051118 Air Force Association, National Defense Industrial Association and Reserve Officers Association Capitol Hill Seminar with Former Missile Defense Agency Director Lieutenant Gen. Trey Obering, on "The Missile Defense Review: Opportunities and Challenges for Future Missile Defense" (For additional information on AFA/NDIA/ROA seminars contact Peter Huessy at phuessy@afa.org).

MR. PETER HUESSY: Thank you all for being here on a Friday morning. Next week we have two breakfasts. Brad Roberts is not going to be here. He's going to be at the Air Force Association's headquarters at 1:30 p.m. There are a couple of events that Rikki Ellison is having on missile defense that ends at 1 p.m., so we're doing it at 1:30 p.m. Brad Roberts is going to talk about his book that he wrote a couple of years ago and the Russian strategy of escalate to win, as General Hyten calls it, in terms of using nuclear weapons in a regional conflict that is conventional. It's very, very important.

Frank Miller is going to be speaking on the 15th of next week and he's going to be going over the Nuclear Posture Review and anticipating what the Missile Defense Review. On the 22nd of May we're having our next Reagan Legacy Forum at the Heritage Foundation with Keith Payne and Frank Miller, Sven Kraemer, Ty McCoy, myself and Susan Koch, talking about what is the Reagan legacy on arms control, nuclear deterrence, SDI and strategic issues. We're going to apply those lessons to today.

We're having a Kings Bay conference on July 12 and 13 down at Kings Bay, Georgia, taking a look back at six months after the Nuclear Posture Review, where are we. On October 9th the Minot Task Force 21 is going to be doing a conference here in this building, on October 9th, a year after, taking a look back on the Nuclear Posture Review and where we are. Those of you who haven't signed up, please let me know if you'd like to come.

We have a very distinguished guest this morning. The two breakfasts that we have had with smaller audiences have been the two most important people, which tells you what was going on in Washington that got people's attention. Bill Schneider, I urge you to go online to our Mitchell Institute web site and listen, get the transcript of what he said about the Chinese and Russian threats, on hypersonic, on nuclear weapons, on their cooperation in the Arctic and the Baltic and other places. It's extraordinary, and as head of the Defense Science Board I think he knows of what he says.

Trey Obering is a dear friend, a former head of the Missile Defense Agency, now with Booz Allen Hamilton. He is on the forefront of things like lasers and hypersonic and where we ought to go on missile defense. Even though the Missile Defense Review is not out, I thought Trey could give us a look at kind of around the corner, where we ought to be going, where our challenges are, but in particular where we have made such extraordinary progress, what you don't read about in the media is that when you compare where we are today versus where we were back in the '89s or '90s, this has been an extraordinary achievement given the restrictions we were under with respect to the ABM

Treaty and then other political restrictions.

So, Trey, on behalf of the Air Force Association, the Mitchell Institute, NDIA and ROA, thank you for coming and joining us here today and giving us a little bit of your wisdom on missile defense. Would you give a warm welcome to my friend, Trey Obering?

(Applause).

GEN. TREY OBERING: I'm going to hope to make this conversational, so you guys can chime in any time you feel like you have a question. I'd appreciate that.

So much has changed since I was the director of the Missile Defense Agency from 2004 to 2009. It has changed so much that we've forgotten what it was like. So before I get started on the next generation of missile defense, which is the primary topic of my talk this morning, I want to paint where we were.

Back now about 13 or 14 years ago, we had no defense against an ICBM of any kind for this nation at all. We had not deployed any of our sea-based interceptors on our ships because we had not completed the testing of those. We were having some technical issues with some of those interceptors as well.

We had deployed some of the Patriot missiles, but the PAC-3 had never been deployed operationally and had just been transitioned over to MDA. So in essence, we had no missile defense to speak of, except for some very, very small capabilities. And there were people in this country that were very, very happy with that. They thought missile defense was destabilizing. They thought it was too technically hard to do. And they thought that it would be political Armageddon.

In fact, and I'll mention this a little bit later, when we pulled out of the 1972 Anti-Ballistic Missile Treaty in 2002, there was at the time the Senate Democratic chairman of the Armed Services Committee said, even if we pull out we're still going to hold the Department of Defense to the terms of that treaty. These were religious wars that were being fought in Washington over missile defense. We don't have that anymore.

In fact, if you look at what we have today -- and thank goodness for persistence and for listening to the right voices -- and that makes a lot of importance today on that very topic. You have a whole lot of voices saying what we should do here, what we should do there with our national security posture. We've got to make sure we don't listen to the wrong people, because if we do it can be fatal mistakes for our national security. In the face of strong resistance from some critics, both in Congress and in past administrations, the Missile Defense Agency folks, the industrial partners that they have, the cocoms and the services, have been responsible for a remarkable production and deployment of missile defense capabilities beginning in the summer of 2004.

