

WASHINGTON ROUNDTABLE
ON SCIENCE & PUBLIC POLICY

Aegis Ballistic Missile

Defense System –

Status and Upgrades

By

Rear Admiral Alan B. Hicks

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***Aegis Ballistic Missile
Defense System –
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by

Rear Admiral Alan B. Hicks
Program Director, Aegis Ballistic Missile Defense

The George Marshall Institute
Washington, D.C.

Rear Admiral Alan B. Hicks was appointed Program Director in November 2005, relieving RADM Kathleen Paige. Previously, RADM Hicks served as Deputy Commander, Warfare Systems Engineering, in the Naval Sea Systems Command and Commander, Naval Surface Warfare Center; commanding officer of the Aegis cruiser USS CAPE ST GEORGE (CG-71); Deputy Director for Combat Systems and Weapons in the Surface Warfare Directorate of the Office of the Chief of Naval Operations; and requirements and programmatic action officer in support of the Joint Requirements Oversight Council (JROC). A native of Louisville, Kentucky, RADM Hicks graduated from the University of Louisville with a degree in International Studies and Economics. He earned his commission through the university's NROTC program and was designated a Surface Warfare Officer shortly thereafter.

Aegis Ballistic Missile Defense System – Status and Upgrades^{*}

Rear Admiral Alan B. Hicks
Program Director, Aegis Ballistic Missile Defense

November 28, 2007

Jeff Kueter: Good afternoon, everyone. I am Jeff Kueter, the President of the George Marshall Institute and it is my pleasure to welcome you to this latest installation of our Washington Roundtable on Science and Public Policy. The Roundtable, as many of you know, brings together scientists and technicians with the policy community to discuss issues of importance.

Given the Marshall Institute's longstanding interest in ballistic missile defense, this program is particularly appropriate. We are quite pleased to have Admiral Hicks with us today to discuss the string of successes posted by the Aegis ballistic missile defense program. Many of you are aware of the most recent test, which apparently involved one of the most strenuous ballistic missile defense tests of the program to date. I am sure the Admiral will talk about that in greater detail as we move along, but I take it as an indicator of consistent progress within the program writ large and accelerating progress and momentum inside the Aegis program in particular. I will also point out the growing international interest in this program. We have quite a few people from Japan that are with us today. Japan's investment in this particular program is an indicator, not only of its continued success, but also of its utility at providing the basic mission, which is protecting not only our citizens, but citizens around the world, from the terror of a ballistic missile attack.

I am quite pleased to have Rear Admiral Alan B. Hicks with us today to discuss this program. He came to an event such as this two years ago to provide an update at that point, and we are glad to have him back to provide a similar service today. He became the Program Director in November 2005. Previously he served as commander of the Aegis cruiser USS CAPE ST GEORGE (CG-71); he was Deputy Director for Combat Systems and Weapons in the Naval Surface Warfare Directorate of the Office of the Chief of Naval Operations, and he has many other accolades in a distinguished naval career, which are listed on the program flyer that you have today. Admiral, thank you for being with us and we look forward to your comments.

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Admiral Hicks: It's great to be back here at the Marshall Institute to discuss with you where we are in the program. It has been almost exactly two years since I spoke to the Marshall Institute. That event had the distinction of being the first public event I had spoken to since I relieved Kate Paige as Program Director. One of the things that I stated that day was based on the success of her and of Mac Grant prior to her, that "I could only screw it up from there," which got a little bit of a chuckle. The fact was that I had to have lifelines in the room because I was scared to death that I was going to get a question I couldn't handle. To let you know that some things don't change, I also brought lifelines with me today to preserve my life, even after two years in the job. Washington being Washington, some things never change and some things always seem to change, but in reality some of the drumbeat stays the same: lots of people in the Pentagon are sweating the end of the budget submission for '09; we are worried about getting '08 obligated; and no, my hair hasn't grown back and I haven't gotten better looking. But we are very proud of what we have accomplished the last couple of years since I talked to you.

When I talked to you two years ago, we had one engagement ship. One. We could modify a second one on the fly, the *Port Royal*, to support *Lake Erie*. She was ready to go, but she wasn't really what I would call a full-up round in the sense of training and procedures. What do we have today? Our tenth Aegis BMD engagement ship and our first Atlantic fleet ship, the *USS Ramage* is pulling into Baltimore harbor tomorrow afternoon to coincide with the Army-Navy game. Navy will extend its dominance of the Army in a continuing fashion! But we are very proud of that. *Ramage* has the physical install completed, and the crew has started her training cycle and will complete her certification sometime in the December or January timeframe to be our first Atlantic fleet ship. When I talked to you before, we had what we called initial deployment rounds that were in the magazine in Pearl Harbor. There were just a handful of those missiles. Today we have missiles loaded on four deployed ships in the Pacific. Our first engagement-capable ship is en route to deployment to the Middle East on a routine deployment. So in two years, we have a tactically certified computer program in an Aegis ship, we have ten engagement ships and we have missiles that are deployed on board ships. It is not enough, but it is certainly a significant achievement. We are going to talk today about where we have come in testing. This year will culminate in five flight tests for the Aegis program, where we will have fired six SM-3s and one Air Defense Standard Missile in our testing. It will also mark our first engagement by an ally, Japan.

We are very pleased with where we have come. But even more importantly, on top of that are other items that I will talk about: the amount of additional testing we have done with the rest of the ground-based missile defense system, THAAD, which is in Hawaii at PMRF for testing; where we have come with testing, working with SBX, we have an afloat radar; where we are with working with the command-and-control

**Aegis Ballistic Missile Defense System
Status and Upgrades**

C2BMC system in our testing; where we are headed there; and some of the things we have set for goals for ourselves to get more integrated testing with other pieces of the ballistic missile defense capability for this nation. So without further ado, I will press forward.



AB/C Group/BRIEFS/Marshall Institute/Aegis BMD Overview - Marshall Institute 11-28-07

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Figure 1

Figure 1 is a slide that many of you have seen on many, many briefings by the agency. What has changed from two years ago is that we did not have in the engagement section, a sea-based terminal capability, shown in the upper right corner. We now have a program of record moving forward, a sea-based terminal missile that will give us a near-term capability late next year and we have also programmed and budgeted for a far-term capability to give a sea-based terminal missile in the 2015 timeframe to follow this. So we are very pleased about that. If you look at the top, where the sensors are, you see the Aegis SPY radar. Another thing I would note is the SBX radar. What is different about the SBX radar is that today it is part of the ground-based missile defense system, but the Navy, leaning forward under Admiral Mullen and continued by Admiral Roughead, is in negotiations for transition of the SBX platform to

Aegis Ballistic Missile Defense System Status and Upgrades

lead-service designation of the United States Navy. The Navy will take over the sustainment operations of that platform in the 2010 timeframe. That will also coincide, as it matures, in its testing and it is part of our overall testing program.

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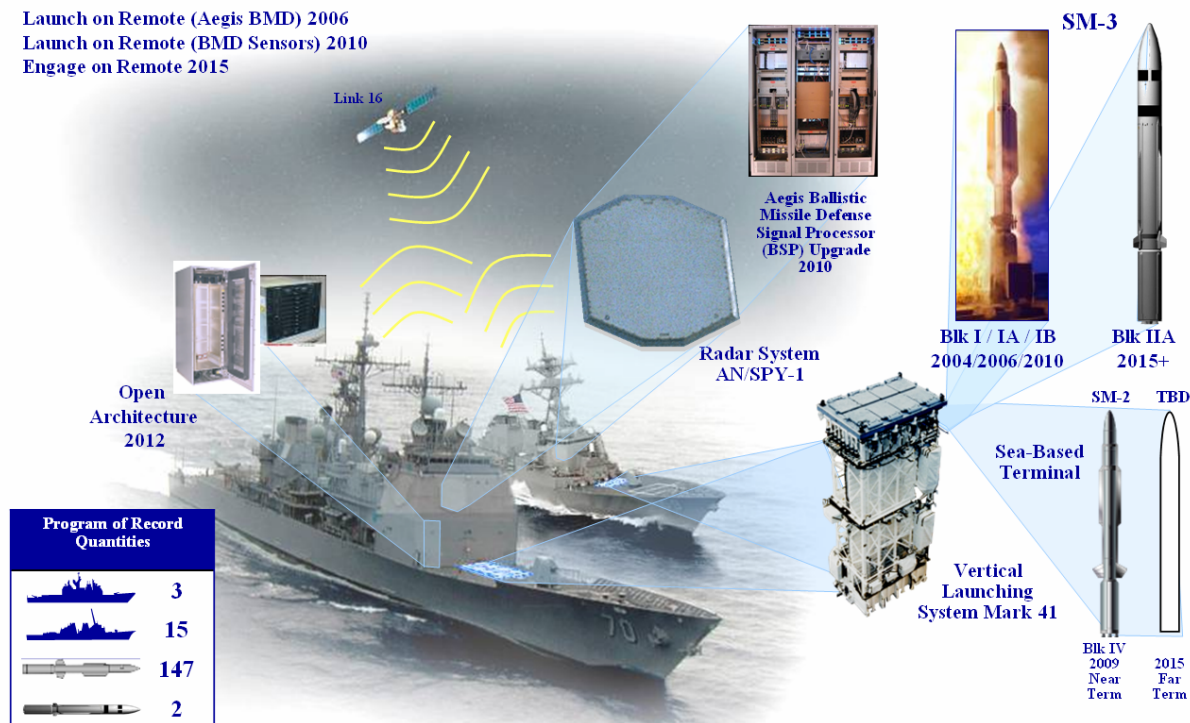


Current and Future Aegis BMD Capability

Aegis BMD



Launch on Remote (Aegis BMD) 2006
Launch on Remote (BMD Sensors) 2010
Engage on Remote 2015



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Figure 2

You see where we are; the SM-3 remains were it was two years ago, in the middle, as a mid-course engagement capability (Figure 2). The other programs are pressing forward and we will talk a little bit more about that later. Again, I highlight what changes in the existing Aegis fleet today. We go aboard and add this capability, this multi-mission platform on: we buy an Aegis ship, let's say notionally a \$1 billion ship, and add a capability, which right now is about a \$25 million install cost to put this capability on a ship without the missiles. We modify the radar and the launcher, we put some computer racks on there to support this, then we do the training and we leverage off that. There are 30-plus years of Aegis lineage, 50-plus years of Standard Missile lineage that we leveraged to get there. The current capability is what it is, and we will talk a lot more in detail about that. The next significant upgrade will occur in 2010 when we do another enhancement to the radar, which will give us more dis-

crimination capability. We will also upgrade the missile with a two-color infrared seeker with advanced signal processing and upgraded optics. We are very excited about that. We will complete, by the end of next calendar year [2008], the final install in the remaining eight Aegis ships that are programmed as part of the program of record. We will have eighteen ships by the end of the calendar year [2008]. The training and certification may take until January or February [2009], but the installs will be complete by the end of the next calendar year [2008], and we are on track to do that. I thank my good friends in Congress for the Congressional plus-up, which helps us to attain that, along with our core budget.



