

How Much Iron Is In Your Missile Defense Diet?

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[Mr. Riki Ellison, MDAA Founder and Chairman]

Good afternoon, welcome from a sunshine Super Monday here in Alexandria, Virginia. What a Super Sunday it was. It's just great to see that defense wins Super Bowls and World Championships. A phenomenal game. And just want a little shout out to the Philadelphia Eagles. The left of launch, boost phase defense was remarkable on their D-line hitting that quarterback before the ball was lost. Just a great display of integrated missile defense, excuse me, integrated defense on it. I'm Riki Ellison. I'm the founder and chairman of the Missile Defense Advocacy Alliance.

We have been in existence for over 20 years. We've been involved with missile defense for 40 years, all the way back to Ronald Reagan. Our whole sole mission is to advocate and educate on the evolution, the deployment of missile defense capabilities to make the world a safer place and to make our nation a safer place. And we're seeing that come to fruition today. This is our 68th Congressional Roundtable. It's on how much iron is in your diet.

And we have some old iron sides with us today that are going to really get into the discussion. They're the original gangsters. And I think as the executive order pointed out, the first paragraph of the executive order by President Trump was referring all the way back to the first iteration, the SDI speech from Ronald Reagan, and then to the withdrawal from the ABM Treaty. Those are the two major inflection points of missile defense in our history. And now we are on the third inflection point that is here today. And I was giving Trey a hard time. I know we're all going to be Domers, but thank God it's not the Golden Dome.

So we're going in a good spot with the Iron Dome on that aspect of it. This is a lot of going back to the future. And we should look back at the future. This is the Holy Grail, so to speak, to be able to actually have an ability to defend the whole country from space. That battle, the Holy Grail of space, has been tried back in 1983, has been tried in 2002. It's now being put forward by a president that is very pro-space on this, and the conditions are right now for that to happen. But if you go back to our country's history, the U.S. Army was in control of putting forward a missile defense air defense system in the 70s, late 60s, that had both air defense and missile defense and Nike sites around the world. So we've been there. We've done that aspect of it.

But now we're in a situation right now where the president has put forward 60 days to come up with an architecture to defend the entire country, our population, our critical infrastructures, and that's really, if you look at it, it's only 40 days because the architecture has got to be in before they push it through the tank into the JCS chair and everybody discuss which ways to go forward, what not to do. We are concerned that this process should not be what we've just witnessed with Guam. That's five years of too many chefs in the kitchen and a process that cost our country five years of time and a process that we

spent a lot of money on, and we eventually got to a service position. Right now, it looks from the outside that there is still that same problem with too many people in the kitchen to figure this out.

I think we want to address that today and look at what the essence of the problem to go forward is. We've got to be very clear with putting one person in charge of the architecture, putting one person in charge of the command. That's the only way you're going to get this thing done the way they want it done. They want a capability up in two years. It's called urgency, and we haven't done that. I think Trey did it with three years with the GMD system, but now that's 20 years ago. Now, we've got to be able to push this thing as hard as we can. We are to understand this is at least \$20 billion. This is double the MDA's budget this first year. It's most likely close to \$80 or \$100 billion over the next four to five years on this. It's very clear inside the present executive order that this is not about past generation missile defense, this generation missile defense. This is about next generation missile defense.

It's written all over that. I think we've got to understand that executive order is the policy. The MDR, Missile Defense Review, is now done. This is the policy of the United States of America with missile defense. There are some key language items in that policy document, like having capability sensors all up in space, having the ability to engage in space. It is a great document. It is not picking North Korea and Iran. It has taken on all our peers against all the threats. It's not hand-picking different threats and letting nuclear deterrence carry other threats. We now have a blank piece of paper here to do it, but we have to do it right. We have to get away from the processes that we've been in over the last 40 years on missile defense and be able to execute this big dream and make the holy grail real. We want to have an opportunity here today to discuss what those challenges are.

I want to start it off with Mark, who has been on our board. He has been a very strong advocate over the years for missile defense, former J-3 for Indo-PACOM. He is just a brilliant guy. Mark, it's all yours.

[Rear Admiral (Ret.) Mark Montgomery, Board of Directors, MDAA, Senior Fellow, Foundation for Defense of Democracies, Former Director of Operations, U.S. Pacific Command]

Thanks, Riki. I'm glad that you can describe a game with 62 points in it as a defensive struggle. It's a real honor to be here today with Mitch, Dan, and Trey. I think we're going to have a very good discussion.

When I look at missile defense, especially through the prism of this executive order, I see five principles and about four programs that need to be pushed. The first principle, and I think it's one that's captured well, and it's captured well in how MDA talks about this, and NORTHCOM, the combatant commander that's most likely going to be tasked with this mission, it's about integrating over geography. The whole idea of an iron dome is that you have an integrated, layered system that works from space to near space to airborne to ground, even surface with naval assets. You've got to be integrated across there, which means we have to have a command and control situational awareness system. In my mind,

that over time is able to pass firing quality track data around seamlessly at the speed of data that allows detections to lead to decisions for launches and in-flight corrections, all the kind of thing we've been thinking about when we talk about JADC2, but which we have not seen enabled. Over time, we're going to have to have this integrated network that powers us across all those domains. That's number one, integrated over geography.

The second is integrated over time. I like how MDA talked about this with four epochs. Look, you cannot answer this question. There is not a question that's the right answer for 2029 or 2028, whenever you think the threat from China is the greatest. That's the same answer for 2035. What you have to do is you have to think about the short term and think about the long term and see them as not disconnected from each other, but probably different solution sets, different systems are involved in those solutions. We're not going to build a system that we just iterate every two years and we're on SM3 block six when it's over. This needs to be one of those things where we think about what we need now, buy it, and we think about what we need seven, eight years from now and develop it. That integrated over time is important.

The third, and this is one where people may disagree with me, but I think only one person, one group can be the architect. To me, that architect is the Missile Defense Agency. We proved I was right by proving the negative, which is we took this away from MDA for the defense of Guam. If I had asked my, at the time, 15-year-old daughter and three of her friends to cluster this up, they couldn't have done a worse job on the defense of Guam than what we got four years later. That was because we pulled it from MDA, the professionals, where the engineers are, where we pay a ton of money to do architecture. So just do it. Give this to Missile Defense Agency. If they need authorities to do it better, give them the authorities. Restore the authorities we gave them 19 years ago now and then stripped away four years ago. Whatever the Missile Defense Agency director says he or she needs to execute this mission, give them that, and then put them in charge as the architect of this. This architecture can't be run by operators and it can't be run by policymakers. It needs to be run by the professional missile defense engineers and thinkers that we have at MDA. And if we need to make the MDA director a four-star to do that, I'm fine with that. I don't know that that's necessary, but if that's necessary, do it, whatever it takes. And if we need to give that person control over the development of some systems that they currently don't have control over, I would consider that. I've observed the goat rope of trying to get a low-cost cruise missile defense system for ground-based defense for the last 20 years. And I'm okay with, if it turns out MDA is the right people to do that, I'm not saying that's a given, but MDA needs to be the architect.

The fourth is clearly articulate NORTHCOM as the commander. Let them drive the capabilities requirements that feed the architect. Now, the President and the Secretary of Defense are already laying out some initial ones to get them started. But over time, the ownership of that needs, that capability requirement needs to devolve to the warfighter who's assessing the adversary and developing a plan. And this is going to cause a lot of pain with what's called the CAL and DAL list over time, because there's a lot of stuff you'd love to protect, and there's a very small group of that that you're going to be able to protect. And so, from my point of view, putting the NORTHCOM commander in charge of that, so that's a deep partnership between NORTHCOM and MDA that needs to be solid.

