

09-20-17 Missile Defense Advocacy Alliance (MDAA) Congressional Roundtable Discussion with Colonel Mark Holler, Executive Officer to the Army Inspector General; Retired Rear Admiral Mark Montgomery, Former Director of Operations U.S. Pacific Command; Rear Admiral Johnny Wolfe Jr., Program Executive Officer Aegis Ballistic Missile Defense, Missile Defense Agency; and Riki Ellison, Founder and Chairman of MDAA, on “Defending Against the North Korean Ballistic Missile Threat”

MR. RIKI ELLISON: Good afternoon, everyone. Welcome. My name is Riki Ellison. I am the founder and chairman of the Missile Defense Advocacy Alliance. I’ve been involved in missile defense since 1980 as a college student, introduced by Ronald Reagan’s national security adviser at that time, and Dr. Teller.

We’ve progressed, obviously, over the last 37 years. In 2002 when our nation withdrew from the ABM Treaty to enable us to put forward missile defense capability to defend our nation, we formed our organization, because of really the lack of education and the bitterness and divisiveness on the political spectrum on this issue. So, we were formed and our whole mission, and we sincerely believe, that the more missile defense capability in the world the safer our world is. We’ve been on a very pure mission, not partisan, to push and advocate for more missile defense everywhere we can.

Today we are going to discuss the current capabilities that we have in the arena to defend against the North Korean ballistic threat today. This is not a discussion on solutions or policy or operations. It’s a discussion on what our tax dollars have done over the last 37 years to get to a point where we have real tested, proven capability defending 300 million people in the United States, defending 120 million people in Japan, and defending 80 million people in Korea today. It is obviously relevant, with all options that are on the table, that this is the absolute core capability that you have to have to enable everything that the world, the United Nations, our country, Korea and Japan, are going to look to do to try and change the situation. Missile defense is clear and needed.

Today we brought together for you the best people in the world that can speak to this issue of capabilities, reliability and confidence in the systems. So we have the privilege of having the speaker that was in command in June of the Korean Peninsula’s air and missile defense capability. We also have a speaker that was the head of operations for the Pacific combatant commander for all the Pacific. And we have a presenter that develops and tests the systems that go to the war fighter.

That’s what we’re going to do today. We’re going to have each of them spend about 10 or 15 minutes on presentations on the capabilities. Then we’ll open it up for questions at the end of the last speaker.

We’re going to start out with Colonel Mark Holler. Mark Holler was the Commander of the 35<sup>th</sup> ADA Brigade, which has two Patriot battalions and coordinates with the Korean air defense Air Force brigades there, and is the adviser to the AFC in

Korea for the missile defense capability for Korea. We've had a lot of visits there. We have had a great relationship in helping that Korean relationship as one team, one fight with missile defense.

Mark.

COL. MARK HOLLER: Thank you, Riki Ellison. I am honored to speak here today about missile defense capabilities in Korea to address the North Korean ballistic missile threat as well as the emerging nuclear threat. I must say up front that while I am fine with the media, being an Army colonel what I say today are my opinions. I won't touch on policy or get into (platform capabilities ?).

I recently completed a two year tour of duty in Korea where I last served as the brigade commander for the Army Ballistic Missile Defense capability in Korea, as Riki stated. Two Patriot battalions gave us a short range capability, and we brought THAAD into Korea over the last couple of months.

While I was in Korea I was also dual-hatted as the deputy area air defense commander, and in that role I had the responsibility to advise senior Army and Air Force commanders on all aspects of ground-based BMD operations. I performed in that function on a daily basis. Also in that role, as the brigade commander and as the deputy air commander, I worked very closely with our Korean counterparts.

I believe it is appropriate to start this conversation with an overview of the threat from North Korea, the development of their ballistic missile systems and also the nuclear threat. It is something that I faced daily while maintaining brigades in missile defense working closely with our South Korea counterparts in that work. My contribution to this panel is really going to be from that perspective, on the ground in the BMD fight. I left the command on the 9<sup>th</sup> of June.

It's probably right to start the conversation off with making sure we have a foundational understanding of what is driving North Korean actions. I believe they are driving to two primary strategic objectives. First of all is the survival of the regime in North Korea, given their economic position, especially as they look south across the DMZ they see the prosperity that's going on in South Korea and really all around the rest of the region.

The other one, I believe, the ultimate goal of the dictator is to reunite Korea under Pyongyang's control. If you look at this problem set it's important for us to frame the ballistic missile development and nuclear weapons development are tools to achieve these two strategic objectives. Most of us are aware that North Korea, over the past couple of decades, has developed and operationally fielded short-range and intermediate-range ballistic missiles that can fire on the population centers in both South Korea and Japan. That is a pretty developed, robust capability that they've had for some time.