When we began to deploy these capabilities, were they perfect? No, they were

not, and we knew they weren't perfect. But again, we had no defense. So if you look at the Pentagon, every decision process in the Pentagon is about, why should we field this? That's why you've heard in many of the studies they say, everybody in the Pentagon can say no, nobody can say yes. That's why, because they want to make sure that before you field something it's at least as good or better than what you have out there.

The Pentagon doesn't do unprecedented too well. Because the question should be then, why shouldn't we field this, right? So if you have some military utility, get it in the hands of the war fighters and then improve upon it as we go. That was the philosophy that we took in missile defense, and that's why the interceptors that we have in the ground today are not the same ones we put out there before. But the ones we put out before could have accomplished the mission that was needed at the time that we deployed them.

So we now have upgraded early warning radars and new X-band radars in Alaska, California, the United Kingdom, Greenland, Massachusetts, Japan, Israel, and a very powerful sea-based radar, X-band radar, in Hawaii. By the way, another comparison. When I got to the Missile Defense Agency the average time a requirement could go through the JROC approval process was 400 days, 400 days. We developed and built the sea-based X-band radar, which is a 6,000 kilometer radar, in 444 days. So that just gives you a comparison of whether you want to think about process or whether you're focused on product.

We've got hundreds of mobile factory interceptors and sea-based Standard Missile 3s on Aegis BMD-capable ships. Another short vignette on PAC-3, when the Army owned the PAC-3 they were under the DOD 5000 rules. That meant you had to meet all of your KPPs, Key Performance Parameters, before you could get beyond low rate initial production, and you certainly couldn't do anything in terms of operational deployments.

We weren't under the 5000, and it turned out that the PAC-3 could achieve four of its five KPPs. The fifth KPP had to do with a threat that was not going to materialize for another five to 10 years. So I called, at the time, Major General Stan Green in the Army and I said look, this is what we can do with PAC-3 if you want it. He said, absolutely. That's how we got PAC-3 into Operation Iraqi Freedom. That was just a hand shake between us to be able to do that, and of course it was successful in three intercepts of the Iraqi (SAM ?) missiles.

We have the land-based SM-3 interceptors at the Aegis Ashore site in Romania, with another coming in Poland. The origin of Aegis Ashore is another thing people don't realize. Why did we ever start this? It had nothing to do with Poland or Romania. It had to do with Israel.

The Israelis wanted a higher tier interceptor and they were bound and determined they wanted to build an Arrow 3. I said, why don't you at least try an SM-3 that we could tie with a land-based radar to be able to achieve that? The Israelis ended up

pursuing Arrow 3, and I was happy that they did that in the long run, and then we realized what we had with the land-based SM-3s, and that's how it got applied to other scenarios.

The THAAD program, THAAD could not hit anything when it started. We had failure after failure, and then it became -- after the transition -- it became the most successful interceptor that we had with its success rate in intercept tests.

Long-range interceptors in Alaska and California, with more coming, and operational command and control centers in Alaska, Colorado, Nebraska, Hawaii, Washington and Germany. The command and control of a missile defense system is very different than any other weapons system. Almost every weapons system that we have operates in a single AOR, Area of Operations. That's not true for missile defense.

If you have a missile launched from Korea to the United States, you've gone through United States Forces Korea, you've gone through PACOM, and you're going into NORTHCOM, all those different command lines that you've crossed. So having the situational awareness and the coordination between those command staffs has to be there, because you're going to have short-range, medium-range and long-range missiles in a real world scenario.

These inventories and these capabilities are going to continue to develop and improve, but where should we go as we go forward? First of all, I think the next generation should not be a small evolution. It needs to be a revolution in the capability.

In order to think about it, the first thing that I think about is, what should be our strategy? What should be the strategic foundation for what we're going to do? We got a little insight into that.

A couple of the NDAA in the last couple of years have called for a change in thinking about missile defense, and not just thinking about limited missile defenses. The Constitution doesn't say provide a limited defense of the people. The reason we provided a limited defense initially with missile defense is that's all we could do. That's all we could do. That's no longer the case, so we need to be able to protect the American people from these threats.

The statutes today describe developing an effective, robust layered missile defense, architectures for a hypersonic defense capability, as well as providing a plan for developing one or more programs of record for a space-based missile intercept layer. When you put this in the context of our national security strategy, what I draw the conclusion from is that we need to develop the capability and the capacity to deal with anything and everything that could be thrown at us by an Iran or North Korea. That means capability as well as sufficient inventory to handle whatever they can do.

And we also have to be able to build the capability to defend against any missile threat that can be thrown at us by Russia and China, including hypersonic, and enough capacity to make sure that we maintain our strategic deterrent. That's where I see that

interconnection. Does that mean that we have to put a million interceptors in space? No, that's not what I'm talking about.