The final kind of thing that this is about in terms of principles is, look, it's laid out in there. Hey, there's three, come back with small, medium, and large plans. Now, the large plan is the plan that's being pilloried, the idea of shooting down every Chinese and Russian ballistic missile. And I tend to agree that that's so cost prohibitive that you need to rely on mutually assured destruction for that. But what's not cost prohibitive and what you can't rely on mutual assured destruction is the idea of being able to shoot down conventional strikes from China and Russia that come from their hypersonic missiles and their long-range cruise missiles. We're going to have to develop a capability. It is not realistic to say to the Russians or Chinese, if you hit one of our missile facilities in the United States and kill 45 Americans, we're going to initiate a 400 million person counterstrike against you. I mean, for deterrence to work, it's got to be credible.

That's not credible. So I do think we're going to settle on one of the smaller medium architectures. So I hope they're smart in that medium one. I suspect the small one will be take status quo programs and jam them through. The medium one will be innovation. I'll talk about what I think that is in a minute. And my guess is that's where the cost is going to land because judging by what Congress is about to put forward, which is 150 billion for defense, of which this is one of four chunks. So maybe it's 40 billion, maybe it's 30 billion over four or five years. You've got to set your appetite to that, not to a \$100 billion program. So my guess is that the fifth principle is that we're going to end up in the middle, the kind of hot, cold, and medium porridge. We're going to end up with Goldilocks' medium porridge.

Now, for me, this talks about at least four different types of programs. One is that the space layer is critical. You and I have discussed this in multiple advisories. It's not just detection and tracking, which I think is a first and second epoch. In other words, in the next two to four years, we're going to see some of that. But it's about engagement from space. And people need to really understand what the Space-Based Weapons Treaty says. It doesn't prohibit the use of weapons from space. It prohibits the use of nuclear weapons. And that engagement, it's probably in the third or fourth epoch. It's six and eight years from now. But you've got to make those investments today to start being ready for that. And I'm not even sure that eventually is the most expensive engagement solution. I mean, there's a beauty to relying on gravity instead of three rocket motors slapped on the back of each other to get a weapon up into space.

The second big program is the glide phase intercept. Look, MDA was forced, their hand was forced last year into picking one of two choices. It was forced by a limited DoD budget for missile defense. That's no longer going to be the limit, the limiting factor. So allow the MDA director to step back, whether he wants to admit he made a mistake or whether it was forced to this, I don't care. Allow both glide phase intercept programs to go. Not because one's better than, one may be better than the other. I bet the one he picks is the best one. They're smart dudes at MDA, as I've said. But one of them delivers a lot sooner than the other. And what you want to do is get one out there so you have some defense. That's your epoch one and two. And then the longer, more beautiful, as the president would say, more beautiful, big glide phase intercept, you let that, you paid for that. And what you tell that company is, hey, the sooner you deliver, the less we buy that other stuff, and the more we buy of your stuff. But let there be some competition in there and get both glide phase going.

Plus, if we're going to build five offenses, I mean, we got Army, Navy, Air Force, you know, DARPA, I'm telling you, you know, offensive weapons. I bet Coast Guard would build one if they could figure it out. You know, we need, it's okay to have two defensive hypersonic weapon systems.

The third thing, Riki, is we're going to have to have persistent high-altitude sensors. Look, I know services don't like to hear this. They're called dirigibles or aerostats. But if you have them up there with firing quality track sensors, you're going to get large coverage areas. You're going to be able to, over time, there'll be lower cost for construction, lower cost for execution over time, manpower wise, versus, say, a permanent aircraft, you know, on a 24-7. And it gives you flexibility for surging them up and down where you locate them. And then, and I know they're ugly. And I know no one wants to have like the one wing set of wings. You know, it's awful. But we got to get back in the dirigible business.

And then finally, we've got to, you know, we got to get the crew, the engagement cruise missile part down. One of the good things is, is we're finding out the really low cost of a Mark 41 VLS when it's not on a ship, but ashore. I think we're in the 42 million range, somewhere around there to have, you know, you know, the 30, the 32 cells there. That's a good deal. And cells can hold multiple missiles depending on their size. My point on this is we can get some low cost, get these positioned around. The Navy's got to stop being obstinate and unhelpful. They were unhelpful in Guam. A lot of the stink of Guam starts with the Navy saying no to AEGIS ashore. So they got to be more involved in these things. And I think over time, we're going to have to, you know, have a reckoning about whether MDA is better doing the cruise missile mission at the ground level than the Army. But I can go either way. As a Navy guy, it's our number one priority. You know, that's why the Navy's successful cruise missile defense, because it's literally the number one warfighting priority for us. And so we're pretty decent at it. We're probably suck at our number 10. But the Army cruise missile defense is not the number one priority. They're kick ass good at the number one through five or six. They're not so good at number 10. We've got to decide whether we slide MDA in there. So I think there's four or five principles there, four or five programs there, Riki, that we have real opportunities with.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Okay, thank you. Thank you, Mark. Just want to ask you two questions.

The authorities for MDA, why can't we give them the same authority as a four star material commander of another service? And the challenge that you said with cruise missile defense, if they if I believe they're taking cruise missile defense, and you might want to talk about counter UAS to whether that's class two, class three, but they would also have to take the development funding from those other services that that are doing their developing for cruise missile defense, and take that and absorb that in with that with authorities can use? Is that possible? Or with a four star command? Is that possible?

[Rear Admiral (Ret.) Mark Montgomery, Board of Directors, MDAA, Senior Fellow, Foundation for Defense of Democracies, Former Director of Operations, U.S. Pacific Command]

So I don't want to equate the authorities I want MDA to have with a four star major acquisition command because it's more I think the rapid prototyping some of the things it

has to be even greater. So it's that plus is what I would say. And again, if the MDA needs to be a four star to do that, fine. I didn't think that was necessary. For the 15 or 18 years when we had some special authorities there, but I you know, I'm happy to be corrected and say, look, it needs to be a four star.

The second part, I'm really nervous about UAS, Riki, the UAS is an important mission. By the way, a lot of the counter UAS in the United States is not a DoD mission. It's an FBI mission, a DHS mission. I don't think China and Russia are near parentheses are using UAS is for military means they're using for the limited part of the whole conundrum that is UAS flag around the United States. It's a very, very small percentage that's adversary in espionage being run against us. So I don't want to get DoD too deep in this. I don't want NORTHCOM owning this. I mean, if you want the NORTHCOM commander to be on a permanent VTC with the White House, give him counter UAS or her counter UAS for the country. I think they need to be out of that. And convert alongside that. I would let the services run the counter UAS is for their ships and bases. I'm okay with that. I don't think there's, but they're not doing great at it. But I don't think that I don't think that's where the problem, you know, the big screw ups are. I'm hesitant to give that to MDA. I think that's a bridge too far. Cruise missiles look a lot like, I think there's a lot of engagement similarity with cruise missiles, hypersonic missiles, ballistic missiles. There's a lot of carryover between SM-2 and SM-6 and SM-3. You know, I put my Navy brain on it. So I would just say I'm much more comfortable with that than I am with the counter UAS, but worth discussing.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Last question. Give us who's challenging MDA for this. I mean, is it the Joint Staff?

[Rear Admiral (Ret.) Mark Montgomery, Board of Directors, MDAA, Senior Fellow, Foundation for Defense of Democracies, Former Director of Operations, U.S. Pacific Command]

If Joint Staff is going to crawl out of the hole and screw this one up, someone needs to get that whack-a-mole thing. I don't think CAPE will do it. I mean, I think we've had our experience where, you know, supported by poor behavior, again, the Navy's poor behavior and not aggressively saying we can do ages ashore here. The Navy refused to do things. The Army kind of said it could do too much for the defense of Guam. And I think JIAMD and CAPE exploited that to come up with a bad plan. And then once we have a plan with the military, we will aggressively execute that plan to success, no matter how long and how much it costs, except we actually didn't for the defense of Guam. I would gently say four years later, we are barely, barely better in our defense of Guam. And we've spent several billion and we have almost nothing to show for it.

