011916 Center for Strategic and International Studies Discussion with Vice Admiral James D. Syring, Director, Missile Defense Agency, on "Ballistic Missile Defense System Update,"

DR. JOHN HAMRE: Well, a chilly good day to you all. Everybody looks like you've thawed out. It's quite cold. Thank you for coming. We're delighted to have you here. I'm very, very pleased to welcome Admiral Syring back. He was with us about a year and a half ago, and I'm very pleased that he's willing to be the kickoff of our speaker series this year on our missile defense series.

I want to say a special thanks to our friends at Boeing who have been giving us the resources to be able to present this program series to the policy community. We invite you to come back for the subsequent meetings that we'll be having later in the spring and during the summer.

I was just talking with Admiral Syring on how much things have changed. When I first was working up on Capitol Hill was right about the time when Star Wars hit. There are a few people here old enough to remember that, though a lot of you aren't.

For so many years, actually decades, missile defense was a partisan issue. It was a way that the tribes identified themselves. And I think we're very lucky and fortunate that we've moved past that. Of course, it helps to have kooky countries like North Korea popping off missiles all the time threatening to incinerate the United States to give you a sense of focus of what's important in life.

I think we're fortunate to have a man of such depth and experience, that Admiral Syring has, as an engineering officer and many different positions, especially in the acquisition community. He's been in this job, probably one of the most important positions that the department has, because he has a global responsibility. It's not just a -- you know, we tend to think of it in very narrow dimensions, but he has to make sure we get the missile systems deployed in Europe. He takes care of national programs. And he takes care of a whole range of other investments that we need for the future. So we're very fortunate to have him in this job at a very critical time.

So could I ask you, with your warm applause, to welcome Jim Syring and thank him for coming and being the keynote on our speech today?

(Applause).

VICE ADM. JAMES SYRING: I have an hour, and I know that there will be no question, right? No, I'll save time at the end for questions. A lot of people ask, where have you been and what have you done and what's in the future? I'll just share a very short story.

I was thinking back a couple of weeks ago -- I don't even know what airport or

what city I was in. It was late one night catching the last flight back to D.C. I saw a World War II veteran sitting with his wife, very contemplative and thoughtful. He had a World War II veteran hat on. Anytime I see that I think it's very important, especially when I'm in uniform, to go up and thank him for what he did and his service, which I did.

It's just an honor for me to see that and have an opportunity to interact with really the greatest generation. So I said, thank you, to him. I was in my uniform. I was in my Eisenhower jacket and black pants, so I guess we look a lot like an Army general at that point. He was obviously Navy. He went through his time that he spent from 1941 to 1945, and just from some areas that almost made you cry with the danger that he faced. It really set me back a little ways.

And then finally it got to me and he said, what do you do? At that point, nothing I could say felt right or felt in context for what he just told me. So I just simply answered I'm in the Navy. I thought he could see that I was in the Navy, but maybe his eyesight was like mine, failing a little bit at that point. So I said, I'm in the Navy, sir. He looked at me and said. "Still?"

(Laughter).

So his eyesight wasn't that bad. Anyway, it's just an honor to go around the country, around the world, and tell people what we do. And it's just my honor to be here to tell you what we're up to, which is a lot, over the last year. And maybe more importantly today, what is in mind for the future.

Before we start -- just go back a slide, please -- read you some quotes that I pulled from some very senior leaders. These are quotes over the last year, and they certainly have been publicized. So I just want to summarize some of the quotes that really guide my thinking and guided what I put together today to address you. We've had very senior leaders say we must find ways to avoid scenarios where adversaries launch large number of relatively cheap rockets, ballistic or cruise missiles, and our only response is to intercept them with highly complex and expensive weapons.

Another quote is, the cost curve is working against us, we can expend R&D to find more cost-effective way of knocking down missiles by essentially inverting the cost curve in the other direction. We need to be able to start knocking them down in boost phase, was another quote. And these are all active duty, very senior leaders that have said these things in the last year or two.

So I want to take that on directly today and talk to you a little bit about what we're doing with the current system and the future system in terms of technology development and capability that we're working on and when some of that might come to fruition and start to field.