That's the other thing, we've got to pay more attention to the integration between our defense and our offense, and I'll talk a little bit about that later. In other words, we must develop a qualitative and quantitative defense against Iran and North Korea, and a qualitative defense, combined with our existing and planned offensive capabilities, to deter peers and near peers, and to win if deterrence fails. So what are some of the needed capabilities that will allow us to do that?

The first one and the foremost one, and you see this in the HASC markups of the current bill, is what they call a persistent space layer, and what I call a global birth-to-death tracking and discrimination capability. This would maximize interceptor effectiveness and kill assessment against both ballistic and maneuvering threats, including hypersonic, and would give us enhanced regional and homeland defenses. So a space-based track helps not just the interceptor sitting in the silos in Alaska and California, but also THAAD, Aegis, PAC-3. All of those would benefit by space-based tracking.

The second thing we need is the ability to intercept warheads in very complex threat suites, including advanced countermeasures and decoys. Today we can defend against bare warheads and we can defend against simple countermeasures, and we've demonstrated that in our testing, but not against the very complex threats and complex countermeasures. But we can develop the ability to do that.

We have to develop the ability, number three, to handle substantial raid sizes, especially from rogue nations, and to handle enough of a raid by peers or near peers to ensure an overwhelming strategic response. Number four, we need a multi-object kill capability to handle the complex countermeasures and multiple warheads from a single missile.

We can get almost as good as we can in the ability to discriminate what is a warhead from what is a decoy or countermeasure. We will never get 100 percent. We will never do that. So we're going to have to have the ability to kill more than what we call one credible object. That's why a multi-object kill vehicle is so important, and that program is underway.

We absolutely need a boost phase intercept kill capability to assist in the defense against substantial raids and complex threats. That is especially true against complex threats because you can take them out of the boost phase before all those complex countermeasures and decoys are deployable.

We need a maneuvering target capability for both tracking and killing maneuver targets. We need a hypersonic defense capability, including the surveillance, detection, tracking, targeting, fire control, and kill mechanisms for hypersonic. Can we do this? Absolutely. Do we have the technology to do it today? Absolutely.

It's a matter of will and resources. Is there going to be a single bullet that we're going to use in this? No, it's going to be an integrated architectural approach to defending against these weapons.

We need cyber robustness of our command and control systems, as well as the sensors and interceptors themselves. Stop and think about that. We today -- and this applies not just to interceptors, it applies to ships, aircraft, etcetera -- there are many war fighting domains. The classic are land, sea and air.

There's also an emerging cyber domain. So these systems have to be able to operate in the cyber domain the way they demonstrate their ability to operate in the other domains, and space as well. Space is going to be another war fighting domain. So we've got to make sure that we're building cyber security into our system engineering process, into the requirements process, so these systems get designed with cyber robustness in mind.

Survivability, both in terms of numbers as well as functionality, including nuclear hardness -- and there's some really interesting things being done by some companies. There's one in particular on radiation hardness. They're taking a very different approach on how to do it and it's a much more effective and cheaper approach.

And then a fully integrated offensive and defensive capability. People think that we're building a defensive shield that is going to withstand everything that anybody can throw at us, and that's not the case. We're not going to sit back and take hit after hit after hit. We're going to be integrating our offense and our defense.

And by the way, we are fielding some very capable sensors with a very precise targeting capability in and of themselves. To tie those to offensive capabilities could be a huge force multiplier.

So what are some of the next generation missile defense programs that we should be pursuing? As I mentioned, the first one -- let me run through them and then I'll go through each one in particular. A space-based precision tracking layer; a multiple object kill program, vehicle kill program; an advanced interceptor. We have not started on an advanced interceptor in this country for a long time, and the technology that we have today, for the most part, is '80s and '90s and early 2000s technology in our programs. It's time that we developed an advanced interceptor.

A boost phase kill layer, and I strongly believe in a space-based kill layer, and I'll talk about that. We currently used space-based sensors to just provide us early warning of a launch and an impact (fan ?) of where that missile is going to impact, that warhead is going to impact. It is not good enough for us to be able to track and to engage that missile just using the space-based sensor.

Can we do it? Yes, we've demonstrated it. We launched two birds called STSS,

Space Tracking and Surveillance System, in 2010, and we've used those in our testing. Those tracks have been extremely precise, much better than we thought they would be. So can we do this technically? Yes, it's a matter of getting the constellations up and getting them in place.

This also adds a birth-to-death ability because now it really helps you watch, even as a very complex threat emerges, you can see what happens, and that gives you great clues as to what is a warhead and what is a countermeasure. So I think that we should build an initial precision tracking constellation as a foundational capability, and that does not have to be a large constellation, and then we can add on and build from there. We can target it to augment what we have terrestrially, in terms of our land-based and our sea-based sensors, so that they will complement each other.