In response to this threat that's been out there for some time, the United States has

deployed the Patriot capability and the Aegis capability with our partners in the region to help deter and mitigate this threat. It's also important to understand that both our regional partners, South Korea and Japan, have also invested heavily in the development of their own ballistic missile defense capabilities to include their indigenous defense capabilities, and the Patriot and Aegis capabilities.

So what has changed recently? While I was in Korea we saw it really started with the changes in the regime under the current dictator Kim Jong-un. We call him KHU for short. He came to power in 2011 and since then we've seen accelerated research and development of a new class of ballistic missiles, intermediate ballistic missiles, that range over the previous intermediate-range ballistic missiles that we've all seen, and the development of the ICBM ballistic missile. These are specifically designed to target U.S. assets in Guam, Alaska, Hawaii, and also the continental United States.

As you look at this new class, something you have to pay attention to is the advances that we seen. Things like solid fuel, which gives them increased responsiveness. Tracked versus wheels gives them increased mobility over terrain and enhances the survivability of their systems. We've also seen the beginnings of a submarine launched capability, and they're striving very hard to develop that capability.

Likewise, if you look at North Korea's development of nuclear weapons, it's a very similar situation. That research and development developed under Kim Jong-il. In the reign of his father, we had two nuclear detonations in 2006 and 2009. Since KJU has been in charge in the last four years he's had four tests. Each one of those had progressively higher yields. North Korea announced its latest test was a hydrogen bomb nuclear explosion. It had a much higher yield than previous explosive nuclear bomb tests.

And then the final capability they're working hard to advance very rapidly -- the last few pieces of the puzzle that they're working towards, is the miniaturization of the nuclear weapon to fit inside the warhead of a ballistic missile, as well as a reliable re-entry capability for that warhead to be put on a longer range ICBM and survive the exo-atmosphere.

So given that kind of overview of the threat, one of the questions is, what have you been doing and what are we doing to mitigate and address the North Korean threat? I think it's extremely important when you talk about the homeland, we need to also for the men and women stationed in Korea, to understand that meeting the nuclear threat to our homeland starts with the U.S. and allied BMD forces in the Pacific theater, especially in Japan. These missile defense forces that we have forward deployed provide the foundation for strategic options to protect our forward-based forces and also our population centers. They enable the introduction of follow-on forces to put more capability into the theater to address the threat. Probably most importantly, they deter and enable decisive operations.

So in sum, I would say they provide strategic decision space for the president. They provide strategic decision space for the heads of state of our alliance partners, as

well as military leaders for the U.S. and alliance partners in the region. Keeping these systems forward, keeping them ready, keeping them updated and modernized, all sends a very strong message of our commitment to the security and safety of our allies in the region.

In Korea, two of our very recent land-based efforts are Patriot modernization and also the interest in THAAD, the Terminal High-Altitude Area Defense. The brigade I commanded was the very first U.S. Patriot force to complete one of the most significant software and hardware modernizations of the Patriot weapon system since the 1990s. That was an eight month long effort.

During that period we added new software and hardware, radars, control systems and launchers. So we now have that Patriot force forward deployed that have increased reliability, extended range and lethality. The most advanced Patriot system in the world is currently forward deployed in Korea. It also capitalizes on the increased capabilities on (NC3 ?) missile defense components.

The upgrades also support increased interoperability with other BMD systems like THAAD. Really what was most decisive in our modernization effort was this was a depot-level modernization. We had Bloc systems in a large building and tore them down and rebuilt them with new components. We did this in a forward station location while maintaining all of our (demonstration ?) requirements. It was the first time it has ever been done in the Army, a truly remarkable feat. The Army led this with additional personnel and equipment to theater. It really came together during the modernization process. It was truly an amazing demonstration.

I think it's also very important to note that our allies in the region are also contributing significant amounts to modernize their own BMD systems, to include their Patriot and Aegis systems. We truly have supported that effort. THAAD in Korea brings a tremendous capability to help support the U.S. and allied effort there. THAAD offers a tremendous capability to have a wider range and really enables a lot of flexibility in options for the commander. That is a very significant force.

The last thing I'll say here is I think it's really important to understand that ballistic missile defense is not stovepipe operation. It relies on other military functions to be successful. The one that I would highlight the most is intelligence, surveillance and reconnaissance assets, ISR. They are supremely important in enabling the ballistic missile defense mission, whether it's a national asset, a theater asset or even a tactical asset, whether it's land-based, sea-based or air-based. They all contribute to the necessary ability to address information requirements on the threat.