If you go to the first slide, the chart is built in a way that on the left side it talks about how do you decrease the shots per threat and at the same time, going across the X

axis, how do you increase the war fighter confidence? I want to start up in the upper left-hand corner and first talk about reliability. Reliability is certainly paramount and part of the equation to how the warfigther -- and I can talk regional or homeland -- how the warfigher decides upon a shot doctrine; how many shots it takes to defeat a credible threat. If you have a highly reliable interceptor, the less it could take.

The second part, if you just work your way down the angle, discrimination and assessment. The better you can discriminate and assess, meaning the better you can discriminate against the lethal object and decoys and countermeasures that could come with it, the less you could expend. Assessment gets to, how can you be assured, how can the war fighter be assured that what they've hit they've actually killed. I'll talk more about that in terms of the specifics of where our efforts lie.

There's a lot of talk on multiple kill vehicles, eventually, and it's primarily on the homeland defense system, but it could apply to regional defense system as well in terms of what is the agency doing with multiple kill vehicles? What is you path ahead? I know many of you are familiar with our efforts back in the early to mid-2000s. I'll talk to you about where we are with that. But obviously, if you can put more kill vehicles on an interceptor, the better chance you have in terms of not only defeating the threat but reducing the shots that you need to defeat the threat.

The group in the middle of the chart you can see persistent mid-course tracking and its importance to all of that. It's important to have persistent tracking, but equally important to that is persistent discrimination to be able to keep track of objects and to be able to accurately, with confidence, determine what the lethal object is. And then finally, once you get out to the kinetic discussion, and I'll spend some time on it with boost phase intercept, many of you remember the airborne laser, I'll talk about that in terms of where that is and then where we are with the technology and the potential for a boost phase intercept capability down the road. But it's really about, what are you going to do with the current systems to increase its reliability and effectiveness, and then how do you address technology in the future to get ahead of the kinetic cost-curve that everybody talks about. Next slide.

I want to just focus specifically on homeland defense capabilities. The chart is built in a way that is parametric, but representative in terms of the step-fold increase that you can achieve with some of the improvements that are in the budget, in the program and in the strategy today, specifically, GBI reliability, discrimination and then battle space. How do you add battle space to the warfighter and give them decision time?

Certainly on the left hand side of the chart, in the middle to later part of this decade, everybody is familiar with all of the improvements that are going on with the GMD system. We know that it was rapidly fielded in the '04, '05 time period. It served its absolute purpose on why the president did that. Now -- and I've talked about this in the past -- now is the time for us to improve all aspects of the GMD system: the ground system, the kill vehicle, the sensors, the discrimination capability, to give us that more near-term effectiveness of the current system that's fielded. We've got billions of dollars

sunk into the system. The marginal costs for those improvements on the left-hand side of that chart, are small in comparison to what is invested. And the step-fold increase in performance makes that a great business case for the country.

In the middle part of the chart you can see discrimination improvements and upgrades and improvements to the interceptors. I'll talk more about what we're doing with the kill vehicle, but again it's back to not just the ground and the sensor network that we're talking about. It's how do you improve the reliability of the current interceptor that's fielded to get it into a more reliable, more produce-able, more testable, more effective kill vehicle that the warfighter can use for decades to come? We've got a great plan down that path.

And then I'll get to MOKV, multiple object kill vehicles and boost phase intercept. Certainly that's the nirvana in terms of what kind of increase you could see from both a kinetic multi-object kill vehicle approach, and I would say in addition to a boost-phase intercept approach someday. Next slide.

Just to show you some pictures of where we are since I was here 18 months ago. I didn't have some of these, or if they were they were very early in nature. In the upper left hand corner you can see a picture of the missile field lawn up at Fort Greeley. That's the ongoing work that is improving the silos that are up there that had been mothballed. A lot of the utili-door work that had been infested with mold and left alone, before we pivoted back to 44 GBIs by 2017, all of that work and remediation effort is on track and will complete roughly in the 2017 timeframe.

The Capability Enhancement-II interceptor is shown. That's the new interceptor. There's a couple of different versions of this, but for purposes of today that's the interceptor going into the ground. All part of, how do we get to 44 GBIs by '17?