The next one is a multi-object kill vehicle. As I said, no matter how great our discrimination capabilities are we're still going to have more than one credible object. We had a program called Multiple Kill Vehicle, MKV, that was launched under President Bush when I was the deputy director at the Missile Defense Agency. It was later cancelled under President Obama. However, the value of this program is so compelling it has come back. Again, it has to be reinstituted and it is being reinstituted.

Modern communications technologies, algorithms, processing power, could significantly enhance the overall effectiveness of this swarming approach. How many of you saw the Super Bowl this year and the Korean Olympics? Did you see the drones in there? Did you see what they do with those?

That kind of technology, combined with a multiple object kill program, is incredible. To be able to combine that type of flexibility and capability in targeting individual credible objects, that's the kind of thing I'm talking about and getting modern technology into our programs. It is also, as I said, not only just for GBIs. We can actually use this on our SM-3 interceptors, especially the SM-3 Block II that has a little more volume and throw-weight capacity. So when you combine the MLKV capability with a precision tracking capability from space, you now begin to really handle very complex threat suites and be very effective even against peer and near peer threats.

As I said, an advanced interceptor X program, what I call an AIX program, the technology we have today is from SDIO/BMDO. You can look at the geneology of the technology and you can track it all the way back to SDIO, the lead program and other program initiatives that are really reflecting that technology we developed in the '80s and '90s. What happened to us? Well, we did the right thing.

We transitioned from SDIO to BMDO to MDA, and in that process we began to focus on getting this stuff out the door and focused on acquisition. We started building up our inventories. We started building up very robust test programs.

Under the last administration the top-line started coming down and what got squeezed was the S&T budgets and the R&D budgets. So building the next generation

technologies started to get squeezed in that. That has got to be reversed, and that is being reversed, so that we can get some of our modern technology into an interceptor program.

We've always relied on the superiority of disruptive U.S. technologies to both deter and defeat our enemies. We should not change from that. We have the best technology. I would never bet against U.S. technology, U.S. engineering and U.S. manufacturing ever. I don't care what nation on Earth, including China or anybody else.

When we put our mind to it we can do it, and it's time that we do that. Just think of the advances that have occurred in sensing, processing, artificial intelligence, propulsion, material science, manufacturing. Just the yields that we're getting now, compares to when I was at the agency, are just so much better in terms of the focal plane arrays and everything that we can produce.

A boost phase kill layer. As I said, the optimum approach to destroying a missile is in its boost phase. When you stop and think about it, if you kill a missile in its boost phase you're defending the entire world against that missile. If you have to wait until the terminal phase, you're defending a very much smaller point against that missile. So the boost phase offers great advantages, and there are some disadvantages. The fact is, it happens very quickly, even for an ICBM it's not a very long time, it's measured in minutes in terms of the transition of that phase.

So one near-term solution for a non-persistent opportunistic boost phase kill would be to use an air-launched kinetic interceptor. Now there has been a lot of controversy on that and back-and-forth on the Hill about, MDA you're not paying attention to this like you should be. MDA had two air-launched kill capabilities back when I was at MDA. One was called NCAD (ph) and the other was called Air-Launched Hit to Kill.

One was a modified PAC-3, which we could launch from an F-15C, and the other was a modified AMRAAM. We actually flight tested both of those programs. The problem we ran into was trying to get it to an operationally effective range. That was the problem. It wasn't having to do with sensing or anything, it was getting it to an operationally effective range.

I still think we're going to face that challenge today. Now am I against that problem? Absolutely not, because I think that it will provide a capability. The Scud missile that killed the 28 National Guardsmen from Pennsylvania in Desert Storm, was seen by an F-15 Strike Eagle inbound to a target, but couldn't do anything about it because they didn't have the ability to shoot it down.

So can we have opportunistic boost kill? Absolutely, but that is not the same as providing a persistent boost kill capability. I think that because of the shortness of the transition in the boost phase it is ideal for high energy lasers, for a laser-based capability.

We must fire today multi-million dollar interceptors at a single missile.

Developing lasers allows us to shoot down multiple threat missiles with a single laser, so the cost-effectiveness is extremely good. We experimented with ABL when I was at the agency. We achieved first light and first flight when I was the director in the winter of 2004. We shot down both a liquid and a solid boosting propellant rocket in 2010. The program was later cancelled by the Obama administration.

A little side note there, the director at the time was Pat O'Reilly. Pat called me the night that we were successful in shooting the ABL. He was very, very happy and excited.

He was on his way back and they had about 1,000 people at the hangar out at Edwards where they were doing the testing. He got a call later from somebody in the administration who said, you don't say a word about this. So he couldn't have a press conference, he had to shut everything down. I don't know the reason for that, but that's what happened.