I'll leave it at that for my opening remarks and thank you.

MR. ELLISON: Thank you, Mark, great job. Our next speaker has just recently retired, PACOM J3. He is the combatant commander for Tom Paris (ph) of PACOM. Mark was his senior adviser on missile defense. He is probably one of the most brilliant

minds on missile defense our nation has. He started years and years ago. We first met when he was in EUCOM fulfilling that mission, and has been (the go to force ?) on operation on that capability as it continues to be fielded.

Ladies and gentlemen, retired Rear Admiral Mark Montgomery:

ADM. MONTGOMERY: I'd first start by saying up front I think over the past 10 years PACOM, enabled by the Department of Defense and the Missile Defense Agency, but also by Congressional budgeting -- has built an effective active defense and does remain postured to defend the U.S. homeland and allies and U.S. forces in the field from the North Korean threat we're seeing. I think that a strong accommodation of effort was made over the last five to seven years in the aggressive manner in which we addressed the growing threat we see.

I do think lately we're facing some new threats, both in North Korea and with near peer adversaries like the People's Republic of China, and I'll talk a little bit about those. But I'd also say, as the Colonel hit hard, we have worked to move a lot of forces into the theater over the last 24 months, whether they're ships or THAAD missile, and I'll talk about that a little bit. So it's a very active theater with a lot of opportunities, but a lot of challenge, and I'll talk about two main challenges facing us.

Generally speaking, our PACOM strategy is to have a forward stationed integrated air and missile defense weapons systems in the Pacific, because we don't believe we'll have the time to get those forces forward in a crisis. The crisis from North Korea exceeds the amount of time it takes to either air deliver a THAAD or Patriot system or have a ship transit from Pearl Harbor or San Diego or Guam to Northeast Asia. So realistically, we have to be forward stationed.

In that regard, the Navy has worked to send three of its latest ballistic missile defense baseline 9 5.0 destroyers into the theater. I expect more will be there within the year, if not sooner, and be home ported there. These three ships will be permanently forward stationed with a majority of our baseline 9 5.0 systems on the frontline in Northeast Asia to help our allies and partners.

Additionally, the Patriot systems in Korea and Japan -- there's U.S. systems in both those countries. We've forward deployed THAAD to both Guam and Korea. So our two permanent force stationing spots will be Northeast Asia.

This is a significant commitment by the United States to these forces. It has positive aspects to it, which means you don't need a 3 for 1 rotation of either THAAD batteries, Patriot battalions or Navy ships. You can achieve a much higher level of operational tempo with a smaller number of assets forward.

So that has been our strategy over the last 10 years in missile defense. I won't bother you with 40 years of stationing forces in Japan and Korea. We remained relatively constant while we had draw-downs in Europe over the same time frame. So it's a clear

indication of commitment to the broad defense of Northeast Asia and the ballistic missile defense of the United States, Korea, Japan and our forces in the field.

We made some good investments in building passive defense capabilities, whether it's hardening or making things more expeditionary, but this is a constant investment. As your adversary builds more and better systems, past defense can be a very expensive thing when you play long-term. I don't think you can call active defense cheap, but new active missile defenses starts to get expensive but we need to protect critical nodes or duplicate critical nodes in order to protect our expeditionary capabilities.

I think the other critical element of success over the last 10 years has been building partnerships. I know the colonel referred to it in Korea. If you look at Korea and Japan, they're the two most capable ballistic missile defense allies we have in the world, whether it's ground-based or ship-based. The number of Patriot batteries that these countries have is two to three times the number of batteries we have. So they have put down their money to build ballistic missile defense systems that defend our forces in the field along with their populations. Sometimes that subtlety is missed. These are countries that in addition to the grants they give us within their countries, which is a whole other issue about construction and military structures and operations of forces in country, they put significant percentages of their defense budget into air and missile defense of the AOR, which includes our forces.

In addition, the Japanese are the only country which really has built a full-up sensor plus shooter ballistic missile defense capability with their four Kongo-class ships. They intend to modernize two more and build two more new ones, so they're going to almost double their maritime capability over the next five years. They're also looking at both Aegis Ashore and/or THAAD as a system inside their country. So they've made some clear and significant investments that when brought together and integrated operationally with us, which is how we operate forward both with Korea and Japan, helps defend our forces in theater and gives us early warning of attack against either the homeland or U.S. territories in the Western Pacific. So clearly the strength of these two countries' investments contribute broadly to our own regional homeland defense.