So I'm hoping no one, no one should. Missile Defense Agency. I mean, what part of like who should architect missile defense isn't answered by the question, Missile Defense Agency. They're the experts. If you're an engineer worth a damn in the system, you should be going to MDA to plan these. I'm excited about MDA owning this. Riki, I think that, you know, the MDA commander is going to, is going to, has an opportunity here to have, you know, to set their bet, set the bar very high because I think they, you know, this is something they can do and they're, they're ready to do it.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Thanks, Mark. That was awesome. All right.

I think we have, well, I think I know the greatest and the best MDA director in the history of MDA, Trey Obering, because you did. You had a presidential order. You executed that order. You put it on time and made it happen. That was 20 years ago. So we are very honored to have Trey with us. And Trey, thank you for helping, you know, create MDAA with us and the statute behind us at Vandenberg. That was huge. Those are great memories. You, you, you've changed our nation in the betterment with missile defense at your time. Trey, it's all yours.

[Lt Gen. (Ret) Henry A. Obering, Former Director Missile Defense Agency]

Thank you. Thank you, Riki. And I really appreciate your kind words. I'll pay you later.

So let me just give a little bit of background that I think sets really important context for this. So our current system that Riki mentioned that we started deploying in 2004 back when I was director is really designed against limited attack from North Korea and an Iranian attack from east coast direction. It is not designed for Russia or China. Our current space capability, just to remind everyone, is not designed to be able to support intercepts in space. It's only for alert and warning purposes. We do not have the ability to do what we call birth to death tracking with our current radar structures around the United States. We don't have the ability to cover what we call the boost asset phase of a missile launch, which is where they're most vulnerable, I should say. It was certainly not designed to defend against any hypersonic threat.

So going forward, I think what we have to do is we need the capability and the capacity to defeat anything and everything that a North Korea or Iran could throw at us. But we need the capability to defeat anything that Russia or China can throw at us and enough capacity to make sure that we have continued strategic deterrence. And I'll talk about what that means. And I think really what's important going forward, we got to realize that missile defense is a critical integral element of strategic deterrence. And that's something that we have to remind ourselves. Also, the current system that we fielded does not use modern commercial technologies. And I'll talk about some more if those are. I'm going to focus my remarks on the space-based layer piece of this because that is the anchor tenet. That is the cornerstone of this entire construct of an Iron Dome for America.

So in addition to what we currently have deployed in terms of terrestrial capability, we're talking about adding space-based interceptors slash sensors. And they will be working in combination with a space-based mesh network transport layer, which is really a communications link. And you can think of that in terms of Starlink, Starshield, or what the Space Development Agency has been putting up here recently with their transport layer. And what this would consist of that would have a major impact is that we would deploy large dispersed constellations of very highly maneuverable small satellites. It would provide versatile options for detection, tracking, and interception of both current and future missile threats. Such a constellation is not easily countered or overwhelmed.

We would incorporate some of the more modern technologies such as artificial intelligence, machine learning, peer-to-peer networks, blockchain technology, so that we could have

these satellites operate autonomously with swarming techniques that would allow them to create synthetic aperture radars in space and then to be able to peel off and decide who's going to do what in terms of interception. Remember that our hit-to-kill technology, we don't use warheads. We use really a kill vehicle for either the ground-based midcourse system or Aegis or whatever. It's nothing more than a telescope with a diverting act control system and a propellant tank. That's it. And so the same thing that can be a sensor can also be an interceptor is my point. And that becomes very important going forward.

To give one example, one concept that we've actually looked at Booz Allen is that we would deploy a thousand of these CubeSats constellation in 20 orbital planes with 50 of these satellites per plane. And they'd be flying in 10 squadrons of five of these CubeSats per squadron. They would be operating at about 600 kilometers in altitude orbit. And this would provide a very, very effective coverage for the trajectories that we would be interested in coming from Russia, China into the homeland of the United States. As I said, it would be enabled by the communications backbone that we talked about. And what that means is that any satellite on that network would know what every other satellite knows on that network. So they would be able to sort out who's going to be doing the attacking of which threat and which object.

So think of it this way. Here's one way to think of it. Think of it as an Uber network in space so that the incoming nuclear warhead suite is considered a passenger. And then these satellites would be considered drivers. And they would sort out which driver is going to pick up the passenger. And that really is very much relies on the same technology like Uber does. It relies on that same technology to be able to do this. This is commercial off-the-shelf technology. And with the advances that have been made in the last my gosh, since 2004, when we started putting GBIs in the silos and we started fielding the Aegis SM-3s at sea and the PAC-3s, et cetera, the technologies have come so much farther. Our processing speeds are orders of magnitude what they were. Our manufacturing techniques with our adaptive manufacturing and with so many different techniques that have really driven down the cost of these with new material science that we can put into these satellites. It's able to drive our costs down to the point where just as a back of the envelope estimation, we can probably put up 1,000 of these CubeSats and Constellation for much less than 15 to 20, I should say less than \$20 billion, probably more like \$15 billion to do that. That would be the development and the launch costs have come down so dramatically as well.

Where we should be today is where we were back in 2004 in terms of managing the program or leading the program. What Mark said is exactly right. You've got to have somebody that leads this effort very strongly. I was delegated authorities in 2004 by the SECDEF. It came and originated from the presidential order. In essence, when you think about it, inside the Pentagon, there are three major lines of authority. There are requirements authorities that are embedded in the Pentagon through the JROC and the JCCIS process. There are acquisition authorities that are embedded in the Pentagon that are part of the acquisition executive chain. Then there's the budget authorities embedded in the Pentagon. Those authorities don't come to one group until they get to the SECDEF. That's what causes a lot of what takes so long in that building to get things done, is you have to coordinate and orchestrate between those three lines. What I was delegated was requirements trades authority.

I was working with Stratcom commander where we could talk about what are we going to do, what are we not going to do, most importantly. I also had budget authority, and I had acquisition authority as the acquisition executive and head of contracting authority. We know how to do this. We've done this before in the past. We cannot put this in the normal DOD 5000 process or the normal JCCIS process. If we do, it will not work. We don't have enough time to be able to do that. I think a combination of being able to import this commercially available technology that we have advanced so far today, combined with the authorities that we know how to do and we've done in the past, that combination will allow this to be successful. I really do hope it is, because we desperately need it as we look at a very aggressive China and a resurgent Russia going forward.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Trey, that was awesome. A couple of questions here. This 15 billion constellation that you put forward, does it handle cruise missiles?

Does it handle hypersonic glide? Does it handle BMD? What exactly does that capability give us?

[Lt Gen. (Ret) Henry A. Obering, Former Director Missile Defense Agency]

Remember that the vast majority of the missile inventories of Russia and China are still ballistic missiles, number one. The vast majority. Number two, this could handle one type of hypersonic weapon, which is the boost glide weapon, because it's vulnerable in that boosting phase.

It would be able to take that out. It would be able to have an impact on cruise missile, but not engagement. It would be able to help with, could help with tracking depending on how well, how you do the sensors, etc. But it will focus on what is the major threat from Russia, China, which is there are hundreds of ballistic missiles that they have, and the handful of hypersonic, at least the one type of hypersonic.

[Mr. Riki Ellison, MDAA Founder and Chairman]

I know Trey, you were involved with ABL and the original boost phase deal. Is there something in the works that way? Are we going to do it from space on that?