We learned a lot of lessons from ABL, a lot, and we are applying those lessons to the laser programs today. What has changed today is the lasers have gotten much more effective and much more efficient. Both the combined fiber lasers as well as the hybrid lasers like the diode pumped laser that actually do promise to be able to get us to the power levels that we need with that technology without having -- and I was on the ABL -- you couldn't fit a basketball in the back end of that aircraft because it was so full of pipes and everything else. Now we can reduce that down to a bench sized table, that kind of thing, with some of the technology that we have today.

We learned to get out of the atmosphere, because the atmosphere gives you a lot of problems with lasers in terms of range, absorption, everything else. You get above those in a UAV, and now that gives you the ability to achieve a lethal kill with a lot less power. The reason we had a mega-watt of power in the ABL is because we were at 35,000 feet. If you're at 60,000 feet you don't need that. You can cut that in half or more.

So now the power development of the lasers are coming up and the requirements for lethality are coming down. So I think we could, if we put our mind to it, have an initial kill capability in five years, and I think a much more robust one shortly after that. And, of course, MDA has submitted a report to Congress that details their direct energy roadmap to achieve that boost phase intercept.

I also think that we need a space-based kill layer. I actually went to Camp David in the summer of 2007. I was invited by President Bush and we spent four hours there. We spent one hour on missile defense, and there were other topics obviously that we were discussing. The topic that we were there to discuss was this idea of a space-based test-bed, because there's answers that we have to provide on the efficiency and the effectiveness of a space-based kill layer, and a lot of technical questions.

What's the long-term storage propellant -- long-term storage on orbit of certain

types of propellants, command and control? There's a lot of things we would like to be able to test out without having to build a robust constellation. President Bush agreed. He said, I'd love to do this, but at the time he just didn't have the capital to do it.

There's a lot of miscommunication and misperception about putting weapons in space. People think that it is outlawed. It is not outlawed. The only thing that is outlawed in space is a weapon of mass destruction. A kill vehicle that is about that big, is not a weapon of mass destruction, especially if it doesn't have any explosives or anything other than propellant to be able to kinetically kill something.

So I believe that initially we could build a kinetic-based space-based kill layer. I think we could do that very cost-effectively as well. The technology in terms of building these interceptors is well at hand. We would like to study some of the long-term effects, as I said, but we certainly have the technology at hand.

Even a small constellation of space-based kill would dramatically complement what we have with our terrestrially-based and terrestrially-deployed capabilities. It would also create ambiguity in the mind of an aggressor or an attacker. And it would provide you with -- if you get a sufficient constellation -- you do begin to get boost-phase defensive capabilities over a much wider region than you would have with, for example, a UAV.

I also believe that it's very, very important when you stop and think that space is just another domain. Just like we have to develop war fighting capabilities in air, land and sea, we're going to have to do that in space as well. I believe that we're going to see the technology get to the point where we can do that in the not too distant future.

Now I want to switch gears a little bit and talk about why MDA was able to do what they did, and also the cost. People talk about how expensive missile defense is. My God, this is a terrible program, we spent all this money.

You go back to 9/11 and you look at the damage cost alone to New York City, just the damage cost, not the economic cost. The damage cost approached $100 billion. The economic opportunity cost and the economic cost they've listed at $3.3 trillion, and that was one attack on New York and it was not a weapon of mass destruction.

We have spent roughly $200 billion on the missile defense program going back to President Reagan when he started it in 1983, over that entire timeframe. So when people talk about being on the wrong side of the cost equation, I don't compare the cost of an interceptor to the cost of an inbound missile. I compare the cost of the interceptor to the value of an American city.

If you look at it in that regard, it's a very, very affordable program, especially when even if we go to $10 to $12 billion a year, which is what I'm arguing for, that still represents less than two percent of our annual defense budget. What kind of price do you want to put on an American city? So I think that it is very, very cost-effective.

The other thing is how MDA does business. As I mentioned, we didn't have to abide by the 5000, we did not have to abide by the JSIDS (ph) or the requirements process. I remember, I used to have a reporter from the Washington Post that kept asking me, general, when are you guys going to look like every other program? When are you going to be normal? When are you going to be normal?

I said, Bradley, name one normal program you want me to emulate. He never asked me that question again. Today I'm getting questions on, which I love, how can we make other programs look like what MDA did? That's what you see happening across the board in all the services.

These rapid capability offices that are standing up, that's what we do. That's what we've been doing. We had the flexibility to be able to move money around. I could move money from a production line into the test program and back without having to go to Congress and ask four different committees for permission to do so, as an example.

Termination of liability. I didn't have to carry termination liability obligated on my contracts for every single program that I had in the portfolio, like everybody else has to. That freed up almost $800 million a year to be able to use toward our programs. I would save enough that I covered the termination of our largest program, but that's all I needed to do because the odds of terminating all of them were very, very small.