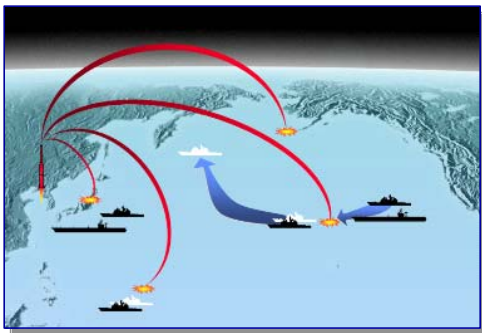
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Aegis BMD Contribution to the BMDS

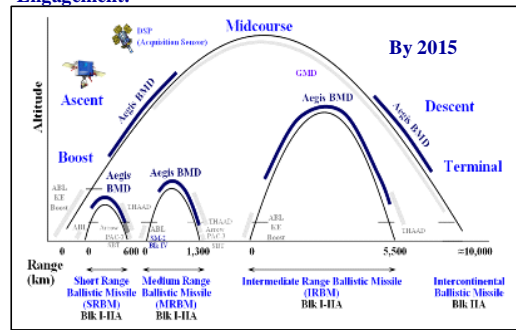
Aegis BMD

Flexible Forward Defense vs. Ballistic Missile Threats



- **Autonomous Operations in International Waters Moves Ballistic Missile Defense Forward From U.S.**
- **Counter-Ballistic Missile Strike, Forward Presence, and Multi-Mission Capabilities**
- **Surge Capability Scalable by Force Level and Geographical Considerations**

Engagement:



Long Range Surveillance & Track (LRS&T)

- Fire Control Quality Track Data for Other BMDS Elements

Global Presence



Figure 3

We do contribute to the bigger BMDS. No one element can go it alone. We are focused today with the current capability against the short- and medium-range threats, which is the regional theater piece. We are also focused on providing sensor support to the ground-based missile defense system and we have a limited capability against intermediate-range ballistic missiles today, with the plan that by 2015 we will

go against a greater set of IRBMs, intermediate, and some limited sets of the intercontinental ballistic missile threat.



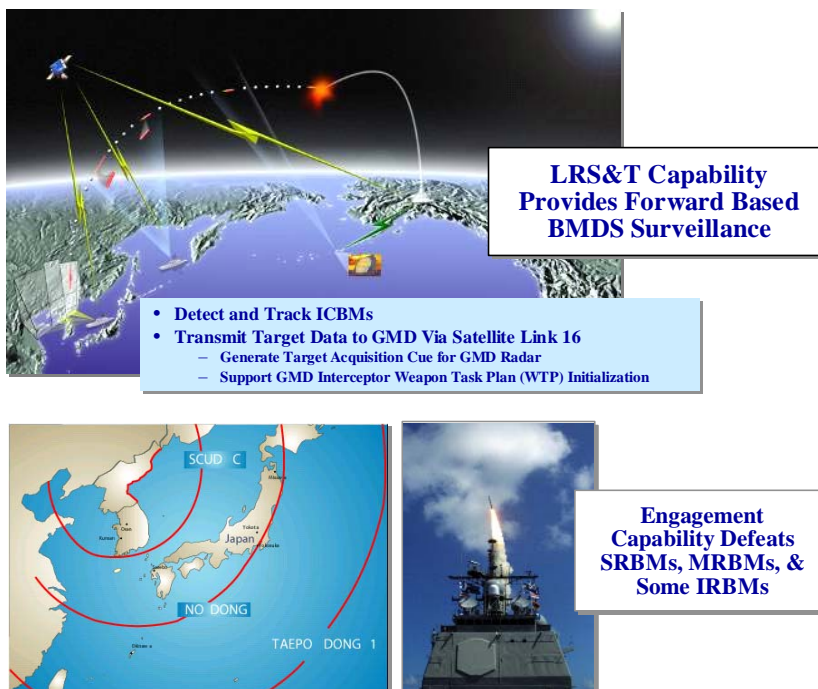
Aegis BMD

Aegis BMD Block 04

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Rev: 3.0, 1/18/07



- ✓ **Limited Defense Operations (LDO)**
- ✓ **Long Range Surveillance & Track (LRS&T)**
 - ✓ Sept 04
 - Destroyers “On Alert”
 - ✓ Aegis BMD 3.0E
- ✓ **Engagement**
 - ✓ Preliminary Capability Spring 05
 - Cruiser
 - Aegis BMD 3.0
 - SM-3 BLK I
 - ✓ Block 04 Capability Spring 06
 - Cruiser
 - Destroyer (End CY 06)
 - Aegis BMD 3.6
 - SM-3 BLK IA



AB/C Group/BRIEFS/Marshall Institute/Aegis BMD Overview - Marshall Institute 11-28-07

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Figure 4

In our briefings this year to Congress, MDA is changing how we categorize or call the blocks of delivery of capability. But today, in the previous nomenclature, the Block 04 capability is fielded (Figure 4). As I said, it is certified and out there with the fleet and available to the combatant commanders. It supports the limited defensive operations for cueing the ground-based interceptors and it also has the engagement capability that I just spoke to. To give you a sense of the threat and why this is so critical, it dates back to the incident with North Korea a few years ago. I put range rings on here to show you the threat. That is why the government of Japan has made such a huge investment in this capability and is the most forward-leaning of our allies to get a capability – it’s because the threat is there for them. It is there today. It is in numbers and it is something that they are concerned about and that we are very excited to be working with them for the defense of Japan.



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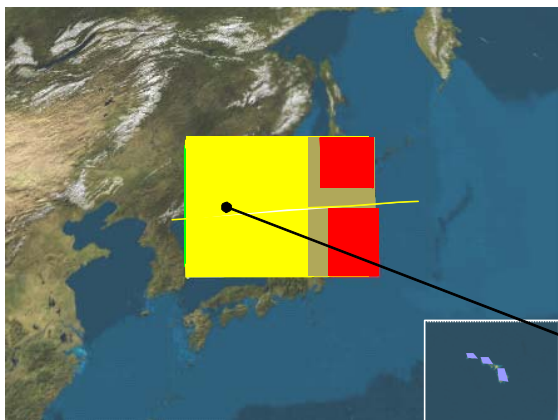


Block 04 3.6 System Performance

Aegis BMD

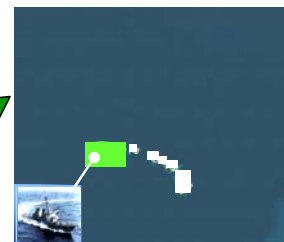
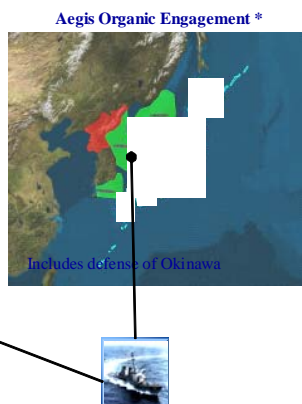
Long Range Surveillance and Tracking

GMD Engage on Aegis



Engagement

Launch on TADIL



Ship Locations Simultaneously
Support All Three Operational Missions

* Block 04 Threat Set

AEGIS BMD BLOCK 04 CAPABILITY

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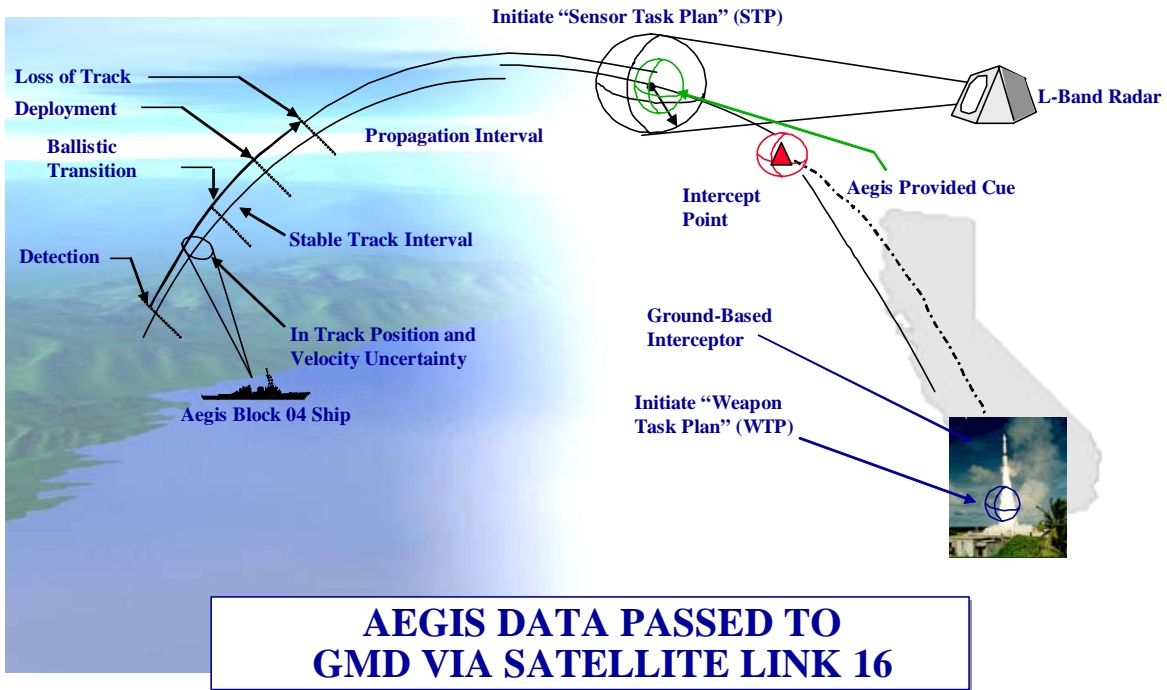
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Figure 5

What is the Aegis BMD weapon system 3.6 capability? Well, it is an upgrade to the Aegis software (Figure 5). We take the current computer program, upload this program, and it gives us this kind of capability for engagement and supporting as a sensor cue. If a ship is stationed off North Korea, it contributes to the defense of Alaska and Hawaii as a sensor to help support ground-based interception. It also has an organic engagement capability to defend Japan, for instance, and it also can cue another Aegis ship that is sitting off Hawaii for the defense of Hawaii. The other thing to remember about this, in the 3.6 capability, which is different than when I talked to you two years ago, we have returned more of the multi-mission capability back to the ship. The earlier versions of this program that we were testing only allowed us to do BMD. But today we can do our other missions, including air defense self defense – not big area air defense, but to defend themselves and also to be able to do strike operations with Tomahawk and ASW.



Long Range Surveillance Operations



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Figure 6





In the long-range surveillance operations to support ground-based interceptors, one of the things I have learned is, what does that mean? Well, if the ship is forward-deployed, which is where the Navy is normally deployed, and the ship has the capability, you will shift into this mode where it will do the detection for the big BMDs from Aegis link track into C2BMC through some translators, and then make some predictions that will then start going through the system to get to the ground-based interceptors, either in Vandenberg or at Fort Greeley, to allow them to launch (Figure 6). This is a significant capability that we have worked on and practiced and we have demonstrated in many of our tests that we can execute. We will be doing testing in the coming year, where we will be the primary cue to GMD. And we will be working on that schedule over the coming months.