Finally I'd mention that we are glad to see that the general security and military information agreement pulls all three of us together in a tighter (alliance ?). When I was at PACOM we conducted in 2016 three Pacific track activities. Pacific Track was the operational name for exercises that tested our ability to link air defense information with each other. It's a significant step on the way to having a broad integrated warning system about attacks.

It's going to be critical because, as we've seen in the last few launches by North Korea, Japan can often be the suspected victim or the intended target for deterrence purposes. So I think that continuing work on these exercises is going to again further deterrence. And there's a third country in the region, Australia, that has also been looking at ballistic missile defense. We work closely with them.

As part of our broad work together in military-to-military exchanges we do work with Taiwan on security, including observation and discussions on operational concepts to include integrated missile defense. So really, it's the area we discuss, plus missile defense, with our allies as our highest war fighting integration. That work over and improvements over the last five years, primarily with the Japanese investments over the last 10 to 15 years, has paid off with a better coalition system.

Finally I'll mention about the successes we've had and talk a little bit about the challenges with the work at MDA on a potential medium-range facility in Hawaii to combat North Korean ICBM threats to that state. I'll leave it to the question and answer period to discuss that, but I think we have a capable system today with Ground-Based Missile Defense. We've demonstrated that. We've demonstrated it with computers and we've demonstrated it with live weapons. What we're thinking about now is where are we going to be five years from now and where are we going to be five to 10 years from now if this problem continues. So I think MDA decisions over the last 24 months has gotten us the right answers.

Five to 10 years from now, what can be ready in five to 10 years? First is we have to redefine that the threat is not ballistic missile defense, but broadly (defense flyers?) and that's across three areas. One is the air breathing threat, and this applies more to a country like a near peer adversary like Russia or China with land-attack cruise missiles.

Then you have to think about the hypersonic threat and again think about the ballistic missile threat. Taking them in reverse order, I'd say the ballistic missile threat we have really worked hard on the MRBM, IRBM, ICBM, MDA's 25 year effort has resulted in the right capabilities, and it's just a question of are we willing to make the investments necessary to deal with our adversaries? I think with ballistic missiles we're in the best place.

On hypersonics we're in a neutral place where we are a signatory to the INF Treaty and the Chinese are not. The Vice Chairman of the Joint Chief, General Silva, has discussed whether or not Russia is adhering to the INF, and given a negative assessment of that. So basically in a two country treaty that limits us significantly, the other country is not adhering to it. When I think of the broad array of Chinese ground-based systems that face our forces, over 90 percent would be non-compliant with INF. This is probably not how you handle an adversary that thinks hard about counter intervention strategies and appears to build a military that generally targets your air and naval systems. It's self-limiting and I think air-breathing assets, cruise missiles, would be good investments. Hypersonics we really haven't gotten to a position on yet because of self-limitation.

Finally, air-breathing, I think we clearly have the technology with SM-2 missiles and air defenses, we can bring those kinds of systems on; and shorter range systems like our ESSM and other systems. We can work to build ground-based systems. The challenge is really a service challenge.

Were defending ships at sea. I think the Navy looks around and says, who's going

to defend these ships out at sea? The Navy is going to defend these ships at sea. So the Navy has a problem. The Navy is charged with fixing it, and the Navy will spend money doing it.

The Air Force looks around and says we have a real land attack cruise missile threat posed to us. Their solution is going to be an Army solution. So I think it's just going to be harder. They're very challenging, difficult and expensive problems for the Air Force to have solved by the Army. I just think it's going to be one of those things where the Air Force has to work through to ensure integrated capabilities as necessary to protect the forces out there.

But Russia and China have a significant land-attack cruise missile threat. The Navy has worked hard on anti-ship cruise missiles. They have a large capability and a large capacity, and whether or not it's enough is a question for another realm. But definitely on the ground-based side, it's a lot worse.

That, to me, is the biggest challenge over the next five to 10 years, defensive fires, and tying together all three of those. If we leave one alone, the adversary will concentrate on that, you can be sure. Because of the openness of our budgeting cycle, they'll know what we're doing, so we really have to get all of them.

The second thing I'd say is we need to link together all our architectures. It's one of these things where if you build two cars and you want to race them and they don't drive on the same gas. You've got to race out there but you've got two different racers out there. What we need to do is be fully integrated.

We need to build integration between the services. The services have to be mandated to build into -- I think there's just too many systems that come up that MDA has to really do summersaults to pull that system into the modern missile defense architecture. So we need to continue to emphasize that from the ground up in almost every system, whether it be a two-mile short range air defense system around a base or a 2,000-mile missile defense system.