Empowered program management. I did not have to go through -- I was in the Pentagon, I was on the Air Staff for several years, I participated in the OIPT, WIPT, all the IPT processes. It's like being in a pinball machine.

You bounce from each one of these things and you think you have a decision only to find out the right person wasn't there or his or her boss didn't agree with it, so you have to go back around. It's just like bouncing from one of these teams to the other. That's why we couldn't get decisions done. That's why it would take three or four months to get a decision that should take three days.

We didn't have to do that. We developed a missile defense executive board that still exists today. The principals were only allowed to come, not the deputies, and those were decision bodies. We made decisions and made them very, very quickly.

In closing, and please ask some questions, I want to address this idea of missile defense being destabilizing, especially with respect to developing capabilities against Russia and China. Strategic deterrence has served the U.S. well for more than 70 years. It works best when the U.S. maintains a real advantage, as we've done over that timeframe.

The missile defenses that the U.S. built against the emerging North Korean and Iranian threats had no effective operational capability against Russia or China, and they knew that. The Russians knew that, they're not stupid. They knew that.

I'll give you another example. I was briefing the NATO-Russia Council and we were putting the missile defense in Poland, the missiles in Poland, the interceptors and the radar in the Czech Republic. The Russian ambassador -- and Dr. Totsky (ph) was there -- and he was complaining about us putting interceptors in Poland. He was complaining about being able to intercept Russian ICBMs.

I said, Mr. Ambassador, with all due respect, you know we cannot intercept Russian ICBMs from those locations. We physically can't do that. We would actually exceed the dynamic pressure of the interceptor to try to do that.

He said, well why don't you put them in the United Kingdom? We're okay with putting them in the United Kingdom. I said, Mr. Ambassador, we could intercept your ICBMs from the United Kingdom if we did that. He said, we don't care.

So for them, it's geopolitical. It was not a technical, military challenge that they saw. I think that what has been more destabilizing than missile defense -- and one other vignette.

When the North Koreans were preparing to launch the Taepodong II in 2006 for the first time, and I was the director, we didn't know exactly what that was. We didn't know if it was an ICBM. We didn't know if it was a space launch vehicle. We didn't know what was on the top of it. There was a lot of uncertainty. They weren't saying anything and they weren't giving any clear zones or anything in the international norms.

I remember that there was a group led by some former senior officials in DOD that ended up also coming back into office, that argued that we should go pre-emotively strike that Taepodong site. That was presented to President Bush and President Bush said no. I'm going to rely on our Ground Based Midcourse Defense program to defend us if it becomes an emerging attack against Hawaii, for example, or another territory.

I think attacking that site pre-emptively would have been much more destabilizing than relying on missile defense, for one thing. Number two, look at what's happening right now with the Russians and the Chinese. They're developing these hypersonic missiles. They are missiles that right now we don't have defense against. That's more destabilizing to me than building a defense against those weapons, because that has a decapitation capability that we cannot afford to have exist.

So I believe that missile defense actually can be stabilizing. Exactly what it does do is when the Taepodong launched in 2006 President Bush wanted to know -- he would ask us -- when am I going to know what it is and how much time to I have to react? That's what he wanted to know.

If we didn't have missile defenses, you don't have that. You don't have that option. It's either pre-emption or retaliation after the fact. You're already saying you're sorry to the dead folks. So I think missile defense is very stabilizing and I think we do

have to build a defense against these hypersonic missiles and we will. I think it's just a matter of time.

Like I said, we need to pay attention to the voices that are saying the right things, not the voices that are saying the wrong things. That remains as true today as it was in the past. I want you guys to keep that in mind as you think about, what are the long-term consequences of some of these strategic choices that we as a nation are making?

It's critically important because, especially with all the young people in the room that I see, it's going to be up to you all. I'm getting ready to get to the sidelines, but you guys are the ones that are going to go on the field. You've got to make sure that we make the right decisions.

I'm going to stop there. Any questions?

(Applause).

MR. : I've got a question for you. Just to preface it, I've seen an X-band radar sitting in the harbor in Hawaii. My daughter and her husband are stationed at Hickam.

GEN. OBERING: The big golf ball, they call it.

MR. : Yes. They lived through the 38 minutes of warning of an attack that wasn't real. Are we doing a good enough job informing the American people about missile defense capabilities to get the advocacy needed to move to the programs you outlined?

GEN. OBERING: No, because I don't think that we ever can communicate enough. I will tell you that there are some grassroots efforts like -- you may know Rikki Ellison and his Missile Defense Advocacy Alliance. The way he started out was to do that. He went around the country. He went to a lot of different cities and he would educate the people.

He would call on the Rotary clubs and the Lions club and he would have these sessions. He would talk about missile defense, what the purpose was, what the capabilities were, etcetera. I accompanied him on some of those just as an informative briefer.