Aegis BMD SM-3 Evolution
Spiral Development with Incremental Capability Improvements

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SM-3 Blk IA	SM-3 Blk IB	SM-3 Blk II	SM-3 Blk IIA
<ul style="list-style-type: none"> • Blk IA Kinetic Warhead (KW) <ul style="list-style-type: none"> - 1-Color Seeker - Pulsed Divert/Attitude Control System (DACS) • 13.5" Propulsion - 2nd & 3rd Stage • MK 72 Booster • MK 41 Vertical Launch System (VLS) Compatible 	<ul style="list-style-type: none"> • Blk IB KW <ul style="list-style-type: none"> - 2-Color Seeker - All-Reflective Optics - Advanced Signal Processor - Throttleable Divert/Attitude Control System (TDACS) • 13.5" Propulsion - 2nd & 3rd Stage • MK 72 Booster • MK 41 VLS 	<ul style="list-style-type: none"> • 21" Nosecone Japan Cooperative Research (JCR) • Blk IB KW • 21" Propulsion - 2nd & 3rd Stage • MK 72 Booster • MK 41 VLS Compatible Light Weight (LW) Canister 	<ul style="list-style-type: none"> • 21" Nosecone JCR • Large Diameter KW <ul style="list-style-type: none"> - Adv Discrim Seeker - High Divert DACS • 21" Propulsion - 2nd & 3rd Stage • MK 72 Booster • MK 41 VLS LW Canister 

(Part of IIA Development;
Not Planned to be a Fielded Capability)

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Figure 7

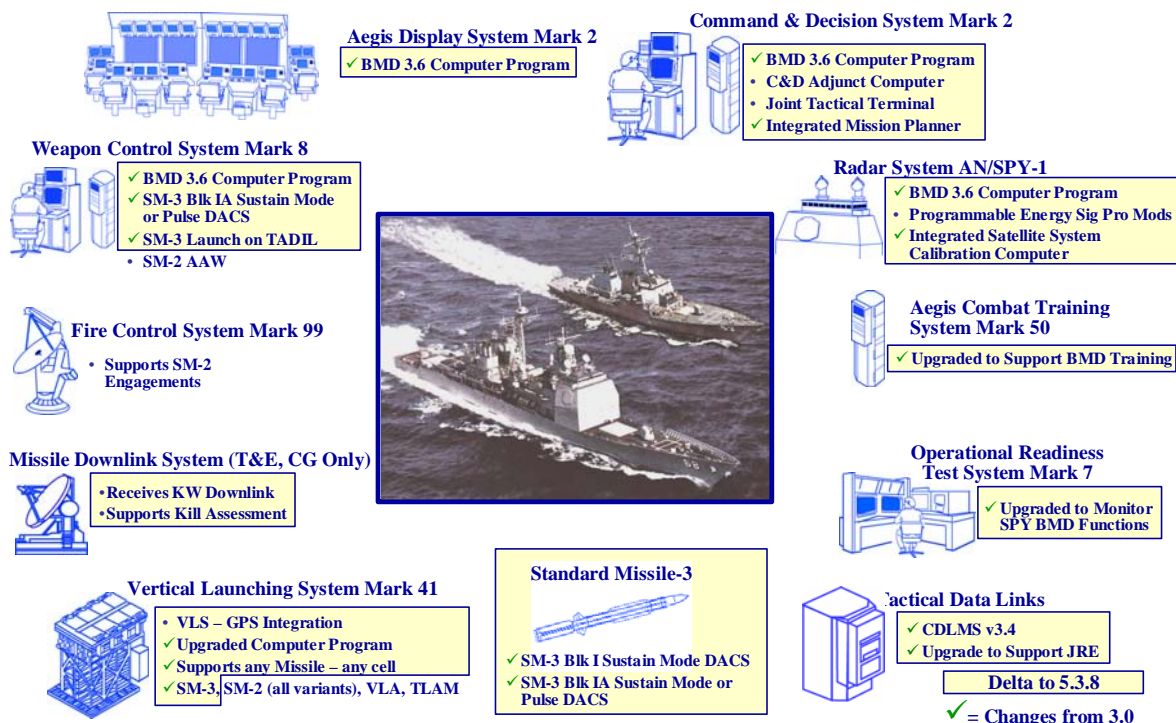
The Block IA missile is in production today. It is not a test round anymore, it is in a production capacity at Raytheon down in Tucson and all the subcontractors around the country that are supporting it, some of who are represented here today. Figure 7 (left) shows the missile, a single-color IR seeker. From the Navy we get the Mark 72 booster and then we have a second and third stage, the third stage being what we call the kick stage that gets us into space. And then the kinetic warhead.



Aegis BMD

Final Block 2004 Configuration - Aegis BMD 3.6 Engage / LRS&T Ships-

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Figure 8

So if you take that and say, “Okay, let’s get into detail exactly what we did inside there,” I can give it to you in a bigger scope. Figure 8 shows the major components of the Aegis Weapon System. The things highlighted in yellow are what we go in and upgrade inside that actual weapon system. Everything from training functions to how we manage our data links to go off the ship to how we handle the missile inside the launcher to give it additional data, which required additional cabling, how we modify the fire control system, to how we upgrade the displays, are all taken care of as part of these modifications.

Aegis Ballistic Missile Defense System Status and Upgrades

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Ship Deliveries - As of November 07 -



Aegis BMD

Engagement and Long Range Surveillance & Track (Aegis BMD 3.6)



USS PORT ROYAL (CG 73)



USS SHILOH (CG 67)



USS LAKE ERIE (CG 70)



USS DECATUR (DDG 13)



USS RAMAGE (DDG 61)



USS CURTIS WILBUR (DDG 54)



USS JOHN S. McCAIN (DDG 56)



USS STETHEM (DDG 63)



USS FITZGERALD (DDG 62)



USS RUSSELL (DDG 59)

Long Range Surveillance & Track (Aegis BMD 3.6)



USS JOHN PAUL JONES (DDG 53)



USS PAUL HAMILTON (DDG 60)



USS BENFOLD (DDG 65)



USS MILIUS (DDG 69)



USS HOPPER (DDG 70)



USS HIGGINS (DDG 76)



USS O'KANE (DDG 77)

Upgrade Installation in Progress

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Figure 9

Ship deliveries I talked about. Again, we are very proud of the ship delivery schedule. The team has done really remarkable work. We in fact accelerated the first East Coast ship, the *Ramage*, which wasn't going to be done until next spring [2008], to this fall [2007] to give us that capability. As you see in Figure 9, the ships on the top have both the engagement and the search and track capability. The ships you see at the bottom are the ones that just have the search and track capability without the engagement. These ships at the bottom will get the upgrade to full engagement next year. There are only seventeen blocks there; the eighteenth ship is the *Stout*, which is our other East Coast ship that will go from a straight air defense capable ship to a full BMD ship by July 2008.

Aegis Ballistic Missile Defense System Status and Upgrades

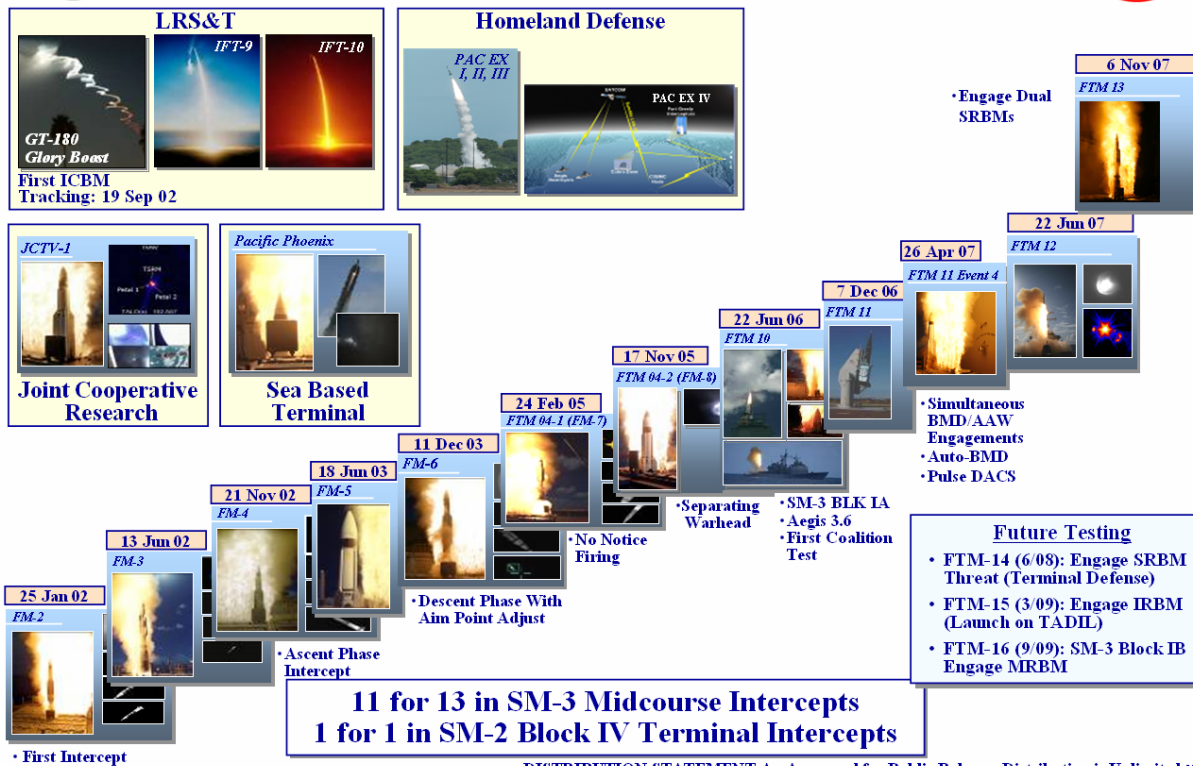
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Aegis BMD Accomplishments to Date

Aegis BMD



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Figure 10

I don't think a week goes by, not a week goes by, that I don't hear something in the press that assaults us on our testing. I have to tell you, we are pretty proud of our testing (Figure 10). My predecessors had the foresight to say, "Okay, I want to be engaged with the Navy operational test authority which is down in Norfolk, Commander, Test and Evaluation Force and is under OSD's Operational Test and Evaluation Directorate (DOT&E) to make sure we have our test plan to meet the needs of the warfighters, the fleet. And we put in place over the last five and a half years a plan that would lead to where we are today and what we completed in November of our last compliance test. This will allow the DOT&E community to finish their report on whether we meet the standard for a certified, from the independent test authority, that we are a full-up system with an Aegis BMD 3.6 computer program and the SM-3 Block IA missile. They will start the report in March after they look at some maintainability issues as part of their overall test program and issue their report sometime later next year. But based on the test results, we obviously think we will have a fairly decent outcome of that evaluation. I don't want to presuppose the independent test authority, because they

have to go through their review cycle, but the evidence is that since 2002, we have a pretty good track record. If you look at the Standard Missile history for air defense weapons, it is about a 60-65 percent success rate. Ours is much higher, as you can tell. So it is a real credit to the government-industry team of what they have achieved here. And I will tell you that these tests are pretty stressful. We have tested from the earliest where we can do an engagement, to the highest possible intercept and the lowest possible intercept before it reenters the atmosphere with the SM-3. So we are very pleased with what that has been able to achieve for us.