Just a quick status update, by the end of this year we'll have 37 GBIs in the ground. Today we have 30 between Vandenberg and Fort Greeley. Thirty-seven by the end of this year and then 44 by the end of next year to make good on Secretary Hagel's commitment of 44 GBIs by 2017.

There's the missile field one, mechanical electrical building. There's a pristine shot of the missile field one utili-doors. These are the passageways that go below where the services are run. And then the Fort Drum integrated data terminal, which will be cut into the operational architecture in 2016. Lots of effort going on just there. Next chart, please.

I'll talk a little bit about the Redesigned Kill Vehicle. It's a multi-industry, cross-industry team with the government in control of the design. The teaming has worked out well between the three prime contractors, which are Raytheon, Lockheed and Boeing, all companies working on different parts of the design.

Again, I have these in order in terms of their importance: reliability, availability,

maintainability, testability, produce-ability and cost. Yes, there will be some performance improvement with this that's inherent, but the precepts of the design are shown on this chart. And I have to keep reiterating that that's what this is about.

We're also going to do on-demand flight communication, which is a given in the Aegis system. This will allow us to update the kill vehicle much more frequently. And then all of the lessons learned that we've learned, that we've compiled over the last decade on the EKV program, have been captured and in many cases largely rolled into this design.

The first flight test, a non-intercept, will be in the 2018 timeframe. So it's a very quick schedule. But I like to emphasize that that's the first flight test. There will be several others that follow between now and 2020. But again, the bottom line here is it will be driven by system engineering completeness and rigor, and not driven by schedule.

So I throw out, the objective is 2018, but it's absolutely driven by design progress through the SRR/PDR/CDR in terms of unit component production, analysis, everything that we need to assure ourselves that this kill vehicle will indeed be produce-able and get the performance that we need out of it. I won't give you a unit cost on it, but given the opportunity to re-design this, given where we were a decade, decade and a half ago, there's a great opportunity here that we're realizing in terms of production costs.

So, the next slide is back to the near-term. I wanted to just let everybody know publicly that the next Ground-Based Mid-course Defense test will be later this month and it will be a controlled test vehicle flight, which means a non-intercept flight. It will be a three-stage CE-2 intercept, the interceptor conducting a non-intercept flight test. So what does that mean?

We're going to fly a very long-range, complex, air-launched IRBM target as the target, full of countermeasures and decoys, to gather discrimination data that we need to effect the previous two charts in terms of what we're worried about, to increase the system performance. But the primary objective is to fully flush out and fully test the alternate divert thrusters. These are the thrusters that have been re-designed that address the fundamental problem back in 2010, in terms of designing these to avoid rough combustion when the thrusters trigger to divert, and allow us to ensure through the physical solution that the inertial measurement unit will not be disrupted.

And those that know exactly what happened with that flight test, the IMU was disrupted and saturated and caused the failure. So we've addressed that near-term with software, and near-term with isolation of the IMU in the design that will be flown here. But more importantly, we're now fixing the fundamental root cause of the problem with the divert thrusters. So this will be a great test in terms of engineering learning. Next slide.

So what's the future beyond that? And I'll just talk about a couple of these. Later this year, meaning this calendar year, we will fly, for the first time, an ICBM with

countermeasures, and that will be an intercept test. We're getting now out to the long-range and closing velocities that certainly would be applicable from a North Korea or Iran type of scenario.

A year later we'll do a salvo engagement of an ICBM, meaning two GBIs against the same ICBM, because we want to see the intercept of one and what the other GBI would see in that case, and whether saturation and other things that we're concerned about would happen. Followed by that, a two-stage GBI with the re-designed kill vehicle out in the 2019 timeframe. There will be controlled test vehicle flights of the new RKV, but these are the intercept flights.

So we're now planning to test, and we talked about it for a long time, a two-stage GBI. And it really is not a different design from a booster standpoint. It's going to be done through software and the warfighter will be able to choose between a two-stage and a three-stage in terms of, does it fly the two-stage or does it -- second-state, or does it just drop?