Let me just add to this, who are you putting in charge of this, SDA or MDA for the development of this space constellation? Is that going to go to Phil Garnett down in LA, or is it going to go to Heath Collins at MDA to do this in space?

[Lt Gen. (Ret) Henry A. Obering, Former Director Missile Defense Agency]

That's obviously not my call, but what I would say is that it's going to take the leadership of MDA, and it's going to take the partnership of both SDA and Space Systems Command down in LA to pull this off. I think the three of them working together under the leadership of MDA, and it certainly is going to have to have direct SETDEF involvement and SETDEF support to be able to have this move quickly through the building. And the boost phase, can you just talk about that? The boost phase would be, this constellation would provide kinetic intercept in the boost phase, and what you're talking about, the non-kinetic effects like ABL, the lasers, and directed energy, etc. That's something that we should invest in because that's another area where there's been great strides in the technology to where we could

use direct energy weapons that would be in space. And of course, space is the great place to use direct energy weapons because you don't have the atmospheric interference that you do in the atmosphere.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Straight on that one, you don't have the power to be able to, how do you power these things in space if you don't have the oxygen and all that to go forward? You talked about putting small nukes up there, what are you doing?

[Lt Gen. (Ret) Henry A. Obering, Former Director Missile Defense Agency]

No. There are different ways, well, I won't go into that, but there's also advantages in how you generate power for that in space, you're right, that could be leveraged. I'm talking about the class of lasers right now that we were able to get up to a megawatt of power out of and to be able to size that for a space-based platform. We're on the verge of being able to do that and be able to take that and weaponize that, but it's something that we have not had in the past.

[Mr. Riki Ellison, MDAA Founder and Chairman]

So, Trey, the last question, can we get anything up there in two years or four years? What can we get up to do exactly what you said?

[Lt Gen. (Ret) Henry A. Obering, Former Director Missile Defense Agency]

I believe, I believe just if you remember, if you remember, Riki, we started the ground-based midcourse program by putting a test bed in the ground, that's what we started. We had a test bed of 10 interceptors is what the first vision was. I think you could also get a test bed up fairly quickly of these CubeSats, at least one orbit's worth, and have that to where you begin to test and you begin to check out the capability and the technologies that I'm talking about.

[Mr. Riki Ellison, MDAA Founder and Chairman]

And that would include demonstrating intercepts in space from that test bed? Yes. Okay, great. That's awesome. I mean, really enlightening, Trey. Thank you for that. So, we're going to our new iron. I mean, he's not an original gangster. He's just got out of the Army's lead position for Space and Missile Defense Command. Brilliant, brilliant man, all the way back to the roots of Army air defense over the last 30 years. He's been on the cutting edge of it. So, we're really welcome and glad to have Dan Karbler with us. Dan?

[LTG (Ret) Daniel L. Karbler, Former Commander U.S. Army Space and Missile Defense Command]

Hey, thanks very much, Riki. Honored to be here and really nice to be able to follow Mark and Trey in their discussions. You know, a couple things that I want to talk to with respect to what Mark and Trey talked about. So, I'll take a little issue with Mark's comments about architect. You know, architect is a broad word. It's like integration, right, and it's defined a lot of different ways. But within the department, you got to look, there's three different architectures that get developed. You have the system architecture and technical architecture, which is, I totally agree with Mark. That is where MDA is well positioned. They are the experts. They have the engineers develop the system architecture and technical architecture. But the danger is, and this is kind of, this is a bit of the danger with what

Senator Sullivan and Cramer have done, is if we just start throwing a bunch of hardware out there and think that we're going to develop this system and technical architecture without first establishing the operational architecture, which lays in the requirements, the information exchange requirements, what really needs to be done, it's akin to, hey, building a house, but we don't have any design plans. Hey, here's a sink. Here's some doors. Here's the cabinets. You know, here's some piping. Here's some HVAC. Here's some wires. But if nobody laid out what the heck the house is supposed to look like, good luck putting together a house that's coherent, that's efficient, and that can actually, you know, house a family together. So, that's kind of the first thing. So, we've got to make sure that that operational architecture is laid in and preceded to that would be an operational concept. And again, I'm not trying to get us beholden to JCIDS and the JROC and everything, but I do think that we have got to have an operational concept that would then drive what the architecture would look like.

I'm going to also go back to the point that Mark made about OSD, CAPE, you know, a whole bunch of hands in the pie here and why things couldn't get done. And I totally agree with him. Let me use a current analogous situation that happened a few years ago with General Hyten. When he was the STRATCOM commander, I was the chief, and Secretary Mattis was the Secretary of Defense. And this goes back to the invent of the NEC, the NC3 section within STRATCOM that helped put together, that helped really coalesce NC3. Prior to that, NC3, as Secretary Mattis said, was done by committee.

You had entities from White House Communication Agency, WAMO, the services, the Air Force, STRATCOM, DISA. Everybody had their hands into NC3. Secretary Mattis looked at General Hyten and said, I cannot have this being done by committee anymore. It's got to be done by a commander in the field. And he said, John, I want you to take it on. General Hyten, who was the smartest guy around, said, well, Mr. Secretary, I can't do that. I don't have the budget and I don't have the authorities to do that. And lo and behold, the next day, akin to the 2002 Rumsfeld memo for BMDS, Secretary Mattis published a memorandum that gave STRATCOM the authority to run NC3, to include having ANS subordinate to STRATCOM for NC3 acquisition. So we've got to make sure that those authorities, those similar authorities would be laid into for Iron Dome for America.

So what I would postulate is that you really have to have two entities. You've got to have an Iron Dome for America commanding entity. And then you've got to have the architect, the acquisition side of this, which would be MDA. And I would say that NORTHCOM is well-positioned to be the Iron Dome for America commander, but they don't have the staff to do it. NORTHCOM would have to be significantly beefed up or maybe subordinated to the NORTHCOM commander because they've got all North America with a lot of different things going on. Maybe there is an Iron Dome for America commander that's established.

Another piece that we have to keep in mind, and Trey touched on all the space aspects of it, is the COCOM who has trans-regional missile defense authority is Space Command. And so Space Command is going to play a role in this. And I think actually having some of those trans-regional missile defense authorities up under Space Command makes sense because they own space. That's their AO. And so any of these space-enabled effects that come out of there are going to have to be tightly coordinated with the Space Command commander, and

then really the supportive commander, the Iron Dome for America commander who could or couldn't be the NORTHCOM commander.

I want to touch on elevated sensors. We talked about elevated sensors just a little bit too. You know, we don't need to do any more studies for the need for elevated sensors. When JLENS was established and tested past the JROC, I mean the operational architecture that included JLENS was a critical component for the operational architecture for air and missile defense. It went through the JROC. It went through the requirements. It went through the AOA. You know, high and above any other capabilities provided what we needed for persistent elevated netted sensing capabilities that could see low radar cross section, low altitude nap of the earth flying objects.

Unfortunate. Unfortunate that the tether broke and that we shut down the JLENS program. I would tell you we have to get rid of, get over our modernization embarrassment about JLENS and move out with it. And this might sound just a little crude, but, you know, we've killed a lot of test pilots testing out aircraft, but we didn't stop developing the aircraft. We kept going after what we knew what the requirement was. So I would say for part of what we need for Iron Dome for America, which is an elevated sensor, which can get after those cruise missiles that could be launched over the poles. They can be air launched. It could be sea launched. It could be launched from container ships, what have you. We need to be able to have that persistent elevated netted sensor capability.