We have also done the simultaneous engagement, which I will talk about, and you will get to see a video of it, that we just completed in November, where we had two targets in space and two SM-3s in space at the same time. Next month, the Japanese Defense Ship *Kongo*, supported by the *USS Lake Erie*, will be on range to complete the first maritime BMD engagement from another nation's ship with the U.S.-provided capability. I will tell you, *Kongo* is a great ship with a superb commanding officer. They will be ready to go. But if you look at these tests, we are also very proud of what we have done with our other BMDS test events where we have worked with other people. They are not all fully reflected on this chart by any means; it would be too busy with both THAAD and GBI and other collection event. You see here a Pacific Phoenix, a sea-based terminal engagement. Back in May 2006 we took the SM-2 Block 4 and modified it, which is an extended range AAW weapon, to go against some of the more basic short-range threats (which the SM-3s are not designed to engage) to give us a near-term, sea-based terminal capability. I will talk a little bit more about that.

As for future testing, next year, we will go back with our 3.6 program and do another test with that SM-2 Block IV missile before we start putting it out in the fleet later in the year. We have what I would call an emergency capability that we could use today, but it is not integrated fully into the program as we want to get it to. We want to be able to shoot both the SM-3 and the SM-2 Block IV and air defense SM-2's with the same software load. But that will complete late next year.

FTM-15 is scheduled to occur in March-April 2009 and is where we will, with the current missile, either be cued by the TPY-2 shore-based X-Band radar or by an Aegis radar downrange. We will launch and then engage against an intermediate range (notionally a 3,000km) threat. That will be a sporty shot, but we are looking forward to that challenge. And starting in late 2009 we intend to fly our first SM-3 Block 1B, which is our next upgraded missile late in 2009 and early 2010, for that testing spiral.

Video narration: *I was told I have to give you a video to break the monotony of my speaking, so here we go. This is our "greatest hits" video that takes you*

through the sequence from FM6 today, which was when we started our operational testing with the independent OT authority.

You see here the launch: this was a short-range launch out of the Pacific Missile Range Facility in Hawaii. My wife reminds me that it is a terrible place to have to go to work. You can see here the Lake Erie doing the display. You will see a series of lots of different launches from different tests. A kid asked me one day, "How long is that plume of fire coming out of that missile?" I said, "You know, I don't know." So I went back and asked. It is about sixty-five feet long.

You will see here different intercepts from the airborne sensors, IR sensors. You are also going to see some from our others. You are going to see end-game there for the intercepts. We have engaged separating and unitary targets. We have also gone to sea with the new BMD signal processor as part of the BMD upgrade with the 1B missile that allows us to do much higher-end discrimination and earlier declaration as part of these tests. We are very pleased with the progress of that; that will match up very well with the 1B with that radar upgrade.

It shows here how we have done integration with the other parts of the BMDS to track long-range ballistic missiles as far as supporting GMD, what we have done for the connectivity connections and support for that. That is a fairly steady drumbeat that we go through.

What you are watching here are the actual sailors on the consoles. You may even see my aide, who just came off Lake Erie; she was the fire control officer until last spring on Lake Erie. Lake Erie has done the majority of testing. We have shot from USS Shiloh in June 2006 and USS Decatur, our first DDG shot earlier this year. We try to involve as many other BMD ships as we can.

In this case you see Hopper's participation; earlier you saw Russell. There is the commanding officer and the Tactical Action Officer. The crew a long time ago came up with the name to call the SM-3 "The Eagle." You are seeing the kill vehicle go through its machinations it goes through in its phases of flight.

This event was with Japan; we are in a cooperative research for a new nose-cone design on board the SM-3, what we call a clamshell design. This was to test the design on our existing Block IA for its applicability to the future 21" SM-3 Block IIA development program we are doing with Japan.

One of the things we do through every event is we stress the multi-mission nature of the ships. One of the things we go through is the ship's walk-through, a

Aegis Ballistic Missile Defense System Status and Upgrades

counter-strike with Tomahawk against a launch site. We have run submarines out there on the range with the ships so they could do ASW (anti-submarine warfare) while they are doing BMD scenarios. During one event back in April, we fired a cruise missile at the ship while she was engaging a ballistic missile target. The ship was very successful; that was Lake Erie. That was in April. We are very pleased with the results there. But the idea here is to let you know, which we needed, because the combatant commander wanted it along with the fleet, was to sustain the multi-mission capability of the Aegis warships.

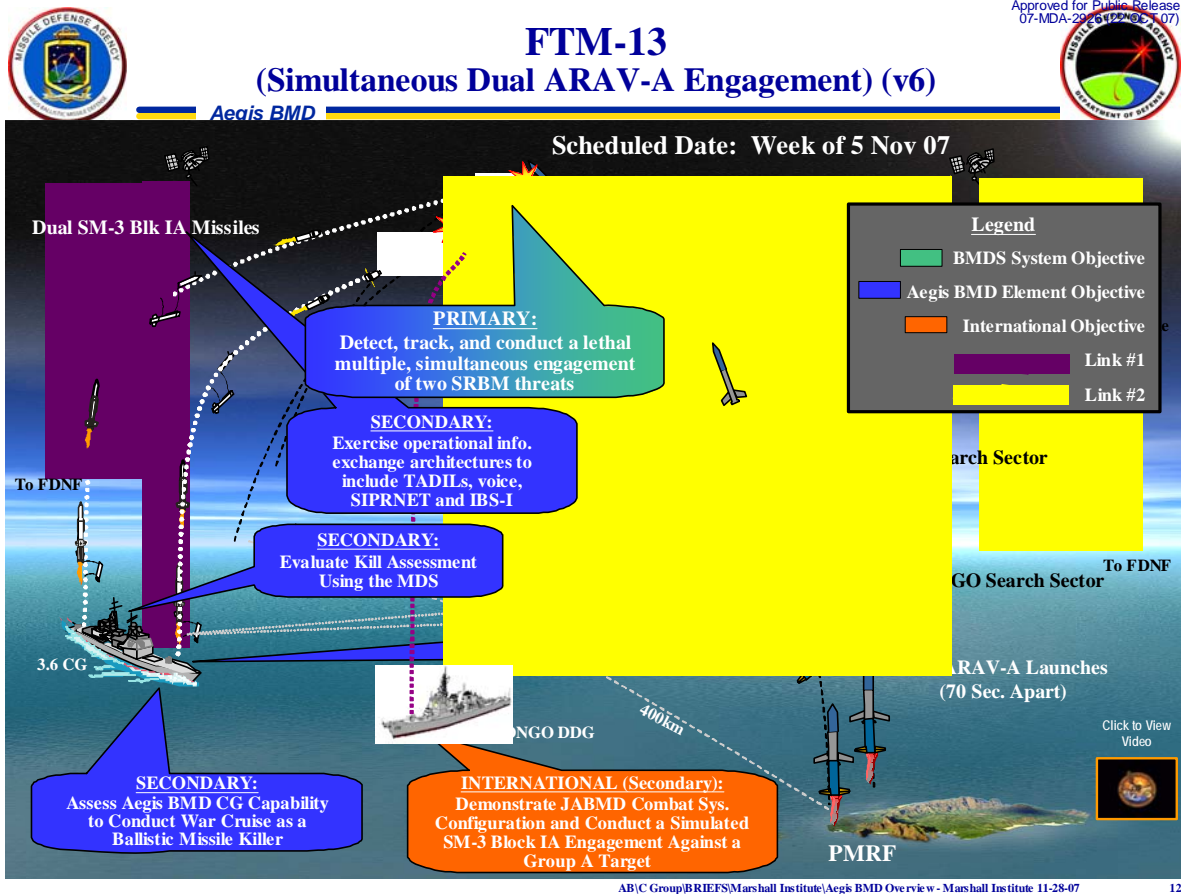


Figure 11

FTM 13 was executed on time, on schedule as we planned it. We did have one delay to the test, not because of us, but because of range conflicts. We were going to do this a month earlier, but we adjusted to allow THAAD to get her shot off in October, which was very successful. The idea was to launch two short-range ballistic missile targets seventy seconds apart from Kauai (Figure 11) with Lake Erie executing the engagements. The primary objective was obviously to achieve a kill; the secondary objective was to allow the Kongo to do a risk-reduction exercise for training. We had lots of

secondary objectives and I will tell you that we achieved all of our primary and secondary objectives successfully. Just to make you aware, we spend months and months going through the data to make sure that if there is something that we need to go back and fix, we go do it. If there is something we need to do for training, we go back and do it, or in procedures.

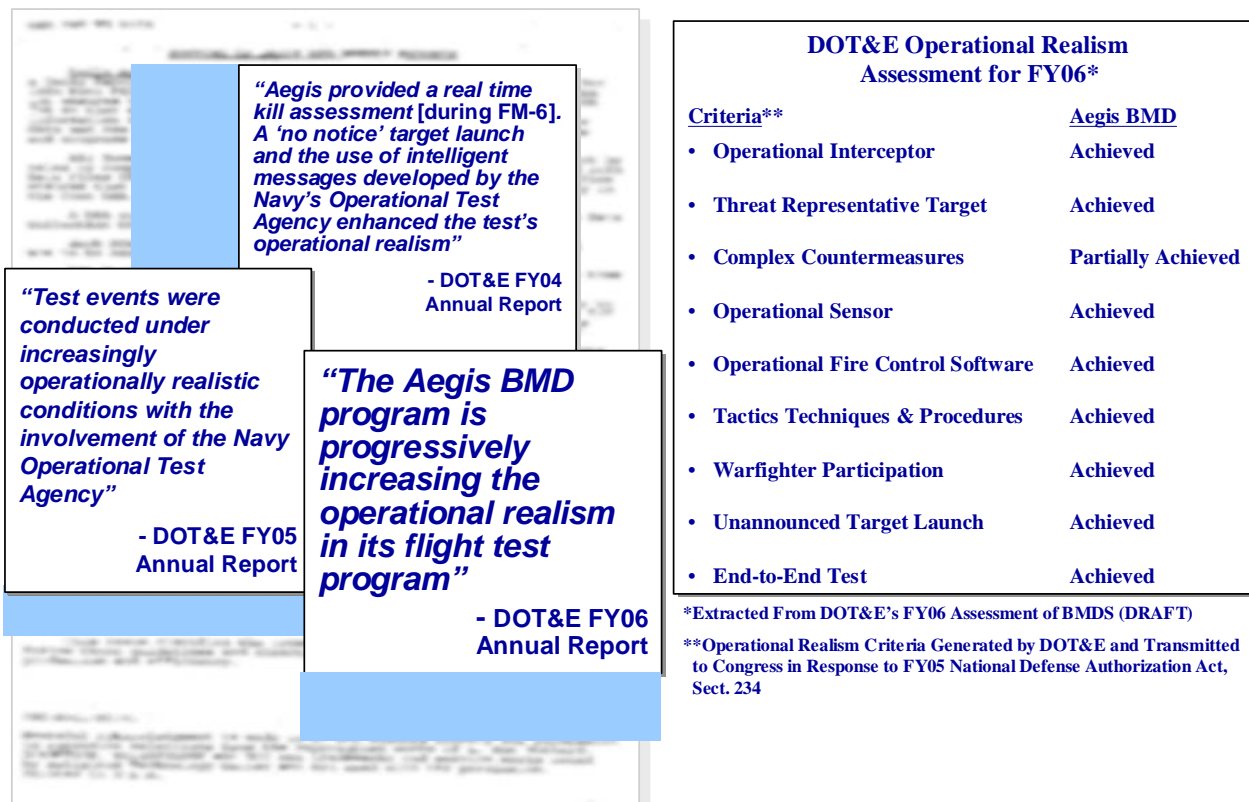
Video narration: *Now in this shorter video – but it is cool – we call this mission “Stellar Griffon,” FTM-13. Target 1 launch. Target 2 launch. Lake Erie is downrange, ready to go. The ship picked up both targets, called fireball, which is what we call a ballistic missile launch. The first SM-3 fired forward, the second one back aft. So the ship got stressed with radar resources as she managed two missiles in flight and tracked two targets, and as you can see here, it was very successful for us. I couldn’t have been more pleased about how this event came off as far as execution and crew performance, testing performance, and data collection; it was really a flawless event for us as far as how everything came off and I know that the OT community was very happy with it.*