And that allows us -- and again, this is not into the architecture yet, it has not been approved by NORTHCOM -- allows us to show NORTHCOM and the warfighter that with this capability the battlespace and the engagement time and decision space that the warfighter have would greatly increase. And then some other tests that are laid out between now and 2021 as well. Roughly on about one year center, some closer, some later, certainly test range constraints drive into this, but if you consider where we're taking the GMD system with ICBM intercepts now, much more complex targets, and then couple that with the new kill vehicle design, there's a lot going on in this program. Next slide.

A critical aspect of the homeland defense kill chain is the Long-Range Discrimination Radar, a solid state phased array S-band two-faced radar that was awarded back in October. This will give us the 24/7 long-range discrimination, precision tracking and hit estimate, allows us with the radar and the discrimination capability that it will provide, to give the warfighter confidence that the shot doctrine can be reduced with much more up to date and much more relevant information for the more complex threats that we're talking about. You see a picture of the facility as shown in the lower left. And then a notional range ring of what the field of view may be for LRDR.

We're going through the final siting analysis approval in terms of the environmental assessment and the final approvals there, but the clear recommendation here is for this to be built and stationed in Clear, Alaska. Next chart, please.

I want to divert for a minute and talk about the future, and then I'll come back to the present and spice things up a little bit. When I get asked, what are you working on for missile defense future? I break it into four areas: space operations, discrimination, multi-object kill vehicle and then some laser experiments, and I'll talk about each one of those. Go to the next chart, please.

Those familiar with missile defense understand this challenge. Those that don't, this is a non-classified, representative picture of what a kill vehicle may see in the end-game in space. And when I say the end-game, I'm talking in the last probably 30 seconds of flight, of how difficult and challenging that problem is. And when you complicate it with even more objects than that, and you complicate it with dim and bright objects and so forth, you can see -- and I just did it for demonstration reasons -- you can see that the red box, which would mean the most lethal, is not the brightest object. When you get into the secret sauce and the algorithms that go into this, those that have worked on this problem and built missile defense for this country, I salute all of you. To be able to do that in a very short amount of time and the closing velocities we're talking about, is complicated today. If you think about what the enemy may do with decoys and countermeasures in the future, that problem gets tougher and tougher.

Now this problem is not just a kill vehicle problem, it is an integrated problem across the ballistic missile defense network. This is a sensor challenge. This is a C2BMC challenge. This is a challenge on the regional bases with Aegis and THAAD. It goes across all of our systems that we field and everything that we're doing. When we talk about increasing the discrimination capability cuts across all of those systems. The program plan that we're on right now executes regionally and, in some respects, a step in homeland in 2016-2017. And then what we call our mid-term discrimination plan across the agency will field in 2020. That allows us to continue to stay ahead of even the projected threat today in this area. Next slide.

Multi-object kill vehicle, I just put this in so everybody understands specifically what we're talking about. Certainly today there's multiple GBIs that are used against a threat or a threat cluster. What we want to do is be able to fly one or two with several kill vehicles on one interceptor. That would allow us to go not just to the most lethal object but to the next one and the next one and the next one. And if you can do that, you can kill everything on the scene and you'll be sure that you got it.

So the theory is -- and a lot of work was done on this from 2003 to 2009 -- that if we can make this work the cost effectiveness of the system can be drastically improved and you don't have to continue to think about, what more radars are you going to have to build? How much more money are you going to have to spend to upgrade those to continue to chase the discrimination challenge? I would say ultimately this is where we want to be. Next chart.

I'll shift gears a little bit, on directed energy. I get the question a lot on, where's the agency with directed energy? We all know and you read about the great work that the Army, Navy and Air Force are doing to demonstrate their systems. And I would say they're in the tens of kilowatts right now at shorter ranges. But again, the importance of those demonstrations in terms of lethality and concept of operations, are critical to our thinking of how we may someday employ the same technology.

There's a lot of investment going on at the national laboratories across different technologies. You can talk about fiber combined lasers. You can talk about diode pump

lasers. You can talk about slab lasers, any or all of the above. There's important work going on at the laboratories and universities and industry down this path. We have significantly ramped up our program in terms of investment and talking about it more of, what else needs to be done to mature this capability?