So there's another piece of this. Who's going to man this system? So huge fights within the services about Aegis ashore. Mark said, you know, the Navy walked away, push away, defense of Guam, push away. By the way, you know, defense of Guam, you know why it was screwed up because we deviated from the way that we do business in the military. Do we have a defense of Bahrain? Do we have a defense of Poland? Do we have a defense of United Arab Emirates? Do we have a defense of Qatar? No, we don't. You know, we have an air defense commander who with their air, army or missile defense commander sits down and develops the prioritized defendant asset list, figure out what can be defended, what assets does he or she have. And then we put them against that prioritized defendant asset list and we defend it. But for some reason for the defense of Guam, we decided to do it differently. And I would say that, that two people are to fault at that, the INDOPACOM commander at the time and PACAF commander. They should have stood up and said, hey, this is my job. CAPE, we don't need you. OSD, we don't need you. We're going to do defense of Guam and we're going to get knocked out. I think that they were both negligent in their duties in taking over responsibilities for the defense of Guam.

We can't allow that to happen here with Iron Dome for America. It's got to be that single command entity. So give me an opportunity here to maybe just lay out some thoughts here that I wrote down, some definitions, because we're throwing around an Iron Dome for America. So Karbler would recommend this. Iron Dome for America is defined as the next generation missile defense shield that will deter adversaries and defend its citizens and critical infrastructure against any adversary aerial attack on the homeland and will guarantee a second-strike capability. These adversary counter value and counter force attacks will be defeated through coordinated operations entailing all missile defeat capabilities.

We haven't talked too much here about left to launch so far in this discussion, but we've got to recognize that missile defeat is the whole entire equation, left of launch as well as active defense. Missile defeat is defined as all actions that are designed to counter adversary aerial threats and include left of launch offensive operations, active defense and passive defense activities taken by the Iron Dome for America forces. These forces will prevent defeat and or minimize the effects of aerial threat attacks.

Iron Dome for America must account for and combine air and missile defense capabilities from the theater to the homeland. We cannot just leave this as an isolated little "America's in its own cocoon", because we've got to remember that these threats emanate from somewhere else, from some other COCOM's battle space. That COCOM needs to be aware and be a supporting commander to the Iron Dome for America commander. So, here's a couple of must do's. Homeland defense is the number one priority and resources will be allocated and dedicated accordingly. The prioritized defended asset list, the PDAL, will culminate a highly collaborative planning process among Iron Dome for America participants, both military and civilian across the whole of government, resulting in an agreed upon framework and policy for utilization of Iron Dome for America resources for protection of assets.

The asymmetric deployment of adversary threat capabilities will require non-PDAL employment solutions. You may have a container ship that we know has got a cruise missile on it from the adversary, and it may launch off the coast, but not against a PDAL asset, but we better go get something down there to go counter that. Could be an F-15 just going ahead and taking that ship out or something, but it may not always be PDAL related for us to take out these adversary threats.

This is a big one here. A collaborative intelligence gathering, assessment, and dissemination process will provide all Iron Dome for America decision makers, forces, and participants with timely and pertinent intelligence. Iron Dome for America mission will fall under the command of a single entity.

At some point during the conduct of the Iron Dome for America mission, based on time, geography, and threat capability, the mission area will require separation of command entities into missile defense and defense against air-breathing threats. Artificial intelligence, human-machine interface, machine learning, and other advanced and innovative technologies will enable a highly collaborative, timely, and secure environment to support planning, execution, command and control, and sustainment among Iron Dome for America forces and participants. The single integrated air picture and common air surveillance picture will provide Iron Dome for America forces and participants situational awareness through robust surveillance and fire control quality tracking capability. This will include space assets, high altitude assets, elevated netted sensors, and terrestrial sensors linked through an AI-enabled integrated air and missile defense battle command system. So, that's how Karbler would do it. If I was in charge.

The last piece is, how do we man this? I was going to get that earlier. We've got to look at how we man our current GMD system up in Alaska and Colorado. We have done a good job using the Alaska National Guard, Colorado National Guard, California National Guard to help man these systems.

We've got to figure it out. I would propose that we have to repurpose our National Guard forces in the Army and look at repurposing the infantry or battalion or infantry battalions, armored battalions, whatever we might have in the periphery of the United States in our National Guard, Army National Guard forces, and look at repurposing them into being Iron Dome for America forces. We have the model. We've done it in Alaska and Colorado and California. And I think with the right willpower, guides, and policies, we can do it again. So, subject to any of your questions, Riki, that's what I got here.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Okay, great. Thanks, Dan. I want to go back on a couple things here with you. I completely agree that the Air Force and Navy pulled out because they didn't want to pay for this. And this may be the same thing that may happen here because people are more worried about the money going out of the service to pay for this and stay out of it. So, I just compliment you on recognizing that. And I 100 percent believe the National Guard owns this mission, 100 percent. And we've got to get over those thoughts that they're not good enough or smart enough or not qualified enough. We've got to train them, whether it's going to be whatever the systems are, we've got to make that happen. And each of these states on the border, certainly, they're going to invest in this. This is something very positive for them. So, two questions. First off, who is going to be the operational program architecture? I love that. It's not MDA because they're not the warfighter. Who is that? What organization is going to do that to actually know the operations to be able to produce an architecture that fits with the technical architecture?

[LTG (Ret) Daniel L. Karbler, Former Commander U.S. Army Space and Missile Defense Command]

Yeah. So, my first thought would be the NORTHCOM commander. And again, if that's too big a lift for the NORTHCOM commander, we've got to augment his staff and perhaps give him a three-star who is the iron dome for American commander. Or, you know, because too often the NORTHCOM commander is NORTHCOM NORAD, they're dual-hatted. Some are going to have to have a break there. The NORTHCOM commander has got a full job jar already. We've got to create an iron dome for American commander.

By the way, let me go back to what you talked about, the funding. And Trey can talk about this a little bit too. One of the things in the 2002 Rumsfeld memo that never got followed and it irritated the services, particularly the Army, there was a provision in there that OMB was to develop a special budget process to allow the transfer of elements of the BMDS to the services. And because that special funding process and however that was going to be defined, increasing service toll is what we were kind of looking for. We actually never held OMB's feet to the fire on that.

And that's why forever we've always had these challenges with transition transfer of elements to the services because there's never been a special budget process put in there to support the services. Instead, it's always been, well, let me rip toll away from MDA, or I'm not doing it if I don't get toll from the Navy or from the Air Force or from the Army to support it. So I just wanted to address that little part of the budget that you talked about. And I see that Trey just chimed in here.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Hey, just real quick, just last question, right? Last question. This is what you do for a living. So you're suggesting the AAMDC, the 263rd, conceptually, be in charge of operating and doing the missile defense for our country. Right now, if we had to defend this country, we would certainly pull two Aegis ships on each side of the coast right now, put FADS out there or BLS out there, and maybe put a couple of radars that we're doing in Guam out there. Is that legitimate to start with? And we got to pay for the \$15 billion that's going to go up for space. Does that fit or not?

[LTG (Ret) Daniel L. Karbler, Former Commander U.S. Army Space and Missile Defense Command]

Yeah. So one, I would not put the 263rd responsible for this. They're too small. They don't have a big enough staff.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Yeah but their AAMDC, right? That's what they are.