You want to have a common architecture across that because whether it's two miles, 50 miles, 100 miles, 1,000 miles, you can't have a break in that. If you have a break in that, there's going to be an operational seam that the adversary can (exploit ?). You really have to have a broader architecture that is truly joint across all three services and are available to critical partners.

If a partner will willing to buy a Kongo-class we need to be in a position to give that country full access to (all systems ?). The same with Korea. The same with any other ally for any defended area.

So I think working on these (flyers ?) and working on the links to bring together the systems are the two big missile defense issues we'll work on the next five to 10 issues so that five to 10 years from now we'll can say, yes, we can handle this threat from North



Korea. That's all I have today, thanks.

MR. ELLISON: Thanks, Mark. Our next speaker represents Lieutenant General Sam Greaves at the Missile Defense Agency. He also is the Program Executive for Aegis BMD systems. Those systems today have the most capacity the U.S. has out and about in the theater. Rear Admiral Wolfe has been a developer of SM-3 systems and the new SM-2 Block 2A is one (he has worked on ?) and he's here to give us his perspective on the development, testing and confidence of the system he builds for the war fighter.

ADM. JOHNNY WOLFE JR.: Thanks, Riki. What I'd like to do is just take a couple of minutes and try to tie together what you heard about the threat and what you've heard from the CoCom perspective on what they're looking for, and try to talk for a few minutes about what we do as a material provider to counter that threat and give the combatant commanders and the services capabilities to do that.

I'd like to reiterate, as we heard, North Korea continues to develop. They continue to test. They continue to make incredible progress, as we've seen just in the last couple of months.

So what MDA is continue to do is we're continuing to develop and field systems to counter that threat, both today and in the future, as you've heard. We have work going on in every part of the Missile Defense Agency and every system that we've got today to counter that threat and to make sure that we have a layered defense. You've heard that it's not just about homeland, it's about regional as well, and so the Missile Defense Agency looks at both of those and how we can bring a layered defense to combatant commanders to make sure that we meet that.

So what I'd like to do is talk for a couple of minutes about what testing have we done that gives us confidence that today, based on that threat, we have the capability to counter it? Since December, the agency has performed seven intercept tests, in addition to multiple ground tests, and other things to prove that capability. As part of every one of those tests, you've heard where we talk about the integration, how do I bring things new into the BMDS architecture? So every one of these tests includes the sensors that we need to be able to both see it and to communicate to the rest of the architecture, both where the threat is at, what the threat is, and where we need to go after it; as well as the command and control, what we call the C2BMC, across the entire BMDS to tie that together.

So let me talk a little bit about -- Mark just talked a little bit about protecting from the sea. In December and again here in August, we tested what we call sea-based terminal. We had proven through two extremely successful tests that we had with the SM-6 off a destroyer, we have endo-atmospheric engagement capability to protect critical assets at sea and ashore along the shoreline. Both of those were with an SM-6, what we call and SM-6 1. Both of those proved the capability to intercept one of those threat missiles going after one of our critical at sea assets. It was incredibly successful, incredibly important because can now tell the Navy with confidence that they have the

capability, that they can set to sea and they can protect their critical assets while they're out there.

The SM-3 Block 2A interceptor, which Riki mentioned, I am very proud of that. That is a cooperative development with the Japanese, and I'll talk a little bit more about that. But we did two critical flight tests of that capability, both in January and in June. In February we had the first ever intercept with that particular SM-3 Block 2A. Obviously our ally Japan was there with us when we did that. It was the first attempted intercept, it was extremely successful, and it allowed us to continue to finish up development so that we can transition to production.

In June we had SM-3 2. Unfortunately we did not get all the way to the end-game where we could consummate the intercept, but I will tell you that we learned a lot. We got a lot of data and we learned a lot about the system, which again gave us the confidence that we are on the right track. We will continue on with that development program and get that into production. So it was extremely successful.

In May we had FTG-15, which was a GBI test where we tested for the first time a three-stage C2 booster and the CE Block 1 enhanced kill vehicle, a successful intercept. That was the first time we flew against an ICBM-class threat. Again, it was incredibly important to show the war fighter, to show the American public, to show allies and to show our adversary that the capability that we've got is a capability that works.

In July we had what we called FTG-A2, which was a THAAD test. That was the first intercept with a THAAD of an IRBM. Again, it was incredibly successful, again proving it had capability in a regional defense posture with layered defense against an IRBM. In July also we performed what we call FET-01, which was again a THAAD test, against a target that was meant to collect data so that we could continue to figure out how we want to take the THAAD system, and how we can get advanced algorithms into the system to continue to make that system better.