Airborne Laser Test-bed, I just wanted to take a second and play the video, hopefully it will play, on what was done back in the '09, '10 timeframe. This was a chemical laser on a 747 and demonstrated that at tens of kilometers an intercept of a ballistic missile, and kill of a ballistic missile, was possible. Go ahead.

(Video plays).

What did that prove? It proved that this concept could work. It proved that given enough power, given enough beam quality, given enough altitude, the intercept of a ballistic missile -- and I won't say at what range. A wide variety of ranges would theoretically be possible. That doesn't say it's easy. It was very complicated in terms of the work that folks did on that program.

The importance, though, of what it provided and showed was that it was complex. It was hard to maintain, a chemical laser, in terms of you would go up and shoot and have to come back down and go through that re-fuel process. And we also proved that an altitude at 35 or 40,000 feet was problematic. Those have flown recently and know where you are at 35 and 40,000 feet -- and it can be uncomfortable sometimes -- and that just has a deleterious effect on laser where you need stability. Next slide, please.

So what are the boost phase opportunities and challenges? If you just go to the chart, the graph at the bottom, you can see where the other Air Force, Navy and Army systems are in terms of power and range to target. I didn't put units on this, but you can see relatively where boost phase intercept needs to be, at longer ranges, much longer ranges, and much higher power. And therein lies the problem.

There's many different options here in terms of how we think it may be fielded. Industry is helping us a lot here on potential airborne platforms, but you've got to be able to close the gap from the lower left part of that chart to the upper right. And if there was one chart I'd like you to take away, that's a pretty big challenge. Next chart.

What it also starts to show is, from a concept of operations standpoint, you obviously need standoff range because this platform theoretically would not be protected. You need to be rapid in terms of retargeting, and you need to have a deep magazine. So when you think about it from a CONOPs standpoint, you're going to need as much power as you can get to destroy as many boosters as you can. And if you can balance that range, altitude, power and number of boosters you need to defeat to help augment our kinetic capability, you're thinking about the problem exactly right. Next chart.

So what are the challenges from a technical standpoint? They are really in four areas: power, beam control, what platform are you going to put it on, and then what's the

booster lethality that you need. We need to be able to take tens of kilowatts today in the lab and industry -- and there's an industry partner or two where you're higher than tens of kilowatts -- but it gets down to scaling. You've got to work on electrical-to-optical efficiency and beam quality. You've got to be able to take this from tens of kilowatts in the lab and scale it up.

If I had a room this big that would be simple. But when you think about the platform that it needs to reside on back on the CONOPs slide, to be at altitude -- and we talk about 65,000 feet -- and to be able to field a package at those power levels in a low size, weight and power form, the technical challenge is significant. You also have to be able to prove beam control and stabilization. I know we probably have some physicists in here that can talk about sub-micro radiant precision, but that's really where you need to be. That's probably an order of magnitude lower than we are today.

A UAV platform to be able to field this thing and then be able to, at those ranges we're talking about, still demonstrate booster lethality. That's what it's all about. The problem is different for solids and liquids, obviously. So many, many, many challenges here to get to boost phase.

I can tell you that doesn't mean that we're declaring it hopeless. The investments that we're making are in the early stages of how do you get there and when will you have enough information with power, scaling and size, weight and power progression, meaning down, to field a credible solution. Next chart.

Here's a chart that I like to talk about. I didn't put any years on here. I wanted to provide power density comparisons for -- get you a feel for -- where were you guys with Airborne Laser? The power density there was 55 kilograms per kilowatt. You can see fiber combined and DPALS in the lab are 35 to 40 kilograms per kilowatt. Where we need to be is down below five kilograms per kilowatt or lower to have any chance of fielding it on a high altitude platform that could be sustained for several days or several weeks.

So you see my goal there. And I challenge industry, if they're listening, that's where we need to be. We're not going to just work on the technology alone. You see us working on the technology, then how do you scale the fiber amplifiers? How do you scale the technology down into a package that could be fielded?

So what's the timeframe? And this is all PB '16 Program of Record here on this chart. I know people are taking pictures of it, so I put that caveat out. We're working hard on scaling, efficiency and power. There's the three areas that we're focused on, labs and industry. What I'm trying to do is competitively drive towards a decision in 2019, with all these efforts progressing, on is it feasible to scale this up to a platform or not? I think we'll know a lot by the 2019 timeframe.