[LTG (Ret) Daniel L. Karbler, Former Commander U.S. Army Space and Missile Defense Command]

They are AAMDC. They are not designed, manned, or trained to do this Iron Dome for America. Could they be the seed corn for it? Potentially, but they're going to have to require some significant up gunning. Yeah, if we're looking at snapping our fingers and having some sort of Iron Dome for America capabilities right now, the challenge that we have is, whether it's Aegis BMD or THAAD or even Patriot, is you're very much into the terminal side of this. And frankly, Patriot and THAAD, to some extent, Aegis BMD, are just not designed to handle any of the long-range intercontinental ballistic missile threats that could come into the U.S. Could they handle a cruise missile launched off a container ship or missiles maybe launched off of subs offshore? Perhaps, but then that requires that you have exquisite intel, you've got the sensor capability up there, and you've got the weapons platforms in place in order to do those intercepts.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Okay. And that's what the bill is from Senator Sullivan, is all that. So we got the next person, Mitch Coogler, who is going to speak next, who has been phenomenal on that side of the ball, on the congressional staff side of the ball, to put forward policy.

He put forward the 1998 policy for our country to deploy missile defenses, the first one that we've done. He is an expert at it. He is a legitimately old Ironside guy. He might be older than Trey, but he's good. So you're in it, Mitch. It's all yours.

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

Thank you, Riki. Well, first off, I'd like to correct one thing. I am not older than Trey Ober. So that's important to distinguish, to start with. But I'm going to go ahead and step back from the quagmire of the Pentagon budget requirements and acquisition processes to address this question top down. But first, I think it's worth starting with a little bit of history.

As Riki mentioned, I did have the privilege of supporting Senator Thad Cochran in passing a law to make it the policy of the United States to defend our country against ballistic missile

attack. Now, this has already been pointed out, but that National Missile Defense Act of 1999 specified that the defense would be against limited threats from rogue states or accidental launch.

It was fundamentally about small numbers of targets. And this was back in 1999. It was a very different time. We were still in the ABM Treaty with all the constraints that placed upon us as a nation. Well, times have changed. And it's worth highlighting two of the important changes since 1999.

First, our nation is increasingly threatened today by countries—think Russia and China—with large numbers of ICBMs or plan to deploy large numbers, along with other countries developing or obtaining technology for increasingly sophisticated missiles of all ranges. Think of some of the same threats from 1999, but greater numbers and more sophistication. Well, at the same time, second, there have been an enormous number of advances in technology since then, driven in large part by commercial companies.

Trey alluded to some of this. I'll go ahead and run through this quickly. Advances in the ability to build small, low cost, but highly capable satellites. Advances by companies like SpaceX in launching small sets in large numbers at low cost. Advances in deploying these small sets in LEO constellations. Advances in computing power at the edge that adds incredible capability to these low cost platforms. Advances in optical comms that enable cross-linking of these small sets and rapidly sharing large amounts of data and processed information.

So here's what that means for us today, with what President Trump talked about as the revolution of common sense. Because if there's anything that could use some common sense for how you acquire a new system at the edge of today's technology, the Pentagon could badly use that revolution of common sense. The President's Iron Dome executive order makes clear that defending our country from all manner of missile threats, all manner, is among his highest defense priorities. And you know that because when you look at the various executive orders that have been put out, there's a relatively small number that have been put out for DOD. And this was among the first ones for the DOD.

So then you ask the question, well, where does this money come from? Because our budgets are always insufficient for everything that everybody wants to pay for and needs to pay for. Well, just in the last 10 days, the President addressed the Davos conference, and he set a 5% goal of GDP for NATO, for NATO defense spending. Well, U.S. defense spending last year was about 3.1% of GDP in 2024. So it's reasonable to expect that missile defense will receive a substantial increase as the U.S. leads NATO in moving toward President Trump's 5% target. The executive order also makes clear the importance of defending America from space. And this is facilitated by all of the commercial advances I've already mentioned. Consistent with the Iron Dome executive order, we must now focus our efforts and spending on first being able to defend the country in all phases against large and sophisticated missile threats. Well, for the SM phase, this means putting interceptors in space and doing it rapidly in large numbers and at low cost, which again, means using commercial companies to do this. I worked at Tier 1 primes for 20 years. And I know that our legacy defense primes don't understand words like rapid and low cost. The only thing they understand about rapid is how quickly they bill the government. So if you want to think

about how to do this, think about this as the Starlink equivalent for space-based interceptors for the asset phase.

Second, we've got to go back to the future. And by that, I mean, too often, we're still treating missile defense like a confederation of independent weapon systems, each with its own sensors, its own shooters, its own C2BMC. And that's really nothing but a malignant vestige of the ABM treaty. So Trey Obering, on this call, started us down the path of decomposing these systems into three elements—a sensors element, a shooters element, and a C2BMC element—so that any shooter could take advantage of any sensor at any time. Well, we need to get back to that right away. To increase overall effectiveness at a system level, that's exactly how we best defend America from the missile threats confronting our nation today.

So I'll finish up again with some history. President Kennedy set the objective of putting a man on the moon by the end of the decade, and in 1969, that was exactly what was accomplished. Well, President Trump's Iron Dome executive order doesn't set a date. But the objective should be to have the first generation of interceptors in space on orbit by 2028.

The will to do this is in the White House today. The technology is available. The threat requires it. We really don't have any time to waste screwing around with arguing about which legacy systems to stitch together to do what we have an opportunity now to do.

So truly, it's up to President Trump's political appointees in this administration to push this forward and push it forward rapidly. Riki, thank you.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Mitch great explanation on this. First off, is there anything that's preventing us to do this? Because I assume, and straight me out, the MDR is no longer valid because we got these new policy restrictions. So back in the day, you'd have all the debate about, is this clear? And is there anything else that needs to be clear policy-wise to go forward with what we're discussing?

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

Well, Pentagon processes prevent us from doing anything quickly. You've heard the other folks who have talked here talk about the different threads that have to be pulled together. And those can't be ignored. And the role of Congress in the budgeting process, appropriating process cannot be ignored. But there's a lot to be said for clarity. And there's a lot to be said for making sure that we don't have so many different priorities that we wind up with no priorities.

So this is where the President's executive order, in my view, is very clear. My shorthand for that executive order is, defend America and go to space. So all of these other things, they're very interesting. They're very important. We could spend money on things that are already being made all day and all night. And I'm not suggesting that some of that spending or a lot of that spending isn't important. But we need to set a priority. We need to say the priority is putting interceptors in space. And then we need to focus on that relentlessly.

Think about the first satellite system the United States had, Corona. There were roughly 150 satellites put in space. Not a single one was the same as any other. 150 different spacecraft. Well, we don't have to put up the truly objective system here with the very first space-based interceptor platform that we put up. And we're seeing with Starlink, that's not the way that SpaceX is doing Starlink.

So we need to take advantage of what we're seeing on the commercial side, which knows how to move a hell of a lot faster than anything we've ever seen at a DoD.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Mitch, how does US Congress help this process, not hinder it? How do they help get this thing up and running when space doesn't seem to have a state to have its own interests, so we can move this thing as fast as possible?

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

It's fair to say that there are a lot of members of the House and Senate who look at solving a problem based first upon what that means for employment in their states. But I worked in the Senate for 10 years, and I saw a lot of senators, Thad Cochran, John Kyl, Coverdell, lots of others, who did not look at what made most sense on this issue as a function of employment numbers in their states.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Do we have that kind of leadership?

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

We sure do. We have plenty of people who will look at it. Look, as you look at things, you can always say life would always be better without friction, but friction is a fact of life.

Friction is a fact of life. Well, in Congress, there are other facts of life that you have to account for, and there are parochial interests, and you have to address them. But those don't have to become, in this case, what is the overwhelming highest priority in order to achieve the outcome that President Trump laid out very, very clearly in his executive order.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Mitch, I would say to you and to the group here that 60 days is March, and that vision of going to space is going to have to be by the President to the American public in a way on what he's able to do in the rest of the time frame, in the two years, and building this legacy forward. So I appreciate the remarks. I'm going to just follow up because I think, Trey, we're going to have a couple more minutes, and then Mitch will take questions.