Getting to that OT thing, the operational realism I talked to you before, I can’t tell you what the 2007 report will say because it doesn’t come out until about February. But I can tell you that we are fully engaged with the OT community. If you look at last year’s report for 2006, which came out in February 2007, you can see in the right-hand block (Figure 12) that we are meeting their intent for what they want us to do, and that intent is driven by warfighter requirements, combatant commander and fleet requirements. These tests are not cheap, so by golly we are going to do them right. They take a lot of resources and if we screw something up, then it diverts the entire team, because when we do these tests, the people who actually help build the missile and build the modifications and fire control system are out there with us on the range as part of the data collection team. So we do all the pre-mission work we can, in pretty challenging scenarios, to make sure we get it right so that we keep pressing forward.



Aegis BMD Operational Realism

Aegis BMD



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Figure 12

Does MDA own this or does the Navy own it? When the missiles come off the production line in Camden, Arkansas and when they finish their final build-up, we sign them over to the United States Navy. They get one flight on MDA’s nickel, and wherever it lands, from then on it is Navy’s. They own the missiles, along with the combatant commanders. We are the first element post creation of MDA and since the day way back of Patriot that has transitioned to the services. The Block IA and the Aegis computer program starting this year begin the transition to the United States Navy and that was staffed all the way up to Secretary of Defense to validate that that transition is occurring. There are funding agreements in place and there is money in the Navy budget to support that transition for sustainment of this capability. MDA will retain configuration control of the capability and is responsible for upgrades, but for the in-service sustainment, that is a Navy responsibility starting this year.



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Where Aegis BMD is Going - By Development Blocks -

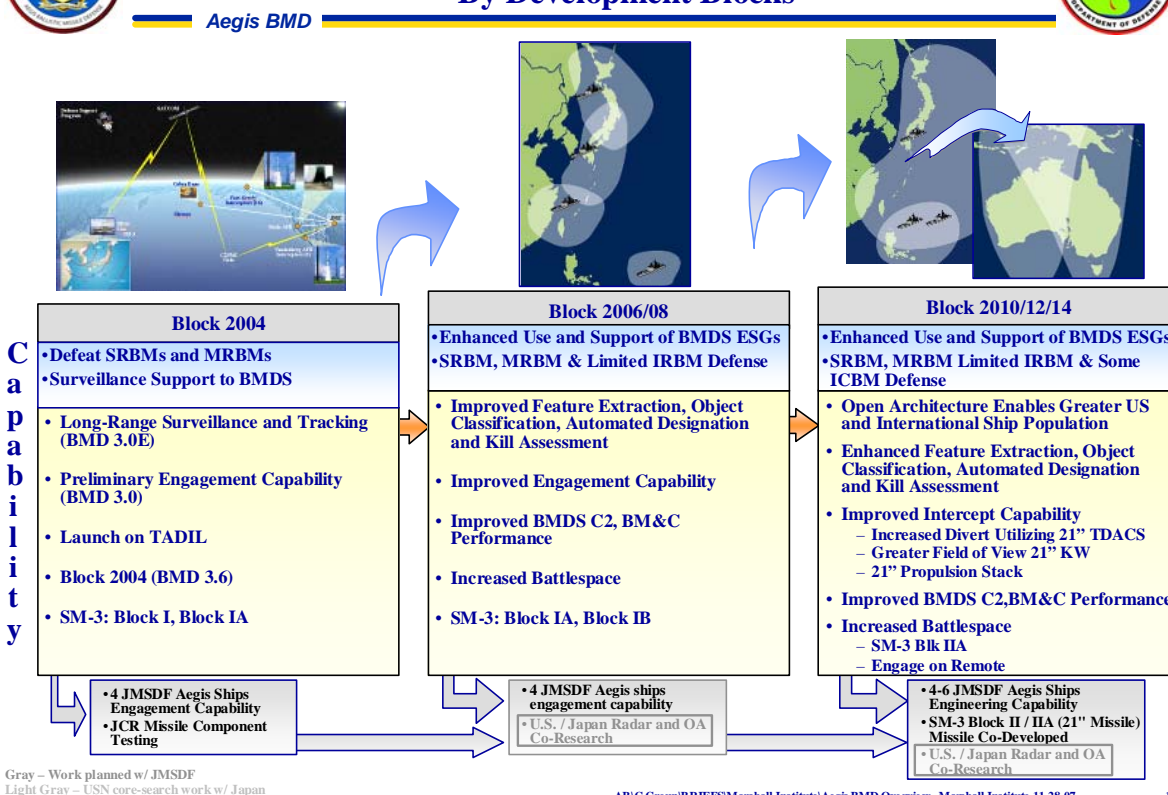


Figure 13

I have highlighted for you in Figure 13 what we have today. I told you we are going to do a radar upgrade and a missile upgrade in the 2010-2011 timeframe. Way out there, past my time, in the 2015 timeframe, we intend to deliver to the country an integrated combat system baseline with the Navy, which means there will be one computer program that does all of it: large area defense, air defense, and BMD. We will also, with the support of Japan, go beyond the Block IB missile to deliver the Block IIA missile, which is the 21" full caliber round, which buys us a tremendous increase in battle space. If you look on the right, you go from three ships that can defend Japan, with the current capability and the Block IB, to one ship which can cover almost all of Japan. More importantly, because of the increased speed of this missile and the extra divert it will have in space, you can now start talking about defending larger areas. As you see in the far hand right, a ship or two ships sitting south of Japan above the Philippines can defend Australia. This is a significantly increased defended footprint. We are very excited about this development program with Japan to get this capability.



Aegis BMD Engagement Mode

- Exploit Organic and Off Board Sensors -

Aegis BMD

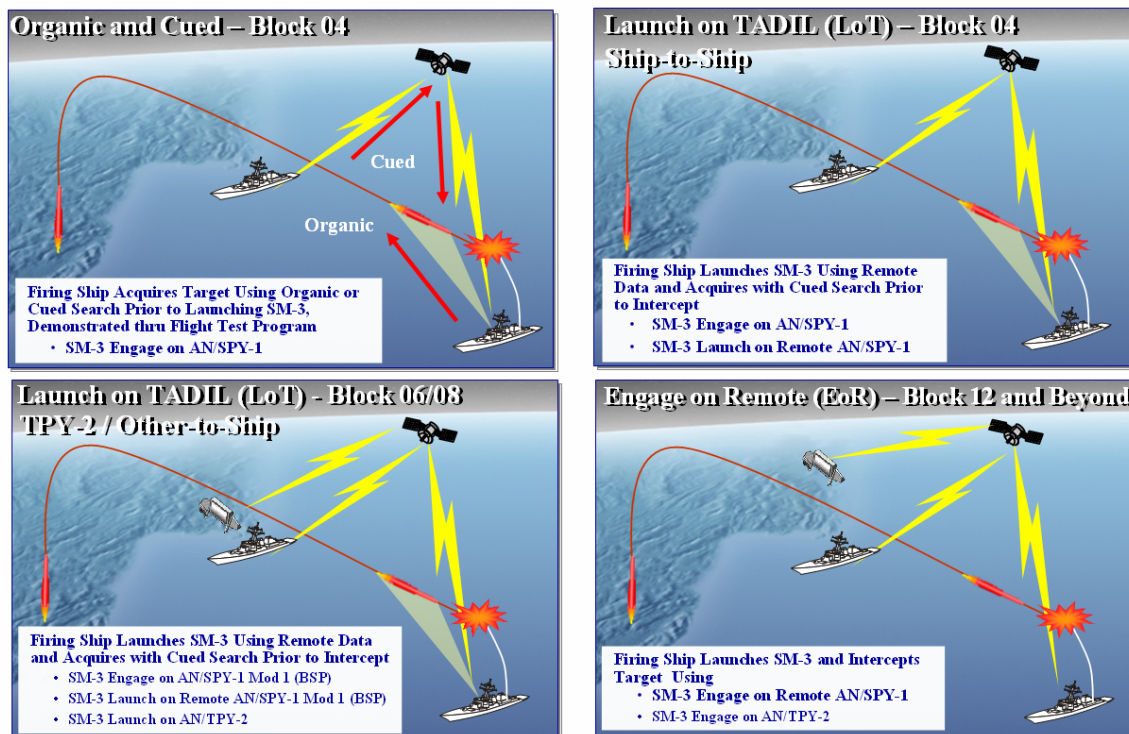


Figure 14

I would also highlight that we have gotten here based on our lineage, but a lot of the stuff we have gotten here with Japan has been based on a very robust research program. We have done joint U.S.-Japan research in radars, missile technologies, open architecture technologies, that has allowed us to build the confidence as a team that we can go forward and co-develop the upgraded SM-3 21” missile, the Block IIA. As I mentioned, we modified the SPY radar to allow us to do what we do today over what it does in traditional air defense. But with a Block IIA missile, and even with the IA to an extent in some scenarios, which is why I mentioned it earlier, sometimes you will want to cue the ship. You can out-fly the radar, so the ability to do an autonomous engagement with a ship is no longer germane. So we come up with terminologies, and I don't want to get too techno-geek on you, but the bottom line here is that we will use data links to provide cueing data from one ship to another or from a shore-based radar to the ship that allows us to support engagements. Because in the future down here, you can out-fly the radar and you will need that advanced support. Now somebody might say, “Well, is it always going to be that way?” When the Navy builds the next

CG(X), then we may be able to do an autonomous radar, depending on the type of radar the Navy decides to build. But for the current plan that takes us through 2015, we will need to build it to leverage other sensors, and I believe that is a good thing.