I already know, since lower power is required for a discrimination capability, that we can do that. The challenge is, can you do lethal boost phase intercept or not? To me,

this is an important progression on how we get there.

You've heard a lot about Boeing's Phantom Eye, and that's shown on the left there. That helped us learn a lot about platform jitter and the altitude that it went to and the importance of high altitude and above the cloud flight. And then we're doing a lot of work with the Reapers and eventually getting to a low-power laser demonstrator out in the 2020-2021 timeframe to prove, again, discrimination at altitude; and then from a parametric standpoint, lethality with a lower power level at that point. Next chart.

I get a lot of questions on, where are you with space? The most near-term discussion besides the partnership discussions that are ongoing with the other services and agencies, are, is this experiment. And really, this was through the help of Congress with reprogramming the residual PTSS money that allowed us to develop a very near-term capability to go run and experiment on IR detectors to capture the intercept signatures of our testing. What will that help us with?

I talked at the very beginning of the importance of hit and kill assessment. These sensors, from an experimentation standpoint, that will be launched on a series of commercial hosts by the end of '17, will allow us to put a network up that will get to that very experimentation point. To me, that is one of the missions that will be important for us when we go to space. How are you going to do hit and kill assessment from space?

The other important aspect of that is, what is your path for persistent mid-course and persistent tracking and persistent discrimination, with worldwide sensor coverage for both the homeland and regional defense problem? I would say that's a harder problem, and certainly there's multiple parts of the department that are focused on the future of space and the partnerships that are going to be required for that. MDA is an active participant in terms of where does the missile defense mission fit into the future plans for the department. Next slide.

Back to reality here. In terms of near-term, I wanted to just talk a little bit about Romania and Poland. Those that have watched the press know that we delivered, from a technical capability standpoint, the system in Romania to the Navy on December 18th. So what does that mean? It means that the Navy is to the point of testing and training and readying for initial operation capability this spring, followed by NATO cut in and acceptance by the summit this summer.

It's a very important time period. The system is done, essentially. They are training today as we speak. It is manned, they're living in the barracks, and the Navy has assumed operation. The handover was very important. I think you'll see us do a much broader ceremony later this spring when IOC is declared.

Poland follows shortly thereafter. We're very close – meaning the Army Corps who does the MILCON work for us in awarding that contract for Poland in the next few months – is working with our Polish counterparts on implementing arrangements. It will follow the same schedule as Romania towards a technical capability declaration by the

end of 2018. All systems are go on this for Poland at this point. Next slide.

There's some pictures, if you haven't seen it. It's an actual picture of the deck house in Romania. There's the combat information center in the upper right hand part. There's the vertical launch system shown. There's the SM-3 that are being offloaded from the C-17 in Craiova. And then, a broader view of the facility shown from afar in the lower right.

It's just a huge effort across not only our department but the State department policy, the Romanian government, all the parties involved in making this a reality, from six years ago when it was announced, four years ago when it started, and to finish it when we said we were going to finish, I think is a testimony to the entire team and the entire government that was behind this. Next slide.

Certainly, TCD of Phase II will augment the Phase I architecture. What does it mean? Not just Romania but the ships that are now in Spain, additional Block 1B missiles, additional enhancements to the TPY-2s, and then the whole recommendation and my signature of TCD included a whole succession of flight tests that culminated in the declaration, to give us confidence for the first time ever, that an SM-3 engagement could be conducted from ashore. To me, the engineering behind that is incredible. The folks – and it wasn't me – the folks that thought of this, to take a deck house essentially unmodified and put it ashore to meet the timeline that was necessary, it wouldn't have happened if it had been a different design. Next chart.

I can't go a presentation without showing you a flight test video. I wanted to show what was probably one of the more important tests. We did a whole bunch, if you were watching, in December.

We did tests that culminated, in terms of the intercept of an IRBM target with an SM-3 IB missile. You can see the layout there. The C-17 was down, way down, to the southwest and the Aegis Ashore System intercepted it. If we could play the video, please? This was an operational test with sailors on the consoles. No notice.

(Video played).