I think all of these tests, when you think about it, hitting a ballistic missile, hitting a bullet with a bullet in space is incredibly difficult. But if you look, seven times or better we continue to show we've got the capability. We continue to show both the American people, we continue to show our allies, and as importantly, we continue to show our adversary that we know how to do this and when we need to use it, it will work. So it's incredibly important.

We're going to continue to look at this and we're going to continue to look at the entire MDA portfolio to meet the combatant commander's requirements, to look at the threat. So what I'd like to do is talk about what are MDA's three priorities that we've laid out to go about that.

The first priority is we're going to continue to focus on how do we take the current systems that we've got today and how do we continue to make sure the reliability is where it needs to be? How do we get the reliability better? We will do that by looking

at the GBI. We're looking at Aegis BMD.

I just talked to you about collecting data for THAAD on how we are going to go forward on that. We are looking at GBI's redesigned kill vehicle. That will get us, again, more reliability, easier to produce, something that will give us what we need. And then, of course, all of that we will continue to support all of the systems that we've got, whether it be forward deployed THAAD, Aegis, whether it be homeland defense and GBI, we will continue to support all of those systems moving forward.

The second major area is increasing engagement capability and capacity. You heard Mark talk a little bit about that. How do we do that?

We will continue to work at and build out the sensor architecture. It's incredibly important. I just talked to you about the tests that we did to improve our shooters, but as importantly we've got to be able to see where it's coming from. We've got to make sure we understand what it is so we can communicate to those shooters.

So we will continue to look at building out that sensor architecture across the entire BMDS. We will continue to work towards and we will succeed in delivering 44 GBIs to our missile force by the end of this year. We will continue to look at multiple object kill vehicle and what that brings to the system, as well as looking at how we do discrimination improvements. As the adversary continues to mature, continues to develop, we will continue to stay ahead of that and make sure that we can actually discriminate and go after what really is what we call the lethal object from all of the targets.

From a Navy perspective and Aegis BMD perspective, we're going to continue to modernize our destroyers. Aegis baseline 9, which is the most capable Aegis baseline that we've ever had, integrated air and missile defense, for the first time I can go after ballistic missile targets and I can go after air breathing both at the same time. It's incredibly important.

We will introduce the SM-3 Block 2A. From a capability perspective, we will continue to procure 1Bs from a capacity perspective. And then we are working with the Navy as they are in development of their advanced SPY-6 solid state radar, which is just an incredible radar capability. We continue to work with them as they work to deploy that. As they start new construction on destroyers in the future, we will be in block-step with them to make sure that as that radar gets developed and fielded all of the BMD capability that we can take from that will be there as well.

We'll continue on with LRDR, again, from a discrimination and from a being able to see perspective. And we will continue work with our allied partners, particularly with South Korea on THAAD and Japan. The 2A program, I think personally, is a great, great success.

If you look at what Japan has brought, one-third of the development of that

program has been paid for by Japan. Their industrial base has developed the motors that will go on the SM-2 Block 2A. They have been an incredible partner through all of this and we continue to improve that capability. We are in the throes of transitioning to production so that we can get that into production and can deliver it.

From an interceptor perspective, we will continue to focus on delivering more THAADs and more SM-3s. We expect to get a full production decision on the SM-2 Block 1B this year to be able to get to a FY '18 production. As I said, we'll transition to production on the 2A as well.

I think the third major area where MDA is focused on is addressing the advanced threat. As we know, there are critical capabilities that we've got to look at to defend against things such as hypersonic glide, to defend against some of these countermeasures which we know our adversaries are producing. We've got to be able to get advanced (information ?) to take those out and we've got to be able to also address the capacity issue so that we can defeat larger inventories as countries like North Korea continue to produce and field.

So we're going to continue down the path of looking at all of this. We are committed to doing that. We work very closely with the war fighter, with folks that are telling us what the threat is doing, and we will continue to do that to invest in all of these capabilities.

Finally, I'd like to leave you with one thought. Everyone should have confidence today that we have the strongest defense possible to counter any of these ballistic missile threats. But we are going to continue to work to make it even stronger as we move forward. That is the commitment and I think we're meeting that today.

MR. ELLISON: Thank you, guys, great presentations. We'd like to open it up for your questions. If you can state your name and who you represent, to start, we'll do as many as we can.

MR. : You were just talking about THAAD, Aegis and Patriot. I'm very interested in the Airborne Laser. The reason why is we have to shoot down in the boost phase because of EMP, electromagnetic pulse. (Inaudible) -- the sooner the better. I know the United States and Missile Defense Agency (worked ?) on a high power laser.