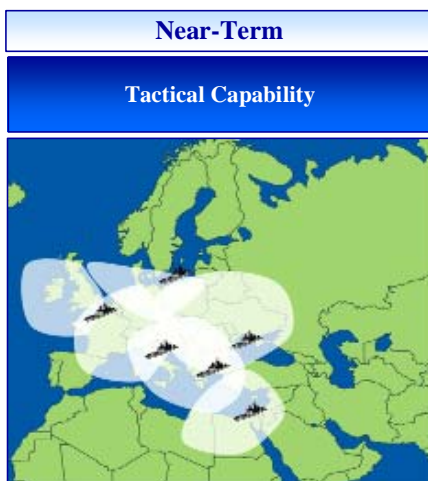


**Sensors and Missile Improvements With Increased
Integration With BMDS**

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07-MDA-2296 (22 FEB 07)



Aegis BMD



Aegis BMD 4.0E/4.0/4.0.1

- Enhanced Use & Support of BMDS ESGs
- Enhanced SRBM, MRBM & Limited IRBM Defense

- AN / SPY-1 Radar with Aegis BMD Signal Processor (BSP)
- SM-3 Block IB Missile with Improved IR Sensitivity & Discrimination
- Launch on Remote with BMDS Sensor Cueing
- Tactically Certified Weapons System Capability (2010 / Aegis BMD 4.0.1)

AEGIS BMD UNDERLAY SUPPORTS “3rd SITE”

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Figure 15

So let’s talk about what increased integration means to things you hear about in the press today. Right now, if you go to Pearl Harbor or San Diego today, you won’t see a lot of Aegis ships in port, because they are under way and they are deployed. They are deployed in the Far East and the Middle East. It is a busy fleet. If we take the 2010-2011 capability with the 1B missile, it would take a lot of Aegis ships to defend Europe. It would probably also require an advanced sensor forward in somewhere like Turkey that would help to support those Aegis ships. That is a lot of ships to support for 24/7 coverage. But what we could do is easily surge the fleet to support GMD in a third site in Europe to help them meet the requirements for the defense of Europe, and of Israel, for that matter. My boss, General Obering, uses the term “it underlays.” It is true; we underlay and support that third site in Europe, as we would help support THAAD, because as we integrate the sensors, we will help support each other.



The Aegis BMD Fleet – End of CY 2009

Aegis BMD

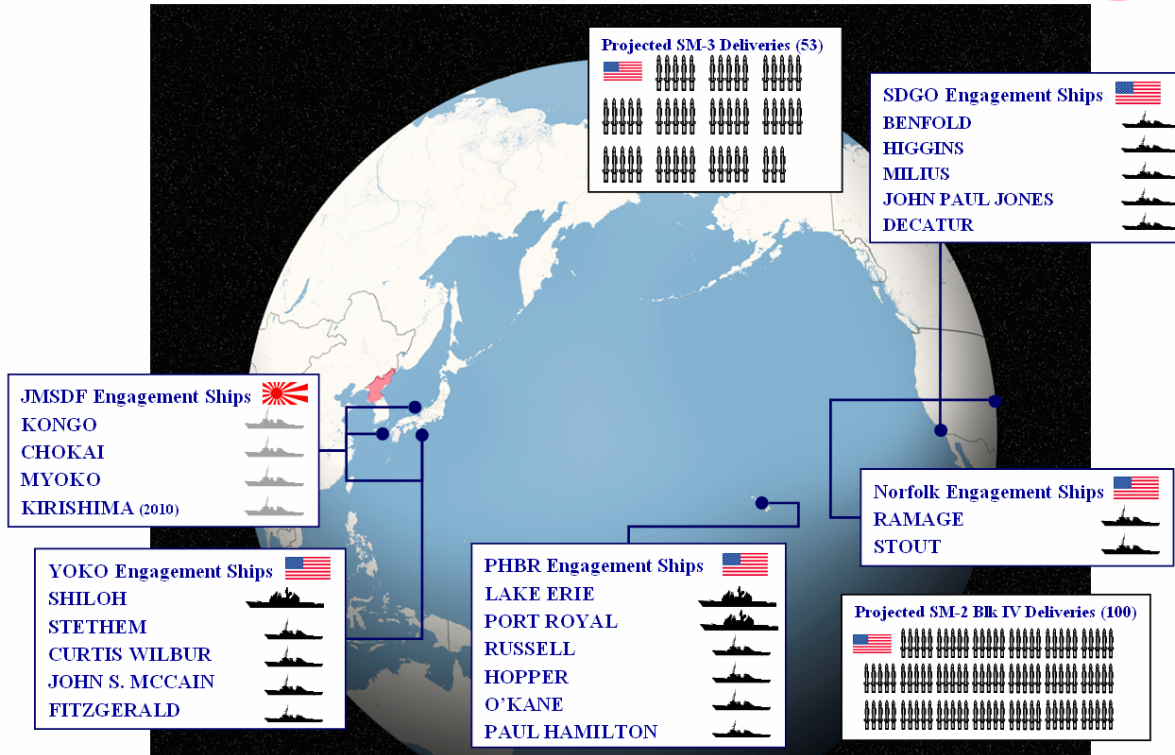


Figure 16

That fleet I talked to you about and those limited numbers I talked about come up to this: if you think of the calendar year 2009 and say, “Where will we be?”, by the end of calendar year 2009 we will have delivered all eighteen engagement ships (Figure 16) (remember, we will have completed all these ships by the end of calendar year 2008). We will have a hundred of those near-term sea-based terminal missiles, because the Navy is essentially modifying existing missiles to do the mission. We will have about fifty-three SM-3s in inventory. That is minus the ones which we shot; that is true inventory. We are taking another look at that with the most recent Congressional plus-up to buy more missiles. With a two-year lead time, that is about what we will have. Japan will have completed three of their four ships for install, and we will have two East Coast ships. So we are pretty pleased with that. Everything will be engagement and LRS&T capable.

Pretty impressive. But is it enough? No. Inventory is inadequate to meet our needs. That is one of the things we are trying to address and we are working with the

Aegis Ballistic Missile Defense System Status and Upgrades

Navy and the Agency in the Navy to try to figure out a way forward for missile procurement in the out years to help address the inventory needs. I will say that in the Navy's budget, starting in 2012 the Navy Aegis ships go through modernization for the DDGs, 2012 and out, all of them. The Navy has budgeted to provide BMD upgrades to those ships, to go above the eighteen ships that we now have. And they are taking a look now at their modernization plan to see if they can do afford to do that starting in 2010.



Aegis BMD SM-3 Evolution Spiral Development with Incremental Capability Improvements

Aegis BMD

Rev: 5.0, 2/9/07
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07-MDA-2370 (27 MAR 07)



SM-3 Blk IA	SM-3 Blk IB	SM-3 Blk II	SM-3 Blk IIA
<ul style="list-style-type: none"> • Blk IA Kinetic Warhead (KW) <ul style="list-style-type: none"> - 1-Color Seeker - Pulsed Divert/Attitude Control System (DACS) • 13.5" Propulsion - 2nd & 3rd Stage • MK 72 Booster • MK 41 Vertical Launch System (VLS) Compatible 	<ul style="list-style-type: none"> • Blk IB KW <ul style="list-style-type: none"> - 2-Color Seeker - All-Reflective Optics - Advanced Signal Processor - Throttleable Divert/Attitude Control System (TDACS) • 13.5" Propulsion - 2nd & 3rd Stage • MK 72 Booster • MK 41 VLS 	<ul style="list-style-type: none"> • 21" Nosecone Japan Cooperative Research (JCR) • Blk IB KW • 21" Propulsion - 2nd & 3rd Stage <div style="text-align: center;"> </div> • MK 72 Booster • MK 41 VLS Compatible Light Weight (LW) Canister 	<ul style="list-style-type: none"> • 21" Nosecone JCR • Large Diameter KW <ul style="list-style-type: none"> - Adv Discrim Seeker - High Divert DACS • 21" Propulsion - 2nd & 3rd Stage <div style="text-align: center;"> </div> • MK 72 Booster • MK 41 VLS LW Canister

(Part of IIA Development;
Not Planned to be a Fielded Capability)

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Figure 17

Let's talk about the Block IIA missile (Figure 17). The bigger missile adds a 21" second and third stage that gives it more power, speed and reach versus the deployed SM-3 Block IA and programmed Block IB. That buys us a much faster missile that can go a lot further. I can't divulge the stats, but this missile allows you to go after some number of ICBM threats and a lot of the IRBM threat set. But more importantly, the defended area that one ship can cover is greatly expanded, and we also hold a lot more countries at risk for denied area they can launch from. We are very excited about this; this is a co-development program with the government of Japan. It is a very critical

program, it is a very complex program, and it marries up U.S. and Japanese industries. I have to tell you, I keep people on the road between Japan and here and vice versa all the time to pull this off. This is a very aggressive schedule to be flying this missile in the 2014 timeframe, to go into production in 2015.



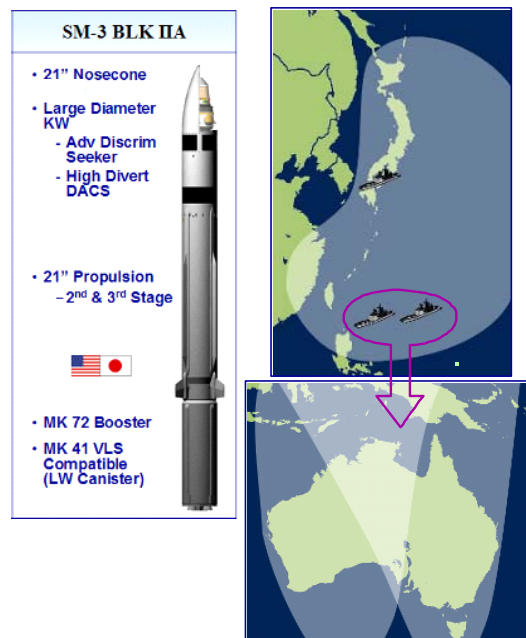
Aegis BMD Block IIA “SM-3 Cooperative Development Program”

Aegis BMD

Approved for Public Release
05-MDA-2006-0005 (Dec 05)



- MDA/D Provided Direction to Incorporate IIA Development Into Aegis BMD in 22 Dec 05 Program Guidance Letter
- The 21" SM-3 Blk IIA Combined with BMDS Remote Sensor Data Provides:
 - Increased Defended Area
 - Increased Probability of Kill Against a Broader Threat Set
 - Reduces Force Structure Requirements
 - Improves Operational Flexibility
- PB07 Program Assumes Japan Work Share at ~50%
 - Cost Estimate \$2.1B (\$1B – Japan Estimated Contribution)
- SM-3 Block IIA Delivery End of 2015



ms-107684 / 083005

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Figure 18

What does it mean? The SM-3 Block IIA buys a lot more battle space, as it graphically shows you in Figure 18. It's a lot of money, over \$2 billion in development. The next year or fifteen months will dictate the work-share relationship, who works on what piece of the missile and who is going to produce those. That joint U.S.-Japan research program I talked about before is what has given us the confidence we can do this. I am not sure there has ever been anything this complex done in a co-development relationship in the history of the U.S. There have been work shares, but when you think about a missile of this complexity and also marry up the weapons systems modifications that have to occur inside the Aegis Weapon System to do this, it is fascinating and challenging and exciting and we are privileged to be part of it.