Those that have been there, or those that have picked it up from the video, you could see that the missile was launched out of VLS, which was probably three miles away from the deck house. That's the arrangement at PMRF. We're used to having missiles right in front of us, in front of the bridge, right under the radar. So when you think about what went into making sure that that happened successfully, and the engineering that went into being able to acquire and detect that missile from that range; again, a design difference was necessitated by the layout there. But again, it worked perfectly. We've never had an issue with uplink or performance of that event.

Last slide and I'll get to your questions. I want to leave you with 44 interceptors by '17, reliability upgrades in progress, the kill vehicle on track for fielding in 2020,

along with the radar, EPAA on track for 2015, TCD which happened in Phase III and the end of 2018, advanced technologies funded and progressing at the effort that I believe is the right pace, and again, this idea of, where are you on the cost curve and how are you addressing that?

In my view it's a combination and a balanced approach of getting the most you can out of the current system and making it the most capable and effective that you can. At the same time, not forgetting about what advanced technology and non-kinetic solutions could provide. That's the strategy of MDA. That's what we're pursuing. We haven't changed since I've been here and I don't anticipate us altering course at all between now and 2020.

So with that, thank you very much.

(Applause).

DR. TOM KARAKO: Thank you, Admiral Syring, I appreciate it. Thank you for joining us. We'll turn to some questions now. Great videos by the way. I have to credit your graphics team. Usually it's heavy metal, Metallica or something, and you got a little instrumental going there. A nice change. Let me step back from the kind of digging into the details that you've been doing and go to the really big super-high level for a moment; and that's kind of the identity of the Missile Defense Agency.

Again, I'm Tom Karako. I run the Missile Defense Project here at CSIS. Thank you all for coming.

But going to the identity of the Missile Defense Agency, it's not BMDO anymore. It's not merely R&D. The public statement is we have to outpace the threat and continue to keep the emphasis on the seed corn, as it were. In fact, MDA has been under a lot of stress with taking on procurement that instead of pushing procurement to the services it's still being retained largely within MDA. O&M.

So you have a lot of different colors of money within the MDA budget, including in recent years, five to nine percent for Israel. And all that adds up. So what is the future of the agency going to be? Some folks have suggested it's becoming, or should become, a combat support agency. Or, should it go back to its roots and really focus on R&D?

ADM. SYRING: Hopefully everybody heard the question. My thinking on where are we today and what's our balance of resources, and again, I'm under the same budget challenges that everybody is across the department. It's not just DOD in terms of where we are with resources. And across the board resources aren't going up, so it's a matter of what can you do to complete your mission under the fiscal constraints that we're under? At the same time, as we have systems that are maturing into production now, with THAAD and Aegis, and have matured in terms of now the capability has been tested and fielded and now it's a matter of numbers, that starts to chew up bigger parts of that topline that hasn't come down.

So when I think about that problem certainly our charter is to start to transition those programs to the services when we can. And those discussions, for example with THAAD, are ongoing with the Army, on when is the right point to transition that. But the way I think about it is that those missiles, those interceptors need to be procured by somebody. And once we understand those balances of resources between us and the services, you can have that discussion.

But from a department standpoint, you're not reducing the bill in any way in terms of that requirement that the combatant commanders have given us. Yes, given more resources -- I think Mr. Kendall has been eloquent on this – more advanced research, more research and development, can be done, more S&T can be done in certain areas. And certainly we have those areas identified.

But, I think it gets back to, are you making the smartest investments, given your resource constraints, with the technologies that you're pursuing, at a smart, affordable, well thought out system engineered pace with technology; as opposed to putting a big bang program in for boost phase intercept and submitting a $5 billion, $10 billion program that says here's my boost phase intercept program, I'm going to get started. I think for that program in particular, we have the right measurement points to inform a larger program if the technology pans out.

DR. KARAKO: You mentioned the numbers issues, and of course the BMDR in 2010 predicted, and in fact has come true, that the demand for this stuff far outstrips supply. But in terms of numbers, you talked about the IIA co-development with Japan. What other opportunities are there with other countries? What kinds of paths with other allies? There's a lot of demand signal out there. Is there something MDA can do more of?