MR. ELLISON: Thank you. Admiral, could you talk about the operational feasibility of such a weapon and where you're going with directed energy and development?

ADM. MONTGOMERY: Obviously you want to get something (in the battlespace ?) to hit a launcher before it launches. The feasibility depends on the country, depends on whether you can get the battlespace for your (forces ?). So North Korea might be a more feasible operational perspective, but I would say from our point, I know we worry more about North Korea and shooting down something in midcourse can

handle that problem as well. So something like an airborne laser is of value. It is not necessarily a requirement, but it certainly would be an integrated family of systems. So we never stipulated that we must have one. What we stipulated is that it is a capacity (to add ?).

ADM. WOLFE: You're absolutely right. MDA continues to look at lasers and directed energy. What I can tell you is there's a couple of challenges.

The first challenge is, how do you scale a directed energy weapon from kilowatts to megawatts to give you the power you need to get into something like boost phase? And then secondly, how do you get a platform that can take that and carry it?

MDA has a very structured approach where we are looking at how do we get that scaling so that we can get to the capability that we would need. We will continue that as we move forward, but those are really the two key challenges that we're looking at.

MR. DAN LAWSON (ph): Thank you, Dan Lawson from Jane's. This is for Admiral Wolfe. You talked about the need for better discrimination and better sensor capability, but not much about space-based. Are there efforts underway to get better space-based tracking?

ADM. WOLFE: That's exactly what I was talking about when I kind of said from a sensor perspective we are working across the spectrum to include space-based to figure out how do we get the best capability to be able to see it, to be able to communicate that we've seen it from birth to death so that we can track it all the way from (beginning to end ?). That is certainly part of the overall strategy as we look across the entire sensor architecture and (what capability will work ?).

MR. LAWSON: Is there timeframe on this when something like that might be --

ADM. WOLFE: What I'd like to do, because I'm not the real space expert, but what I'd like to do is take that as a look-up and get you with our expert and get you the information.

MR. : (Off mic) -- what is your assessment of North Korean UAV threats? (Off mic) -- how would you assess the North Korean UAV threat and what are we doing about it?

COL. HOLLER: I would tell you it's an emerging capability. It's something that they're working on. I would tell you most importantly is we have a credible current capability to defeat that threat from North Korea right now. The U.S. has a short-range capability there against that type of threat. So it's something that all of our crews, to include our Patriot crews, train for and are ready to detect and track.

MR. : Now that the THAAD battery is in place in South Korea, what do you see as the civil-military engagement challenges and force protection challenges, and the

sustainment challenges, because the protests continue. You've got (to maintain ?) a supply route along with North Korean infiltration of South Korean protests. What does that mean for sustainment and force protection challenges?

COL. HOLLER: It is a sensitive topic. When I was there a lot of this was politically related, with pressure from a third country. China placed a lot of pressure on South Korea because of the presence of THAAD, a lot of economic pressure.

What I can tell you is we have the commitment of the South Korean government for the deployment of that system. When I was there we worked through some of the challenges with the local population. I worked closely with the police department, the national police and a lot of other folks to protect and secure that area. It's a challenge but also a great opportunity for partnership and collaboration. I think in time that situation will lead to talks. We had a very similar situation with Patriot several years ago amongst the population. We worked through it with our partners.

MR. JOHN CRAMER (ph): John Cramer with Congressman Joe Courtney. I wonder if either of you gentlemen could talk about the strategic implications. Obviously we've seen North Korea ramp up and conduct more frequent attacks because they don't fear failure, whereas for the U.S. we have to come for money to Congress and we have to say we have a demonstrated capability. Maybe there are some strategic implications if we have unsuccessful tests. How do you balance that?

ADM. WOLFE: Let me say that every test that we do is prudent and representative, unless we're trying to prove a specific development capability that is not part of the normal system. So we do some of those tests. You don't normally see them as part of a flight test because the way that we architect the system is that we will do incremental improvements, we'll do ground testing. We do a lot of ground testing. We do a lot of integration testing before we ever get to a flight test.

Flight tests are extremely expensive. So I think it's our responsibility to make sure that we develop the capability in the most cost-effective way. The flight test is really at the end to prove the capability that we've developed through modeling, simulation and through hardware tests. So it is a systems engineering process to get to that point.