But Trey, I want you to follow up with Dan Karbler's remarks. I know there were some exchanges there that I thought that you could reflect on.

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

Riki, you're talking about his remarks about the authorities and about the operational architecture and that type of thing?

[Mr. Riki Ellison, MDAA Founder and Chairman]

Yes, yes. Just give it a perspective. I mean, Dan put it out.

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

Again, kind of going back to the future, back in 2004, we were very, very closely linked with STRATCOM commander in terms of laying out and with NORTHCOM to try to develop what the operational concepts were going to be for the GMB system itself, for example, and also on determining what were going to be the priorities for the various stages that we took the system through. We initially deployed a capability against North Korea. Then we turned our attention to being able to upgrade the radar in Chile, Greenland to be able to handle-

[Mr. Riki Ellison, MDAA Founder and Chairman]

Did you have an operational architecture for that? Was that Larry Dalton? Who was that?

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

We had—and Larry, I was just getting ready to say, Larry was one of the key drivers in that to help us define that. But it was really done in parallel because we were moving so quickly on the acquisition side, to Dan's point. Those two things are critical.

There should be an operational architecture that is very closely aligned with the overall architecture, the acquisition, if you want to call it that, the system architecture that is deployed because both of them have to go hand in hand.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Who is that in your mind? Who is the operational architecture?

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

Well, it's got to be led by the Missile Defense Agency. I'm sorry, the operational architecture?

[Mr. Riki Ellison, MDAA Founder and Chairman]

Yes, the operational architecture.

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

For the defense of the homeland, it is most likely NORTHCOM. There's limits to that. There are going to have to be some things that are done there.

But if you just look at the mission, the roles and the mission responsibility, that would be NORTHCOM.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Dan and Mitch, do you have anything to add to the discussion or ask before we get to the questions? Dan, are you good? Okay.

All right, Mitch. You can throw a couple of questions.

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

I've been nominated to gather all the questions that have come up in the course of the discussion so far.

I will take the first question, which is, why do you think SBIs can be done so quickly?

You may have noticed I've been hitting on the commercial theme a little bit here. I'll use Starlink as the example. There are roughly 7,000 Starlinks that have been launched in just over five years, about 200 launches by SpaceX. Those cost about \$250,000 per platform.

I'm not suggesting that a space-based interceptor platform would cost precisely the same amount. But the entire Starlink constellation is estimated to cost about \$10 billion to \$12 billion. I don't know what this would cost today for space-based interceptors, but I would suggest that it doesn't have to cost substantially more than Starlink.

When you contrast what a commercial process looks like that gets 7,000 spacecraft up on orbit in just over five years with the Pentagon approach, which is not the speed of relevance so much as the speed of constipation, this is why we've got to use commercial processes to get this moving forward.

Next question I've got here is for Trey. Trey, with your background as the director of the MDA and as the deputy there, and deeply involved in these issues from inside and outside of the Pentagon for so long. How do we properly balance MDA and the SDA, which is today putting out contracts and funding the various layers? You mentioned the transport layer, but other layers as well. Structurally, how would you address that?

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

In terms of balancing them, again, MDA and SDA have already partnered together. They were partners on the hypersonic ballistic tracking space system, the HBTSS program. They've already got a track record of being able to partner together.

What I would do is I would more formally codify those ties between MDA, SDA, and SSC, and start establishing even stronger rules of the road, leadership responsibilities, that type of thing. Most importantly, and somebody mentioned this, I don't know if it was Dan or Mark, but the key to this, look, the CubeSats and the satellites, those are commercial off-the-shelf types of capability that we have. The sensors that would be on those, we understand that technology, we have that.

The key piece of this is the glue that puts everything together. That's the artificial intelligence, the machine learning, the C2BMC or C2B4I or whatever you want to call it. That's what's going to be the glue of all of this. That's what's going to make everything operate. That's where you're going to, again, apply some of the more modern technologies. I think that MDA is well-positioned to be able to, again, working with SDA and with SSC to be able to do that.

They're going to have to get together and iron out some of the rules of the road for this. Clearly, look, with the sense of urgency that the president, and that's the one thing, when you have a presidential order to do something, that gives you a lot of leeway in the building

to get things done. Between the three of those organizations with, I think, with MDA to lead, they could actually get this done.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Hey, Trey, just on that point, the competition for the C2BMC, obviously, it's going to come from the Joint Fires Network. It's going to come from stuff they're doing and maybe the CENTCOM and stuff from IBCS. How do you say that MDA should be the one that's the coordinator on the C2BMC?

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

Again, I think that they would be the ones, again, working with SDA and SSC to put out the contracts to be able to allow that to be developed. Because a lot of this, by the way, a lot of this technology, AI and ML, is stuff that's being used today, like in Uber, that we would just take it and adapt it to the environment.

[Mr. Riki Ellison, MDAA Founder and Chairman]

But we're doing that in Ukraine with Uber and a microphone.

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

That's exactly right. In fact, one of the examples I've used in the past is that the GIS RDS system that has been developed by the Ukrainians, that's exactly what we're talking about. Only this would be a space-based application of that.

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

Okay. Next question, Dan, is for you. I'm kind of jealous when I read the start of this question, because it starts by saying, I miss Lieutenant General Karbler and look forward to hearing him speak. Certainly, neither Trey or I got a prelude to a question like that, or Mark. But the question is, will interceptors in space reduce the need for next-generation interceptor? Should MDA revisit re-tipping the current GBIs to reduce the cost and free up resources?

[LTG (Ret) Daniel L. Karbler, Former Commander U.S. Army Space and Missile Defense Command]

Well, first, whoever said that, maybe I owe them money. That's why they missed me so bad.

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

I don't have their name here, but I'm sure that Riki can investigate.

[LTG (Ret) Daniel L. Karbler, Former Commander U.S. Army Space and Missile Defense Command]

The question is a good one, because so often it gets to the notion that the silver bullet interceptor or the platinum sensor, the thing that can do it all. And what we have to remember is, within air missile defense, is that we have got to have a layer defense. That's why the concept of missile defeat is so important. It goes everywhere from left to launch, right? Take it out while it's still on the runway, while it's in the silo, while it's on the pylon, whatever the case is, before it launches, through boost, midcourse, and then terminal

phase. Every one of those parts of that flight trajectory, we've got to be able to address that in a layer defense.

And so, yep, space-based interceptors, especially being able to get after threats as they're in the boost phase and most vulnerable, are important. But next-generation interceptor, we're not going to be able to get everything from space-based interceptors. We might have satellites that are not in the correct orbitology over where the threat has launched from. Those satellites could be off station, whatever the case is. We don't see the launch. So now we've got to be able to have a next-generation interceptor.

As far as what we put on the warheads of the next-generation interceptor, Trey is really the expert. But what I would want to make sure is that we're not fooled by decoys that were able to address multiple reentry vehicles, maneuvering vehicles, or multiple warheads.

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

Trey, would you like to add on?

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

Oh, no, Dan is correct. It would have to be able to sort out warheads from decoys and countermeasures, et cetera, to some degree.

Another way to do it is you kill every credible object that you can discriminate a certain number of those down to credible objects, and you take the rest of those out. Instead of having the rifle bullet that we have today with GBI or with THAAD or PAC or PAC-3, we have to come up with more of the shotgun approach where we have multiple kill vehicles to be able to take out multiple credible objects. That's part of what, you know, one thing we've learned in our program is that it does not take a lot of mass from a kill vehicle interceptor to be lethal. So, these CubeSats can be very lethal against these warhead suites.

And so, we can, and you'd also, you don't have to, this is something else that's important. You don't have to, you don't have to destroy every single missile and have the, you don't have to have the ability to destroy every single missile, everything they throw at you. What you have to have is to be able to take out enough of their attacking force that will put a question in their minds as to whether they will be successful at all.