ADM. SYRING: Yes, we – and I won't be specific here – but there's several countries that we're working closely with in terms of their requirements and analysis that we believe can help them and help us. We're obviously tied very closely to Israel and what they've done with Iron Dome in terms of funding – I mean the Congress in this case -- and what we're doing with development funding for David's Sling and Arrow. We just had a very successful series of David's Sling tests. I think you'll see us work closely with them on a similar co-production agreement that we have with Iron Dome. So that's good for them and it's good for the United States – and follow suit with Arrow.

So I think that in particular the Israeli example is a great example, and then other countries in Europe and Asia are equally important.

DR. KARAKO: Let me go to the RKV slide that you had up. You had a lot of great stuff on the RKV slide. In some ways the CE-1 and CE-2 is sometimes said is not that far removed from what was done in the 1990s, given the urgency of putting something in the ground and making marginal improvements to it. That's what makes RKV, in part, so significant. Could you talk a little bit about the technologies and sort of

the connectivity between where we are today and the kind of vision you laid out for a multiple kill, and why we have to go through RKV to get there?

ADM. SYRING: Yes, I get that question a lot. Why don't you just go to MOKV? I would say that the technical problem -- and the cartoons make it look easy – the technical problem of scaling up to multiple RKV-like vehicles and at a smaller scale, is another degree of difficulty. So given the fact – and it's not impugning anybody that was in the program at the time – but essentially the system engineering cycle was cut short to field these things very rapidly in '04 and '05. I think, and believe, having studied that design carefully, that we know, everybody knows at the engineering and physics level, where we need to do better with that design, and what it can do in terms of increasing reliability step-fold.

And I believe that the path we're on to not just inform MOKV with those design principles, but to be able to take a highly reliable kill vehicle and get it fielded back to the current fleet to sustain it for decades to come, is the right path. The engineering and the testing and the pre-program testing and concept development that we're doing with MOKV will go on, and there's some great ideas out there from industry on how to do that. But I'm viewing RKV as the necessary and first step for us to go produce a highly reliable, produce-able and testable kill vehicle.

DR. KARAKO: Why don't we open it up to questions from the floor. We've got mics here on the side if you want to just raise your hand and identify yourself and wait for the mic.

QUESTION: Thank you, Admiral, John Harper with National Defense Magazine. Have any decisions been made with regard to whether to upgrade or replace the radar on the Patriot system, and also potentially developing new near vertical launch systems? Thank you.

ADM. SYRING: Honestly I'm going to have to defer that to the Patriot Program and the Army in particular. I am not up to speed on their future upgrade plans. I know what they fielded, but I don't know what's in their budget and the program for Patriot.

QUESTION: Admiral, thank you for your service and your three years at the Missile Defense Agency. Bob Vince, engineering duty officer as well, but currently at the National Lab Livermore. Cyber was touched on. I'd like to ask about cyber in a slightly different way. The Supercomputing Initiative can provide for modeling of complex interactions. Does supercomputing provide for some help in reducing, perhaps, the number of flight tests necessary for missile defense?

ADM. SYRING: Absolutely. It's vitally important. I've got great Americans like Keith Englander (ph), people like that, thinking through how much more we can do with ground testing and modeling and simulation, given that exact capability.

As you know, flight testing is pretty limited in terms of what it actually shows

you. Very importantly, it shows you the interceptor – whether the intercept worked. But in terms of testing the capability around the envelope, that capability, we believe, given the capability that's fielded today, in that area can be expanded greatly. And I think you'll see us think through those options, not that we will walk away from flight testing, but I truly believe that more can be done in that area. A great question.

QUESTION: Thank you, I'm Jae Ming Sung of (inaudible) Daily News, a South Korean newspaper. Do you have any update that you can share on THAAD batteries deployment on overseas in South Korea?

ADM. SYRING: No.

(Laughter).

As you know, formally, there's no discussions, no considerations. We continue to work with South Korea on a wide range of potential capabilities, and I'll just leave it at that. That's in a totally different lane than mine. I'm the equipment provider. I'll let the policy and State department officials work that side.

DR. KARAKO: Admiral, thank you. Thank you for coming out here. Thanks for all of you for coming and for Boeing for sponsoring our series.

(Applause).