Rikki then moved over to war fighter education and war fighter advocacy, which is what he's been focused on for the last several years. But he's been one of the few folks that have been doing that. I agree with you that we need to get more and more out there.

When I was the director, we tried to do that as much as possible. We did an awful lot of outreach and educating folks on that. But after I left the change to the Obama administration, to be very honest, missile defense was not a big part of the Obama administration.

In fact, coming in their advertised cut to missile defense was going to be 50 percent. That's what candidate Obama said during the campaign. Sure enough, the first guidance that came out of OMB was a 50 percent cut in the program. That would have killed the program, because we were spending 50 on testing and support alone.

The war fighters pushed back and the Joint Staff pushed back, and it went from 50 to 15. But they weren't big advocates of that, so that kind of atrophied over time. But your point is well taken, to get back. It's a dramatically needed capability.

You know the saying that all politics are local? I went in to see Senator Feinstein, and the subject was we were trying to get support and funding for our Thule radar. We had a radar in Thule, Greenland that we were going to upgrade to missile defense capability, and we were trying to get money to do that.

I walked in her office and she said, you know, general, I'm not a very big missile defense fan. I said, let me show you something, senator. It turned out that for a missile fired from Iran into the United States we could cover all the United States from the radar in the United Kingdom at Flyingdales, except for what we call the Thule Gap, which was a gap in coverage that extended down the West Coast and out into the Pacific.

Her house was in that gap. I said, see, that's why we need the funding to close that gap. She voted for it.

But there is an education process that has to go on because -- oh my God, this is another one, I apologize. I was holding a staffer breakfast on the Hill and there was probably 50 staffers around, a youth thing, and I was talking like I am today. Ted Postol, this Ph.D. out of MIT that everybody that is critical of missile defense always points to him as the expert, which he is absolutely not. But he's a Ph.D. from MIT.

I said, how many of you in this room have gone to MIT? There were about eight hands raised up. I said, how many of you had Dr. Postol? Five hands raised up. I said, what did he teach you at MIT? They said, political science.

I said, look, I rest my case. I said, I have 600 Ph.Ds working this program, several hundred from MIT. So why do you point to one person as being the god of missile defense knowledge when they don't even know what the hell they're talking about? So a lot of that kind of education has to go on as well.

MR. HUESSY: Could you delineate the question we've had on boost phase on the extent to which you could do it from an airplane or remotely piloted vehicle, and the difference between persistent coverage, day-to-day during peacetime in case someone has an unauthorized launch, versus if you're in combat you have a totally different ability to go over someone's land. That's the debate right now. Mr. Griffin and General Mattis have asked the Air Force and MDA to look at this very quickly as to where should we go. Could you --

GEN. OBERING: Yeah, I'll talk about it. First of all, an airborne boost phase defense of any kind is only going to be effective against fairly geographically small nations. So North Korea is amenable to that, portions of Iran are amenable to that.

But even Iran begins to approach a geographic size that is not very amenable, unless you have the ability to be totally stealthy and to fly very deep into enemy territory. When you have that restriction on you that begins to restrict what kind of interceptor you can put on that platform and still maintain your stealth signature. So when you look at that, combined with the operational range of that interceptor, it begins to get very problematic for having a persistent capability that could cover the trajectories necessary to cover to protect the United States or even some regional fights.

Like I said, Korea is very amenable, so having a high flying UAV with a kinetic interceptor onboard that would have a reasonable range could help in some of the trajectories from North Korea, not too many to the United States, but to Japan for example or Guam. If you look at the way the globe is, almost every launch to the United States from North Korea goes which way? Does anybody know? North, it goes straight up over, not out over Japan, not the way people think, but straight up north. We're trying to fire down from the South, so it's harder to do that, right?

But with a laser, that's a different animal. If you have a laser on a high flying UAV, you actually can cover most of the trajectories to the United States, because of the range of the laser at those altitudes, and the speed of the laser. So you get more kill time, so to speak, because it's a speed of light weapon versus a kinetic weapon.

Do I believe there's value in a kinetic-based airborne platform? Yes, but I think it's more opportunistic, like I said, and it would be after combat. The other thing about -- if you were able to put a laser on -- if you put a kinetic weapon on a UAV, or weapons, your shots are only as many as the interceptors that you have. That could be two, three at probably the most.

With the laser that's not true. With the laser you have a magazine that could go for quite a while. What we learned on ABL is we had all these model predictions about how lethal -- how long would it take from the time we acquired the target to the time that they put -- so on the ABL we had an acquisition sensor. We had a tracking laser that we put on the target. And then we put an atmospheric compensation laser that would go through and measure the distortion of the atmosphere.

On the evening news you see these weather maps with the clouds. That's what it looked like. It was a distortion map.