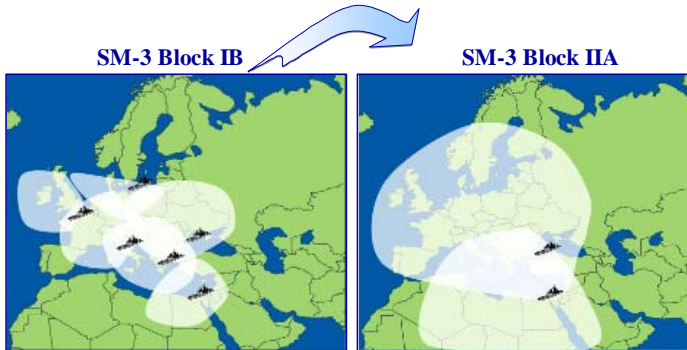


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07-MDA-220 (S&B 07)



Greater Missile Reach Increases Defended Area

Aegis BMD



Aegis BMD 5.0/5.1/5.2

- Enhanced Use & Support of BMDS ESGs
- SRBM, MRBM & Enhanced IRBM Defense & Limited ICBM Defense

• Supports 3rd Site

- Forward Layer of Defense Ascent Phase
- Underlay
- Additional Depth of Fire
- Interoperable Component of BMDS Including GMD and THAAD

WORLDWIDE MOBILE CAPABILITY

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Figure 19

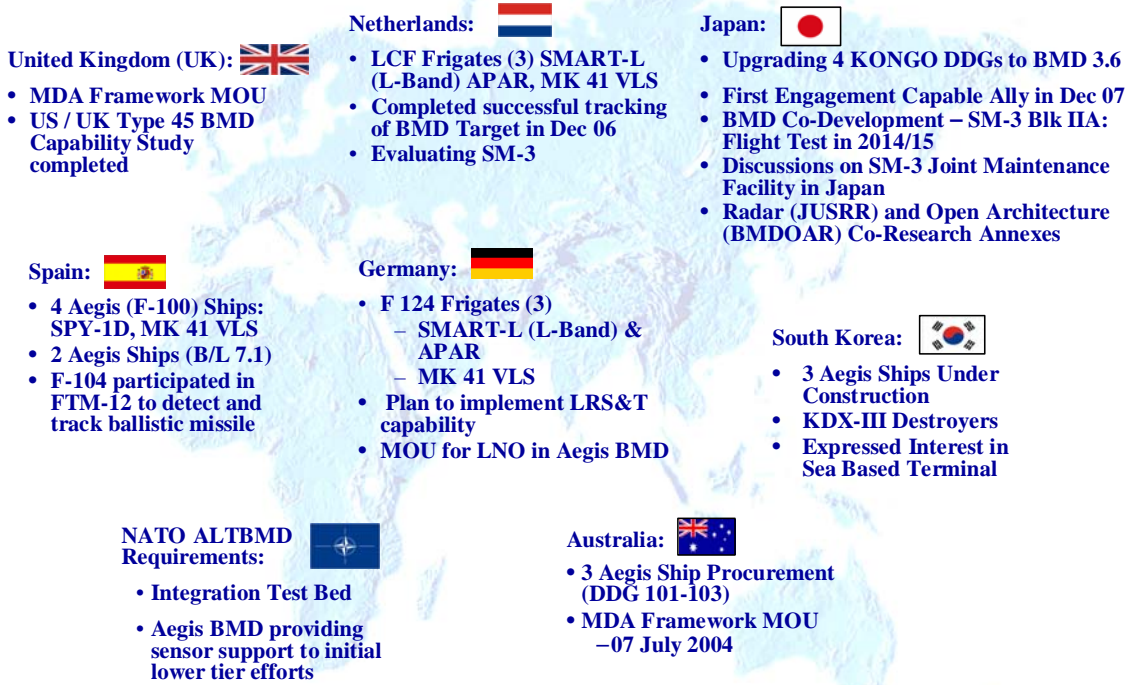
Let me run this geography (Figure 19). Before I told you how we underlay the GMD European site. Instead of needing all the ships you see on the left, now with a forward-based sensor and the SM-3 Block IIA, two ships can defend Europe and underlay that third site in Europe along with THAAD.



Aegis BMD

Sea-Based Ballistic Missile Defense State of Play

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07-MDA-2370 (27 MAR 07)



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Figure 20

As I was introduced, we talked a lot about Japan's role, but we also have other international partners (Figure 20). In December 2006 The Netherlands sent one of their new area air defense frigates, the *Tromp* to participate in FTM-11. She successfully tracked a ballistic missile target. They are working on their way ahead for acquiring an indigenous ballistic missile defense capability. We are supporting them with technical data and discussions. We are working with the U.K. on what it means for their Type-45 air defense ship and what trade space they want to look at. I have talked a lot about Japan. Once we go more public with our far-term sea-based terminal program next year, we anticipate interest by the government of South Korea on their new Aegis area air-defense ships to acquire that capability. Australia is building three Aegis Air Warfare Destroyers. This year they announced that they want the flexibility, to potentially put a ballistic missile defense capability on those ships. We are supporting the NATO ALTBMD effort with sensor data for their lower-tier systems. We are working with Germany as well. Germany's ship is very similar to the Dutch ship including having the same exact radar suite. There are differences between the ships, but they are looking at their trade space too. Last summer, Spain sent one of their F-100 class Ae-

Aegis Ballistic Missile Defense System Status and Upgrades

gis ships, the Nuñez, over to participate in a flight test mission. Obviously with an Aegis Weapon System, they were very successful in tracking the ballistic missile target and they are now looking at how to acquire a search and track capability and what it means for them budgetarily. Again, we are excited about that.



Figure 21

In summary, as you see today, ships are at sea and are loaded out with missiles (Figure 21). These Aegis BMD ships are capable, the combatant commanders and the fleet commanders have determined appropriate missile load-outs. I can tell you that they are pretty aggressive in maintaining those load-outs. I am pressured on a constant basis of “We sure would like more.” So we don’t waste any time; when they come off the production line, we fly them and they load them. We have, I believe, a very sound program to continue on the philosophy of Aegis and Standard Missile to spiral-upgrade the capability. We are very proud of where Japan has come and their commitment and the fact that they work with us to get where they are today. We are all very excited for what we anticipate will be a successful event here in December. I can tell you that they have done all they can to be successful. Nothing is a sure thing when you do this kind of business, but I will tell you they have done everything they can to train and prepare that ship to be ready to go. We are getting a lot of interest and that is exciting, too, with other nations coming forward and talking to us about acquiring this capability. A standard line I hear from our allies is “We do not want to be held at risk.” It

would be a terrible thing to be held at risk and we had the opportunity to acquire the capability, but we chose not to. What is the price of that? What are the consequences of that, to not acquire a capability, particularly since it is a defensive measure? It is very interesting to deal with the allies as they go through their military and political discussions on this and frankly it helps us to see their view of how they see it. A lot of this is consequence management. What are the consequences of not doing something? For those of us in uniform, the worst thing you can say is that we chose to do nothing; there was a need and we chose to do nothing. It is different on a political view, clearly, but it is very impressive, with a couple of the allies in particular, how they work their political system to get the right debate on the table so they can have a good discussion. Very impressive.



Where Is the...
Aegis BMD

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06-MDA-1787 (15 SEP 06)
Rev 0.0, 06/23/06



...Missile Defense Fleet?



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Figure 23

Where is your missile defense fleet today? It is at sea on patrol and it is providing options for us. In January of next year when *Kongo* returns to its home waters of Japan, there will be two nations with sea-based missile defense capability that we will be working with aggressively, and we already are with the Seventh Fleet working with

the Japanese fleet commander to get that capability integrated where it supports both nations. Now I am available for questions.

Questions and answers.

Question: You had mentioned the Congressional add-on this year for the Aegis missiles. You said that you could get all these eighteen ships installed by the end of the next calendar year? Did you mean by the end of 2008 or 2009?

Hicks: 2008.

Question: That's about a year earlier than you envisioned?

Hicks: About six months. Actually the industry partners and our install teams have done better than we had planned and the materials are coming a little bit earlier. We normally plan for a two-year lead time and they came in a little earlier. One of the things we were concerned about in 2008 was whether we would have enough money to get there from here. We were worried that we would have the equipment, but not the install money. The money from Congress allowed us to do that. After we briefed General Obering on our priorities for what we would do if we got a Congressional plus-up, he supported that, and that allows us to meet this schedule that we wanted. I am very concerned about having only sixteen Pacific ships and two Atlantic fleet ships. It doesn't take long for a demand signal, if tensions should arise, that we could rapidly put them to sea and keep them at sea for a while, because there are only eighteen of them. If you move ships to the Middle East, where are they going to come from? Right now, they are going to come from the Seventh Fleet, and the Seventh Fleet has to worry about North Korea. So getting the Atlantic Fleet ships adds a little bit and getting more ships in the Pacific Fleet quicker gives the operational commanders more flexibility.

Question How would you assess right now the threats in North Korea and Iran? Specifically with North Korea, have we managed to determine anything as to their recovery from the failure of the long-range missile in the multiple test?

Hicks: I am not a traditional acquisition guy; I still like to think of myself as an operational guy. But what I have learned after twenty or thirty years of active duty is that intelligence, like economics, is a dismal science. It is imprecise. I don't know if I have a good answer for you as to whether they have recovered. There is a lot of supposition in the intelligence community. What I will tell you is there appears to be the will to press forward with their technology, to keep exercising it, both on the Iranian and the North Korean side, and that concerns me. So as long as the will to keep working with

their motor technology in their missiles and how they would operationalize to reduce warning times, those things concern me. I will leave it at that.

Question: Obviously circumstances dictated that as missile defense technologies matured, they were incorporated into existing hulls. Now we are looking at CG(X). How involved is your office in terms of designing that ship from the bottom up for missile defense roles?

Hicks: There is a very clear statement by the Navy, and I used to be, in my prior job, the CG(X) guy on the OPNAV staff, or one of the guys. To the Navy's credit, they have asked us to be on their analysis of alternatives oversight group as they go through their review of alternatives. I think if you look at the Navy's current shipbuilding program and where they are going in the future, the criticality of the Navy getting this ship right – and when I mean getting it right, I don't just mean capability, but something that is affordable, that can fit within our industrial base and is compelling over time as a priority for this nation – has never been more critical. I can easily rationalize to any audience, to you or going out to the Midwest, that the nation needs this cruiser for lots of reasons, not just for ballistic missile defense, but for advanced cruise missile defense. Today's Aegis fleet, particularly the Baseline 2 cruisers and all the Aegis destroyers, are the first class of ships that we haven't considered decommissioning because their combat system became obsolete. You can always upgrade a ship engineering-wise. We have maintained 1,200 PSI steam ships, which is not easy to do, for 35-plus years. We decommissioned earlier classes of combatant ships because we couldn't upgrade their combat systems affordably. Our Aegis ships have been kept upgraded over their lifetime so they remain relevant today. The Baseline 2 ship that came out in 1986-87 is still probably one of the dominant maritime assets on the water today. So we need to choose wisely like that when we go to CG(X).

Lots of people want to build this incredible radar. I do believe you need to get there in a step fashion. Jumping to a radar that is three generations ahead in one leap is going to be terribly challenging and may drive costs in the red. So we need to be very careful how we get the risk-reduction path to that cruiser. The Navy has wisely chosen their full Aegis modernization program, in which the cruisers have already started and the destroyers will soon start, to keep them relevant for the future. It is a good value for the nation. Leveraging that program to help you buy down risk for CG(X) should be done. That is my belief and the Navy knows it; I have told them and I have become more convinced of it over time. Because you have to make it affordable. While we do it, we need to talk to our allies early to offer them opportunities to be part of this development and give them an opportunity to understand where we are going, to see where they want to go. Because I also believe that with cruise missile threats for

the future and ballistic missile threats for the future, that there will be a demand for one of those ships.

