget alternatives and they were reviewed by the Department at the highest levels, including the Joint Chiefs, the combatant commanders, the services. We went through many trades and part of the balance was the Budget Control Act requirements. But of the priorities that came out of it—and again, they were set by the priorities that General Formica's organization sets—this budget is consistent with those priorities.

Senator SESSIONS. Well, of course we know that the Defense Department has been asked to take a very substantial reduction and it had to make tough choices. So we're just trying to ascertain how that's playing out in real events.

Isn't it true that the budget reduces the number of planned THAAD interceptors from 503 to 320?

General O'REILLY. Yes, sir. It matches the number of units that we are now procuring.

Senator SESSIONS. And doesn't it reduce the number of planned TPY–2 radars from 18 to 11?

General O'REILLY. Yes, sir. Those radars are associated with the units.

Senator SESSIONS. And is it true that the Joint Staff -led capability, joint capability mix study endorsed and was used as a justification for increasing quantities of these high-demand assets in last year's budget?

General O'REILLY. Yes, sir, that was. As that was reviewed again this year, again by General Formica's organizations and others, and that was taken into account.

Senator SESSIONS. Well, has the demand from the combatant commands for THAAD and TPY–2 radar decreased over the last year?

General FORMICA. Sir, if I may, I'd respond to that.

Senator SESSIONS. Yes.

General FORMICA. The demand for THAAD and TP–2 radars, like the demand for other missile defense assets, continues to increase and has not been reduced by combatant commanders. The discussion on how many THAADs to procure as it came up in the review process during the Missile Defense Executive Board really came down to going back to the priority between investing in the homeland and investing in the region. THAAD is a capability that predominantly provides for investment—for defense, regional missile

defense. So the decision was made to reduce the number of THAAD batteries from nine to six. Six was the minimum acceptable that the operators had identified, so we didn't go anywhere below that. There's demand for more than six. There's actually demand for more than nine. But again, balancing operational risk, affordability, homeland defense, and regional defense, the decision was—

Senator SESSIONS. Balancing the amount of money that you had.

General FORMICA. Yes, sir, there's no doubt that was part of it. That was the affordability.

Then I would just say, one of the I think important decisions that we take for granted is that the three THAADs that were reduced were the last three in the program. So this budget will build THAAD capability in the early years on the time and schedule that was originally programmed. It allows us to build that capability and establish increased capacity, and we'll be able to assess based on operational requirements and budget in the following years.

Senator SESSIONS. So you plan to stick at the 320? is that what that means?

General FORMICA. It means that the current budget will start at the 320 interceptors. Again, as General O'Reilly said, that is appropriate for the number of launchers that are being procured. The number of batteries, it's tied to the number of batteries.

Senator SESSIONS. Right. So the number of batteries and the number of launchers, the 320 would be where you plan to stop.

General FORMICA. That's in the current program.

Dr. ROBERTS. May I add a point to that discussion?

Senator SESSIONS. Yes.

Dr. ROBERTS. It's not where we plan to stop. We plan to continue to build capability for the homeland and for the regions for decades to come. That's the plan in the fiscal yearDP. It's not as if at the end of that we've drawn a line and said that's enough. This is just what we're currently capable of funding. It leaves the production line open and it continues the capability in the regions, and it also gives our allies the opportunity to buy some of their own.

Senator SESSIONS. Well, I understand that allies might help keep an assembly line going. But if we allow the assembly line to go down, you just can't start it up so easily, and the price per copy would go up, would it not?

General O'Reilly, it's been almost a year and a half since the GMD test failure. Unfortunately, the problems I understand have not been fixed. I understand that the flight test to validate the fix will not take place until December of this year, a full two years after the failure.

Is there anything that you could have done, that you think now you could have done, to fix that capability enhancement sooner than we planned?

General O'REILLY. Sir, the first issue we had was a quality control issue. We showed in the second flight that we have addressed that issue, and we did not have that in the second flight.

Unfortunately, that delayed us to get into a test regime and environments where we did find where we needed to revise the design of some of the components of the missile. Once we finish that, sir, going through the time it took to validate exactly what the issue was and convince ourselves we understood it, and then we started

the process of building the revised components. But out of that understanding we now have changed—we have more stringent manufacturing requirements and in fact we've found we were not meeting those manufacturing more stringent requirements, and that in fact caused us to start again to adjust the production.