And then we would take that information and feed it back and we would deform the mirrors in the system so that when we put the high energy beam out the nose of the aircraft, it would use the atmosphere as glasses to focus the beam. So it was kind of a

reverse focusing that we used. It worked very, very well.

You could see when the laser was shining against our (martyr ?) target for example, which was an aircraft that we used for testing, it looked like a radar weather map. When we turned on the atmospheric compensation it went right down to about the size of a basketball. So we believed that it would take -- I can't tell the number because its classified -- but X amount of seconds to destroy these targets. It took about a third of that time.

So we discovered that we were much more lethal than we thought against those targets. You're killing targets in a matter of seconds -- I can say that -- with a magazine that you can recharge and that you can fire repeatedly. Now you can kill many vehicles, or many threats, with one platform.

MR. : The command and control discussion, in the defense area you're driven by the engagement windows of the interceptors that potentially could be used against a threat that has launched at you. On the deterrent side, those weapons systems right through impact you still can be thinking about how you want to respond. What's the biggest challenge of trying to integrate the command and control that you described earlier?

GEN. OBERING: For space, you mean?

MR. : Between the offense and defense.

GEN. OBERING: I'm sorry, between offense and the defense. First of all, the biggest challenge is the compatibility of the programs of the systems that we have right now. We've got to do a better job of integrating the ITWA (ph) systems that we have with the missile defense systems. That's the first thing to do. That begins to show you what kind of opportunities you would have in that decision space and how you would be able to do that.

The other thing is kill assessment, which is critically important, and how that could feed both of those command and control systems. But I think they should be merged into one, into one single command and control system. With today's technology, you can do that and you can (strengthen ?) both of those missions.

In fact, our sensors are getting to the point where if we were able to simultaneously feed the track of a missile into our defense system, and the point of origin into an offensive system, that would be a MIDCAP (ph) or something like that, that would be the optimum use of those sensors. We're not doing that like we should today.

MS. : How would you start that integration first and who would be responsible within MDA, DOD, Pentagon-type environment to actually bring those systems together? You have quite a lot of capacity with Aegis ground-based radars. How do you actually start to integrate those activities?

GEN. OBERING: I would lay that at the foot of STRATCOM. I think STRATCOM would be a great lead for that. STRATCOM is supposed to be the lead among equals, first among equals, of the combatant commands when it comes to missile defense; and, of course, with their connections with the offensive forces. So that would be where I would put it, with the STRATCIM staff. Of course, they would have to work with NORTHCOM and PACCOM and EUCOM and CENTCOM, etcetera. But from a process perspective, that's where I would start, at STRATCOM. STRATCOM and MDA working together.

MR. HUESSY: Trey, you know one of the biggest issues that will probably come out of the Missile Defense Review is the extent to which we deal with China and Russia. You get the destabilizing arguments from the critics of missile defense. What's your recommendation?

You covered a little bit of this, of how to emphasize that what we're trying to do is stop nations like China and Russia at the initial part of a conflict using missiles as coercive blackmail levers, and take that lever away, similar to what you saw in Israel and Syria just recently. Israel shot down the missiles, but they didn't have to go to war. They may have even taken out some of the Iranian and some of the Syrian facilities, but as you know, they don't have to engage in either take it, where you hit it, and then go back. The more you have an ability to keep --

GEN. OBERING: I have a couple of thoughts on that. Of course, Reagan did too. One thought would be -- remember I said I made a very clear distinction and I hope it came across. I'm not talking about building thousands of interceptors, space-based or otherwise, that would be China and Russia compatible. I'm talking about building enough that would deter an initial attack, that would allow our strategic offense to survive. So that's one thing.

If we start building thousands, that could be threatening, so to speak, to Russia or China. But the fact that we're trying to build enough to maintain and to keep a strategic offense response, I think is an important distinction. Of course, Reagan's answer to that was, invite them to participate. That's what he said. He said we build a global missile defense system and invite them to participate.

One of the things I did after I retired is I joined Stephen Hadley, the former National Security adviser to President Bush. He had a group that he put together, including Des Brown, the former Defense Minister from the UK, and -- I'll think of his name, there was one Russian retired minister and two Russian general officers and a Russian colonel, several Europeans, and we formed this group to see, could we do cooperative missile defense? The focal point was in Europe.

We were thinking about an Iranian threat, in joining it, and Victor Eck (ph) and I, the Russian counterpart, from a technical perspective actually put together an architecture that would do that, without revealing any U.S. sensitive technologies or vice versa. So

there's ways to do this. There's ways to do this.

It's just a matter if you want to do it. Of course it didn't go anywhere because Mr. Putin did not want to do that and it didn't work.

MR. HUESSY: Thank you, Trey.

GEN. OBERING: Thank you, guys. I appreciate it.

(Applause).