Interestingly enough, one of the allies came to me and said, “One of the things we are worried about is justifying the cost of these ships we are building,” that is, one nation’s air defense ships. For us, it is about \$500 million per year or something like that and we are worried about justifying it. The thing they found with their public that resonates is, “If we can modify it to do ballistic missile defense and still retain its current capabilities then that looks like a good deal for us.” We have been doing with that for a while, so all the more reason to communicate early. This is what Australia has done. They decided to buy Aegis. They saw potential, not just with the current capability that Aegis brings for multi-mission types. They said, “The U.S. is going with ballistic missile defense, so we have an option.”

To go back to CG(X), that ship is critical for the Navy. At some point, the Aegis cruisers are going to get tired and we need to work on this ship critically. There is also the industrial base issue. We have to take a hard look at that because it is important for the nation to retain the right capability to be able to build that ship and do what is right for the nation.

Question: How concerned are you with the elimination of MKV funding for Aegis?

Hicks: I would have liked to see some funding that would have allowed us to get to a system concept review for a multiple variant for the SM-3. As much as anybody, I would like to have something beyond the unitary warhead that is planned with the government of Japan to deliver with the SM-3. That is priority one, absolutely priority one. We have to deliver that missile on our agreement, not just to the government of Japan, but to our own combatant commanders who want that missile. But beyond that, to get an extra kill vehicle or two on top of the SM-3 and provide options against more advanced threats in the future is something I would like to be able to have as an option. I am also acutely aware there are finite fiscal resources to do this and there are also finite engineering resources to do this. Whether we like it or not, the technical base out there is finite. If we want to ramp up and go to my industry partners, it takes time and money to go do this. I would have liked to see some MKV funding to get to a system concept review for the SM-3 Block IIA. We will see how that plays out over the year. We are going to press forward with the current program of record. Within the agency we are going to look for opportunities about how we go forward with Congress to talk to them about what we want to do with the SM-3 in a multiple concept. But clearly right now the number one priority is to meet our commitment to Japan. It always has been and will remain so.

Question: Could you comment on where you see the command and control architecture going between Aegis and PAC-3, especially in the Japanese scenario where you may very well have a U.S. Aegis and a Japanese Aegis, a U.S. PAC-3 and a Japanese PAC-3, and if you have missiles coming in, who is going to shoot them?

Hicks: Great question. There are two issues. Let's talk about Japan first. The Japanese are planning to practice deploying their Patriot units within Tokyo in a very public exercise. The Japanese already have their own air-defense radar system and so the question is, if we put our Aegis ships on station and we take the X-Band radar that we have put up in Shiriki in northern Japan, how do we integrate those two together? We are working on that today. In fact, we are negotiating with Japan a case that allows us to work from an engineering perspective to do that integration piece. The Seventh Fleet commander in Japan is working with his counterpart in Japan and they have already been executing BMD exercises for coordination of Japanese Aegis and U.S. Aegis. The next step is to get into that command and control network to provide link-data to Patriot. Now these inflections are kind of easy for Patriot. It is an intelligent weapon; it is a point defense system. If it gets a cue, it is going to start looking and it is going to shoot. So if SM-3 either doesn't have a shot, because of geometry or whatever, or it misses, the Patriot will take the shot, is the way I would like to see this go. So engagement coordination with Patriot is just to make sure once there is a successful intercept – I don't think that will be an issue, but just to assure we don't waste Patriot missiles shooting at small debris that is burning off in the atmosphere. That is good news. THAAD is tougher. That is one reason we are excited is that THAAD is with us at PMRF in Hawaii for their testing. We are stepping forward with integration of how we work with THAAD so we can start working the tactics, techniques and procedures so that we do weapons coordination with them. Aegis has a larger engagement envelope than THAAD does. So if SM-3 gets that first shot and gets a kill assessment, you get a kill passed to THAAD so it knows that it doesn't have to shoot. If we miss, then we need to send a no-kill, so they can take the shot. We can do this, and we can do this with Japan, too. We have the relationships in place. But this is also a matter of passing data first. First you have to assure yourself that you pass the data where it is relevant and timely to make decisions; then you need to engage your decision-making bodies on how you want to do this, which is a political end issue.

Question: Is there a long-term test plan that you are starting to think about, testing that particular issue?

Hicks: I would tell you that the Seventh Fleet right now and Pacific Fleet commander and PACOM have a plan where they want to press forward with testing operational fleet and joint events with Japan. I think they will figure that out with the support of MDA and STRATCOM to go do that. I don't see that as an issue. Whether it is writ-

ten down in concrete yet, I couldn't tell you. I know they have been holding live exercises already, just not table-tops. Let me shift gears here to the Middle East. There is U.S. Patriot in the Middle East. The Fifth Fleet has already set up coordination with Patriot for cuing and they exercise that. In October we flew over and did a war game that wasn't just with the Fifth Fleet in Bahrain; Admiral Cosgriff, the Fifth Fleet commander, brought in the joint players, so we had the strike group reps from the deployed strike group in there with us, we had the Army, we had CENTCOM staff and we had the Air Force JFACC there to help us do the war game of how we would – what they have learned to date in training and fleet events and joint events and where we want to go. So I think we are on track there. They have the connectivity there that can make this happen.

Question: If you just look at the technology, could the Aegis system replace the need for ground-based interceptors in Europe?

Hicks: That is a loaded question! If you look at near-term, until we can define how many U.S. ships we want to have deployed all the time – if we want that persistent coverage (24x7), the limited number of ground-based interceptors we are talking about putting in Europe – ten – provides that persistent capability there that doesn't require the fleet to be there ready to do it all the time and frees up those ships for other missions. Certainly by the near-term capability, between now and 2015, that is a lot of ships and I wouldn't recommend it for anybody. Also those missiles run out of juice against something that is going across the ocean. So for the defense of Europe, you could put a lot of ships up there and do it. It would take God knows how many THAAD, but a lot of Aegis ships, too. In the future, post-2015, a better missile could do more, but you are still talking about ships being dedicated to a mission set that doesn't give them as much flexibility to go off and charge over the horizon and do something else. It doesn't mean you could say that you now have higher priority tasking and go back and go to an optimal station to get the maximum coverage. So I would say underlay is a great term. The other issue I would like to bring up is, I have to tell you, if we screw this up and there is a weapon of mass destruction, a lot of people are held at risk. I don't want a single-point failure, so I would like more than one system. The other thing, I would like to do it exo-atmospheric, because you reduce consequence management. Consequence management becomes a lot easier to deal with. So I wouldn't want a single-point failure.

Question: You mentioned the stocks aboard the ships, the shortage of missiles right now, below the requirements. Can you talk about what those requirements are? You mentioned ten ships [sic] in Europe. What are we looking at? How do we come up with those requirements?

Hicks: That is a great question. When I was on the Navy staff years ago, we looked at several scenarios, three to be exact, as to what we thought we needed for sea-based missile defense capacity. I can't divulge all of those to you, but we put a lot of work into modeling down to a very high-end level what it would take, in confidence, in different scenarios. What we came down to is, one, you don't want to default to just a sea-based option. You need other pieces, THAAD, Patriot, you have to have them all. They all contribute to the fight. I am talking about a regional theater fight here. And the other piece of this is, a lot of those processes we came up with have been picked up and also been done by the Joint Theater Missile Defense Office and also STRATCOM to look at what they call the joint capability mix study for this mission area. They have come up with what they think are numbers for different scenarios, what we think are inventory requirements of missiles. And I will tell you that it is my personal belief that we need to modify significant numbers if not all the Aegis ships to give the Navy a robust operational BMD capability. We may not load-out all the ships all the time, but the ability to load them so that they are available and not have to rely on a specific call to go do the job is, to me, a needed thing. That is why the Navy decided to invest in Aegis modernization to get those upgrades on those ships.

Question: How far are we? Say we're looking for increased stocks, what are we talking about in terms of scale?

Hicks: Let me put it to you this way: a lot of this depends on how many THAADs we buy. The more THAADs you buy, maybe the less sea-based. Some of this depends upon how many Patriots we have and where they are going to be, because that lower tier, and maybe then I don't buy as many terminal sea-based weapons in the future. There are some places I don't think I can get Patriot into or force-flow them into, so a sea-based option may be more optimal in some scenarios. For upper tier, that doesn't really change a whole lot. You really need those SM-3s. For that, we need a significant increase over the current program of record to get there. Right now, we will have 132 missiles in the program of record, delivered, by 2013. We need more than that. I will leave it at that.

Question: You said that you plan to deploy in 2015 a sea-based terminal capability.

Hicks: A more robust capability.

Question: What year to you plan to initiate development? Is that in FY09?

Hicks: This year, sir. We are going to start announcing the plan this year, hopefully in the spring. We are in the process of briefing it up. It has been briefed to General Obering and we will take it forward from there.

Question: You will manage that from Dahlgren?

Hicks: Initially we will be split between MDA Headquarters in Arlington's Navy Annex and the Aegis BMD building in Dahlgren. Once we make a decision on the plan, my expectation is that we will manage it from Dahlgren.

Question: In addition to the SM-3, there used to be a program called Brilliant Pebbles. Why are you not doing that? Should it be done maybe in cooperation with the European nations, since they are much cheaper?

Hicks: Do you mean a space-based capability? On this one right now, Congress has chosen not to move forward in support of funding for space-based steps and wasn't supportive of funding for moving forward for any risk reduction to go to space.

Question: My second question is if the Europeans were charged with Brilliant Pebbles, would the United States support it?

Hicks: Sir, I can't answer that question; that is not in my turf. I'd love to be able to answer, but it is just not my area.

Question: It would be an interesting proposal.

Hicks: It would technically be a very interesting proposal. If you can get the Europeans to lean more forward, God bless you! I think it is a very appealing issue. Going back to what I have learned in working with the allies on ballistic missile defense, with the exception of Japan, as one of my good friends in Japan said, "It was interesting watching public opinion in Japan once something flew over Japan that we didn't like." My answer to you is the debate needs to occur from a technical viewpoint to validate to the political side the value of the capability. Sometimes we immediately jump to the emotional argument, based on non-validated data. Again, sometimes when I go on the road, I talk to people out in the Midwest and I am still shocked by some of the questions I get. But if you look at the press coverage, in this case a lot of it is not reported. It is not bad reporting; it is just not covered. I viewed the event that occurred in Hawaii back in November as historical in nature. I look at the blood, sweat and tears put out by the engineers and the sailors to get this thing out there, and with about a fifteen-second sound bite on CNN for a part of the day, nothing in the Washington Post, I don't think, nothing in the New York Times, for God's sakes. Now if we had missed, I am sure I would have made the front page! I view it in light of the old Navy expression, "Twelve "atta-boys" are negated by one "aaww shucks."

But the technical argument is really important and in fact, one country brought in their academic community to help run an analysis of the need for BMD. Very interesting, because you would think they would be left of center, but they came out and said, "We need to do something. The consequences are too drastic."

Thank you all very much.

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