What's really key in the time it's taking is, unfortunately, the components that we've had to redesign and revalidate and requalify are at the very beginning of the assembly process. So we have to literally disassemble most of the kill vehicle in order to get to the component and then very precisely build them back up. If it was some of the components on the outside, like a thruster problem or something, we could have very quickly replaced out the components once we had a redesign.

So it's the nature it happens to be of the actual components where we found the issue that is the driver in the long time line.

Senator SESSIONS. Well, sometimes those things happen. We can all pretend that these things shouldn't happen, but sometimes they just do and I understand that.

I guess, Mr. Chairman, if we look at it, we had the GMD trying to use a two-stage in Europe, and we have a THAAD program and a Patriot program, but we're shifting a good deal of money and resources to what is projected to work, an SM3 Block 2B, that I think now will be about 2020 before it's projected to be ready to deploy. Would that be about right, General O'Reilly?

General O'REILLY. Sir, that's what we projected last year. But our budget we received—we requested $123.5 million. We received $13 million. So that has effectively delayed the program a year because we didn't have the funding to execute. So 2021 I believe is a more accurate number.

Senator SESSIONS. And we've got severe financial challenges in this country, and I'm not sure how tough it's going to be. I'm not prepared to say that we're not going to have additional cuts, that it's not going to be put off longer, or you might have a technical difficulty and it's 2025, when we could have had in the ground, as I understand it, the two-stage by what, 2017, something like that? What was the plan for the two-stage GMD for the Polish site? How long would it have been to be deployed?

General O'REILLY. Sir, first of all, we flew the two- stage two years ago. So we believe we have a mature—and it has the same kill vehicle on it that we have in our three-stage. So we believe it is a very mature missile design and capability.

As I recall, it was a 2014 delivery when we finished, when we'd begin delivering those. I defer to Dr. Roberts. I'm trying to remember.

Dr. ROBERTS. Sir, when I assumed my responsibilities my first briefing on the European third site was that initial operational capability had slipped to 2018. At the same time, we'd also lost the support of the Czech Government for the radar. But that was IOC, and as a result of the approach that we've taken with our allies we now actually have what might equate to IOC. We actually have phase one of the PAA already in place, the capabilities in place, radars deployed.

We will continue to grow this capability to protect our forces and to give our allies opportunities to protect themselves. In other

words, we will have covered a lot of ground in providing protection against the emerging Iranian threat, that would not have been covered at all until IOC, whenever it was. The briefing I got was 2018.

So we can have a discussion about whether beyond 2018 we're on the right path, where you grow the capability. But the regional approach that's now in place puts capability into the field now that wasn't planned for another few years.

Senator SESSIONS. Well, I'm aware that this happened. I think some of it was to try to accommodate the Russians' concerns. But I believe had we been strong and firm the Czechs would have stayed in line, I think the Poles would have been happy to see the system deployed, and we would be on the road to doing it now. I'm a little bit concerned about where it all will end.

We'll need to look at that. I just share that concern.

Senator NELSON. Thank you, Senator Sessions.

Dr. Gilmore, there have been numerous concerns raised over the years, especially after flight test failures, that our missile defense systems won't work in an effective manner. There have been some recent press articles on this. Part of your job is to evaluate whether our missile defense systems have demonstrated that they will work effectively in an operational environment. Do you believe that testing to date has demonstrated that our fielded systems are able to accomplish their initial missions and are improving in their capability against increasing missions?

Dr. GILMORE. Testing to date has demonstrated the systems can work. What I will not make is a statement about confidence in the performance of the systems, because a statement of confidence for me is a statistical statement and it won't be for some time, as I have said in the two or three reports to Congress that I have submitted on testing of ballistic missile defense, until we have, as I pointed out in my comments a minute ago, conducted a flight test, which will give us the information needed to verify, validate, and accredit the models that we will have to use in order to evaluate the performance of the systems across the full battle space in which they'll have to operate.

In the report that I submitted this year, I provided quantitative estimates of performance and confidence in that performance for Aegis and Patriot. We're close and next year we'll provide the same kind of information on THAAD. But it takes time to gather the data, to verify, validate, and accredit the models. That is the focus of the test program and it will take a number of more years until we can do that comprehensively for all the elements of the system.