ADM. MONTGOMERY: On the last two questions, first under force protection, Kim Jong-un's testing of programs is probably the number one thing that will drive the population to the right place over time because it's something that's a threat to day-to-day life. On the second one, from a North Korean perspective, they don't have a (budget system ?) so they're not really worried. This is their national -- I mean, for North Korea the percentage of the discretionary budget that's applied by the North Koreans to this effort is to the point that it actually affects the national readiness capability for this effort. So you're not going to go through an NDAA three month review process after each Nodong failure. So I just think it's (the oversight provided by who's making the decisions that's moving this forward ?).

MR. CRAMER: But for the U.S. it has strategic implications when we do flight tests and we fail.

ADM. MONTGOMERY: I think we do enough tests and we're open and transparent about it. The Japanese and Koreans, if they're involved in the investment in it, they observe at a very detailed level. As a result, I think that transparency allows for a better system.

We all say, none of our systems (are perfect ?). Some of the things we do might not even show up in a test. In fact, our testing program solves problems. So I think we're very comfortable with a very transparent and open system. We recognize that the North Koreans aren't really going to convince anyone (their reliability ?).

MR. : (Off mic) -- if you had a single dollar to spend extra in the MDA budget which program would you specifically put it into?

ADM. WOLFE: That's a pretty solid question. I would tell you, I would have to say it depends. As we talked about, if you look at the architecture and you're absolutely right, 44 GBIs by the end of this year is incredibly important.

But again, if you look at the MDA program, it really is to understand, would I invest another dollar in reliability or in making sure that we can be able to have a sensor network and discrimination network that helps me reduce the number of interceptors that I might need to launch against any particular threat? That in and of itself becomes a capacity (issue ?). That's why building up our sensor architecture is incredibly important to be able to do that.

But, of course, capacity when we talk about (results ?) is also important. So we look at that and figure out where that line investment is based on where we're at with all (programs ?).

ADM. MONTGOMERY: We can't answer that question without a lot of guidance from the Hill, from the executive branch on, is our national strategy to shoot down every ballistic missile? That would massively bias us towards a GBI investment, if the answer was yes. The next question would be, do we (respond to the adversary ?)? The next issue would be, how much initial depend on a conventional first strike by an adversary?

Once you get answers to questions like that, then you go to MDA and you describe the effect you want. But to do that you have to get the strategic footprint you want to operate in. If you gave me a dollar to go to a budget cycle, that's when that question is a great question, because at that point you have five things in production, five programs that run, you know which three can absorb an extra dollar and which one has (the most scope for improvement ?).

That would probably be how I'd use my extra dollar. But if you want to sit back and make the calculation, the missile defense assessment, you have to set the strategic framework for operators. And there's a broad difference between taking the only ones you have to shoot down, or (saving the inventory ?) for North Korea or Iran or China and Russia.

MR. CRAMER: (Off mic) -- timeline for that?

ADM. MONTGOMERY: I would say North Korea is adjusting one of our rheostats for us. Even other rogue states don't run the risks (that he does ?).

MR. : (Off mic).

ADM. WOLFE: We continue to work very closely with Japan on just that question. Ultimately a decision on where those systems go, what interceptors go in that system, is up to Japan. We are providing all the data to give them all the analysis that shows what the capabilities will be. But I will tell you, much like we have in Europe today with EPAA and Aegis Ashore as we have there, the Aegis Ashore and SM-3 brings incredible capability to the country of Japan. And we will continue to support any request that we get to make sure that as the final decision is made we can help provide that capability.

ADM. MONTGOMERY: Can I say one thing? If they go for Aegis or THAAD or both, what is important is that an integrated defense is critical. You need to keep the support as inexpensive as possible, a bolt out of the blue -- you want to keep that cheap because you have to pay for it 365 days a year. So a ground-based system gives you that. It can just be maintained there. It has a big startup cost, but then it's just the cost of maintaining (the position ?).

The ships and the surge capability give you defense in depth. A better sensor architecture allows you to use less missiles in the defense of your systems. So you want this fight tonight ground-based system that gets you defended for the first six or eight hours.

Then the Japanese destroyers coming out of Saso (ph) can go up and do their mission. This integrated defense really is the next logical step in thinking about how to provide a more long-term integrated defense of the country against a growing North Korean military threat. So I think whatever system we went with or the Japanese go with, as you said, what weapons they put inside is their choice, but historically you can see from what we've done in Europe with allies forward, what a platform looks like.

MR. ELLISON: Well, it has been a great discussion. I think we have covered the whole breadth of it and we can all walk away knowing that we have great confidence in the current capabilities in addressing the needs that we need to go forward with to defend our country from North Korea. Thank you very much, Mark, Mark and Johnny, for presenting and having a great dialogue with the audience.



Thank you very much.