And that's what's the key behind the strategic deterrent piece of this.

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

You know, sometimes, and I'll just add, supporters of MD are our own worst enemies in the sense of people picking a favorite system and loving that to the exclusion of other systems. Here, the fact is, well, in my view, a space-based interceptor layer makes the ground-based interceptor generic that much more important because anything that gets through SBIs has got to be caught by that next filter. And that filter in mid-courses is going to be our current GBIs and upgraded GBIs, whatever they're called, whenever they show up. And then below that, the next filter could be SM-31B, 2A, or maybe we go back and say, let's turn the 2B program back on, again, that President Obama canceled years ago. But it's not one system

to the exclusion of all others. And that's one of the things that I believe that all supporters of doing what President Trump is trying to achieve here need to keep in mind.

[Mr. Riki Ellison, MDAA Founder and Chairman]

One question here, because you're talking about intercepts in space. You're talking about debris fallout. So we got to understand what that is and what the effects of that is on constellations of current satellites.

And that's the fear. Can you, Dan and Trey, can you address that? Because if we do this, that's real.

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

So, let's, okay, having been a director when we actually shot a satellite out of space in 2008 with the SM-31B out of the Aegis ship, debris is a consideration, but it should not be a paralyzing consideration. And also, there's ways to manage the debris by how you shape the trajectories for intercept so that you can minimize that debris generation. But the other thing that people don't quite realize is that space is a big space. It's a big place. And there's still an awful, awful lot of room there. And again, the last consideration is, I don't think if we're trying to stop a completely consolidated nuclear warhead attack, I mean, a nuclear attack on the United States, I think debris may be probably the least, one of the least of our issues, to be honest with you.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Dan, you got anything on that?

[LTG (Ret) Daniel L. Karbler, Former Commander U.S. Army Space and Missile Defense Command]

Nope. Trey's right. And yeah, the, whatever that downward trajectory, hopefully, and it pushes all that debris in the lower orbit. We intercept at the lower orbit than low Earth orbit and hopefully minimize all the debris pattern follow-up. But that also, that applies though to just any intercepts. It doesn't have to be space. If we're doing intercepts over North America or Canada or populated areas, the planners have got to be, take that all into account.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Because of that Kessler theory, right? That you hit one and the debris just multiplies and multiplies. That, is that the space too big? That, that fits in this argument?

[LTG (Ret) Daniel L. Karbler, Former Commander U.S. Army Space and Missile Defense Command]

It certainly is a consideration. But it's something we take, we do take into account. Planners today figure out where THAAD boosters are going to fall. If we launch THAAD boosters over in the Middle East, we're concerned about where that booster is going to fall. We've got to make sure that it's not going to fall in some populated area.

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

Well if the alternative is a nuclear weapon hitting the United States, I would rather bet on the, you know, the debris in space and deal with that.

[LTG (Ret) Daniel L. Karbler, Former Commander U.S. Army Space and Missile Defense Command]

So it's, it's Riki, it's a great consideration because, and I want to kind of go back to what I talked about in the operational architecture is, is broken into four areas, right? It's not just execution, pushing the button, you know, get a sensor, push the button and shoot something down. But there are planning considerations that have to be linked with, you know, planners across the DOD and civilian agencies. There are command and control responsibilities, such as things like a commander establishing rules of engagement, which would have debris pattern followed as consideration. Then there's the execution. And the last part is sustainment.

All four of those elements have got to go into the architecture so that it's not just, we're not just thinking about one thing, but we truly integrate across all the different disciplines, planning, command and control, execution, and sustainment.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Great. I think we're, we went over time, but it was phenomenal discussion, everyone. I'd like just to go around and just get your final closing remarks on the discussion and the way forward, if you could.

So we'll start with you, Dan, we can start with you.

[LTG (Ret) Daniel L. Karbler, Former Commander U.S. Army Space and Missile Defense Command]

Now there's a lot of back to the future here. When I was a young major at JIAMDO and we were doing work and Trey was the commander or the director of MDA. I remember we talked about this in many different occasions. So the fact that it's, you know, coming around full circle is really important, but you also have a lot of experience now in folks that have, that we've, we've seen this rodeo before and we think we know how to address it. Now it really becomes more of an issue of, Hey, are we going to get the policy to help support it? And are we going to get the budget to help us move forward?

But thanks Riki, for having me on. I appreciate it always.

[Mr. Riki Ellison, MDAA Founder and Chairman]

Thanks Dan. Trey?

[Lt Gen. Henry A. Obering, Former Director Missile Defense Agency]

I'll sum it up very quickly. People ask me, we talked a lot about what's changed technology wise. Well, it's also changed geopolitically and what happened, and Ukraine happened. And you saw Russia doing a lot of nuclear saber rattling during that, during the outset of that conflict. And it really got a lot of America's attention and it turned us, turned them to the government saying, are you protecting us from that kind of threat? So I think that that is part of what has really changed. And then the aggression that we see coming out of China and how they're trying to populate some of their strategic forces.

So there is an urgency here that we have to, that we have to address. The good news is we've got the technology. We've got the resources for God's sakes. I mean, we spent \$30 billion there about to put 44 interceptors in between Alaska and California, \$30 billion. And

we spent over time about \$52 billion on that program. So we're talking about a lot less money now to get 1000 interceptors on orbit combined with our terrestrial capability. So we have the opportunity. We have the resources.

What we need is the will and the leadership to go do this. I think President Trump is providing that. And now the impetus is all the department to show that they can take those orders and move out smartly.

[Mr. Riki Ellison, MDAA Founder and Chairman]
Thank you, Trey. Mitch?

[[Mr. Mitch Kugler, Former Staff Director Subcommittee on International Security & Proliferation Senate Committee on Government Affairs]]

Riki, I would just finish up by saying that the history of the development of MD programs has been about moving in a very deliberate manner to understand exactly what you want the objective system to look like before you really get into the development process and, by and large, to develop towards that objective system.

And you can do that if you want to take a lot of time. There is an alternative available to us here today. And the alternative is to put up what you can put up to give you an initial capability, even if it's only some small fraction or reasonable fraction of what that objective capability will look like, and then just continue to improve that over time. Because when you can go ahead and launch 30, 50, 60 of these satellites at a pop, you can be constantly improving what you've got.

And it would really be a shame if all of us, all supporters of MD, fail to recognize that time always works against us. Trey's point on the threat of China and Russia and others, time works against us. Politically, time works against us. You can never be guaranteed that the next president will support a capability as much as the current one does. And what we're seeing from President Trump in supporting the kind of true next generation capabilities, we have to take advantage of that support now and not screw around with studying this to death for three and a half years.

[Mr. Riki Ellison, MDAA Founder and Chairman]
We're in the perfect moment. This is a historical shift on missile defense. We've got less than 60 days. And as you heard the discussion today, all of you, there are some major issues on the processing, the timing, the politics of this, that this answer may not be good enough for the president. You got to look into this and redo it. Because there are critical things here that have to generationally change in the way we acquire, test, and develop that's being put on the table now. And we've got to take risk. And I think we're right now in that feeling place where we're getting too many people involved with this thing and made it over complex. And I'm afraid that if that goes forward and they get rejected, then another 60 days, another 90 days, you're going to go forward.

So this is a critical time to do this. And I also, I'm going to take a quote. I also believe that this president, this administration is space first. And if you're not first, you're last. And this is going to be a driver on everything on this program.

Great discussion. We covered the breadth of it right now. It was just phenomenal. So I want to thank Trey, Dan, Mark, and Mitch. Just a phenomenal discussion. Thank you.