We're continuing to gather data and improve the models, so we're making progress in that regard constantly. But a complete, comprehensive assessment is still a number of years away.

Senator NELSON. General Formica, from the warfighter's perspective do you have confidence in the capability of our fielded missile defense systems, and do you agree that they're becoming more capable?

General FORMICA. Again, thank you, Mr. Chairman. The warfighter actively participates in and supports MDA's robust test program. The test program enables us—enables the system to demonstrate reliability in its performance. It improves warfighter confidence in the systems as they continue to test. It allows operators

to develop tactics, techniques, and procedures so that when those systems are eventually fielded we're ahead of the game in having those procedures in place and begin to develop them, and it allows for us to begin training our operators. Finally, it provides an opportunity for interface between the operator and the material developer early on, so that they can consider adjustments based on operator input.

So we support the test program, have confidence, continued, growing confidence in the capability of the ballistic missile defense system, and do agree that it is improving.

Senator NELSON. General O'Reilly, from time to time as failures have occurred I'm sure that others have talked to you about those failures and asked questions as to what you're going to do to fix them. What do you say when people ask you whether or not these systems are going to work effectively if needed, after the failures?

General O'REILLY. Sir, what we do, sir, is as we proceed forward with our flight test programs, we make each test tougher. We've had in the last 10 years 50, as I recall, 51 intercepts or 52 intercepts out of 64 hit-to-kill intercepts. So we have a very high percentage of success. But each test we make it, again working with Dr. Gilmore and the test community, we make it harder.

We also test in different environments. The basic environments, which for GMD for example, we've gone through the functionality. We've flown the older version. A large portion of the current version of our fleet of GBIs has flown five times and we have not found significant issues with it and we adjust to it.

But when we have a failure, we first—we have a very disciplined process. In fact, our failure review boards are formed before we have a test, just to make sure we don't lose anything and we can immediately capture data. Then it takes an extreme amount of analysis. These are complex programs, complex systems, and it is a—we not only determine with renowned experts from around the country what the probable cause is. I require they demonstrate it to me, they prove it, that this is a failure.

If they come up with three or four things that could have been the failure and they can't prove any one of them, then we do fixes to all of those probable causes. So that's a key point, sir. And our flight test at the end of this year is a non-intercept test, purposefully, because we're going to fly that missile in a much rougher environment than you normally would in any of our missions to protect the United States, just to validate that in fact we have solved this problem.

Senator NELSON. There has been some confusion about the Standard Missile 3, Block 2B system that's intended for phase 4 of the European Phased Adaptive Approach to missile defense. In addition to providing robust defense of our forces and allies in Europe against potential long-range missiles from Iran, it would also augment our homeland defense capability by providing a forward-based and cost-effective early defense capability against potential future long-range Iranian missiles that could reach the United States.

General O'Reilly, can you explain why you believe, if you do, the SM–3 2B is important to our homeland defense and what the impact would be if we didn't develop it.

General O'REILLY. Sir, there's two levels of answers to this. First of all, the SM–3 2B program is designed to be a program that intercepts a long-range ballistic missile, an ICBM, and that is what it's designed to do, a longer range missile. It's its primary purpose. It's to intercept it if you're in the right location and you're on a mobile launcher, like a ship.

If you intercept—and you can have a quite small missile compared to the capability if you're in the right location for the threat. If you're worried about, an example, Iran in the future and the United States, it's goal-tending. You get into the right position.

The benefit of it is our regional systems are built by having shoot-look-shoot. You have several opportunities to make an attempt and then determine have you been successful, and then you shoot again. We have that for all our regional systems. We do not have that for our homeland defense system. For all of the scenarios for homeland defense. We want that so that GMD is the system we're dedicated to and it is our primary defense, but we would first like to have a shot at any early intercept to determine whether or not we need to shoot the second one.

The second is, sir, is that in our industrial base we have a limited opportunity for companies to continue to complete and use their well-developed design teams in order to develop an intercept program to accomplish that capability.

So I am concerned about the industrial base and I am concerned about the opportunity for multiple companies—I think it's important for competition that multiple companies have the opportunity to compete for our missile defense interceptor programs. And without the 2B program, that tremendously limits the ability for the industrial base to maintain their expertise and capability.

Dr. ROBERTS. Sir, may I add an additional point to the discussion?

Senator NELSON. Sure, please.

Dr. ROBERTS. This goes to Senator Session's concern about the balance of investment between GBI's and SM3 2B. General O'Reilly has set out the important operational benefit of being able to have two tiers in this defense of the homeland. So when we've talked about EPAA phase 4, people associate the SM3 2B with the defense of Europe. Yes, we'll have some ancillary benefit there, but this is primarily—phase 4 is about the defense of the homeland. It's getting that first shot in early.

An entirely separate discussion of cost. We all expect we're going to have to continue to grow missile defense of the homeland for a long time to come. The proliferation trends are clear enough. There's a question of when threats will mature, but we don't expect them to stop maturing.

So we've tried to take a long-term look while ensuring that we remain well protected in the short and medium term. So strengthening the defense of the homeland involves addressing the technical problems in the GMD system, the results of concurrency that we discussed earlier. It involves being well hedged against the possibility that we need to put a lot more capability into the ground quickly because there's a breakout somewhere that would somehow call into question the fact that we're already well protected with 30 GBIs in the ground.

But looking ahead to the future growth, we'd rather put that future growth in—well, two areas: improving the performance of the existing system. If your shot doctrine is four to one, six to one, eight to one, you're much better off having a shot doctrine of two to one than buying a whole bunch of new GBIs.

Second, we'd like to put money into the 2B because it gives you the opportunity to grow at a much more cost- affordable way that future capability we're going to need. So from our perspective it's not a ransack the GBI budget to go do regional missile defense. Rather, it's a strategy for strengthening the homeland defense over the long term in a way that is cost affordable and enhances the performance of the system through the addition of this second layer.

Thank you.

Senator NELSON. Thank you.

Dr. GILMORE. Just one additional comment.

Senator NELSON. Sure.

Dr. GILMORE. With regard to the GMD test program, the content and pace of the GMD test program is essentially the same today as it was when I first looked at the integrated master test plan when I first took office over two and two- thirds years ago. So it is not the case that we have used the GMD test program budget to pay for anything else in this budget or in previous budgets.

Senator NELSON. Senator Sessions.

Senator SESSIONS. Well, I'll just say this about the SM3 Block 2B. It's not developed, it's not on the assembly line, it's not ready to be deployed, it's not a mature technology. And we've gone from a bird in the hand for two in the bush. And you're not going to be here probably, Mr. Roberts, and President Obama is not going to be here, in 2022, 2023, 2024, whenever this thing, if it ever gets funded to conclusion.

So we've gone from a virtual certainty to a very uncertain situation. From a politician who handles the money and knowing what we're going to be looking like, that's what we're doing. And I'm uneasy about it, frankly.

General O'Reilly, you talked about competition. You had some success with competition recently you were sharing with me. I was very impressed. Maybe we ought to hear that and what your concerns might be if we lose competition in the future.

General O'REILLY. Sir, we have had a benefit. We've had multiple programs. In, first of all, our ground-based midcourse defense contract, it was over ten years old. We have recompeted it. We believe because of the competition the actual cost of the contract was a billion dollars less than the government cost estimate that looked at all the factors, and we use history to predict what the cost of the contract should be.

We saw extremely innovative ideas in the company that ultimately won, Boeing, in order to save costs and in fact have a very effective program.

There were some other benefits, too. Because we were in a competitive situation, it allows the government to make clear what its desires are and to ensure that industry is highly motivated to respond. For example, our defects clause that's in this contract now. Previously, if we had a flight test failure, for example, there's a

limited amount of award fee money that we had planned to award the contractor, given a successful flight. Often, though, the failure of a flight can cost many times more than that award fee.

Under the new contract, all of their award fee from the moment the contract was first awarded is under consideration, rather than just the award fee associated for an event if the government determines harm has occurred to the government by a failure or something that we determine should have been preventable.

We have great access to data within the program that often isn't part of another contract. So we think contracts—that the competition, sir, has saved in this case a billion. We have also determined that we've had several others. This isn't the only one. We have a trend. Every time we've competed in our missile programs and targets programs, the savings has been in the hundreds of millions of dollars. This is all over the past year alone.

Senator SESSIONS. I think that's good news, and I think some of the things that we were prepared to pay a lot of money for because they were so difficult and unproven, once the technology has become available, it's like computers and cell phones to some degree; they're just less expensive today. Hopefully, we can build on all that good work that's been done and the price per copy of a lot of the new systems will be less and we can achieve even better capabilities.

Thank you, Mr. Chairman. This is an important part of America's defense. One of the things that I learned a number of years ago—when the issue was hot and I asked people at town meetings, what would happen if a country launched a missile at us, and they said: We'd shoot it down. Well, this was before the GMD was in the ground. I think there's a general perception by the American people that we have perhaps more capability than we do. But we've got some people that think the system won't work at all, that it's too complex and can't work.

But the truth is we are developing a missile defense capability that is reliable, that is—consistently defends America. But we need more of them. We need to keep the cost low. I think all in all we've accomplished more than a lot of people ever thought possible. So I congratulate all of you.

Senator NELSON. Thank you.

I have one final question. General O'Reilly, the Aegis BMD program had a flight test failure last September during the first flight test of the Standard Missile 3 Block 1B missile, which has delayed the scheduled production of that missile, and now it requires a plan to fix the problem and demonstrate the fix in flight testing. Can you tell us the likely cause, if it's not a matter of security, and how you're planning to correct it, and give us some indication of the criteria for a production decision on it? And do you agree just in general that we should demonstrate the problem is corrected in flight testing before we make a full rate production decision?

General O'REILLY. Sir, I offer to answer that question in a closed session. I can describe the exact reason why we believe the failure occurred, but we have—I can say we've duplicated it many times on the ground. We've proven this is the cause. We fly again next month. To answer your question, sir, there were planned three flight tests across the summer, and next year three more, to firmly

address that we have resolved it and flown it in many different scenarios before we go for a production decision.

Senator NELSON. We don't have a getting the cart before the horse here at all. You're going through a very significant methodology of identifying the problem, with a plan to fix it and test it before production; is that fair?

General O'REILLY. Sir, that is fair, and it's the same criteria we set with Dr. Gilmore years ago. The criteria hasn't changed. When we have a failure and a problem, we maintain the criteria. We just have to be ready to continue on with the flight testing.

So effectively it has delayed the start of the production, but again to address risk for EPAA phase 2 which it will be used in, that's a 2015 deployment. So we're many years in front of it right now.

Senator NELSON. And the delay is just a structural technological delay, not as a result of not having enough money to be able to do the testing?

General O'REILLY. No, sir. It's not related to funding.

Senator NELSON. Well, I want to add my appreciation to all of you today. I think we've set a record for an abbreviated hearing, but I think if there are other questions we'll be submitting them, and the record will remain open until next Tuesday to try to get as many questions answered if there are remaining questions.

Thank you very much.

Senator SESSIONS. Mr. Chairman, I just would say how much I've enjoyed working with you on this. Your leadership, your commitment to developing the kind of strategic capability this Nation needs to protect us, that's been your goal from the beginning. You've been an honest and strong advocate for those issues. So it's been a good hearing and I appreciate the opportunity to be with you again.

Senator NELSON. Well, thank you very much for those kind remarks. I'm really glad that you did arrive at the hearing in time to be able to make those remarks as well. [Laughter.]

General FORMICA. Mr. Chairman, can I make one closing thought?

Senator NELSON. Sure.

General FORMICA. I appreciate the discussion today and the investment of the technology and the systems that will deliver ballistic missile defense, and we appreciate this committee's support for that. We recognize that there will never be enough and so there are other opportunities that we have to take in the offense-defense mix. But most importantly, we appreciate the support of the committee in investing in the soldiers, sailors, airmen, marines, and civilians who will operate these systems, and we appreciate your commitment to them.

Senator NELSON. Well, thank you, and we should never forget them. They are essentially what makes this country strong and what will help our defense against these kinds of threats.

So thank you all and thank them for us, too.

General FORMICA. Thank you, Senator. I will.

Senator NELSON. Adjourned.

[Whereupon, at 2:00 p.m., the subcommittee adjourned.]