Mr. Riki Ellison:

Good morning ladies and gentlemen. From the end of the summer, hot humid day here in Alexandria, Virginia. There is excitement in the air. It's Friday night. The NFL opened up last night. We've got a World Cup match that begins with France and New Zealand today. It's an exciting time. Welcome to our 54th Congressional Roundtable. If you can't see it, you can't shoot it and the requirement for an overhead persistent sensor. I'm Riki Ellison. I'm the president and founder of the Missile Defense Advocacy Alliance. Its sole purpose, its only purpose is to educate and advocate for the deployment of missile defense and its evolution as we firmly believe for the betterment of the world, for the betterment of mankind, for the betterment of our nation. Been doing it for 40 years, MDA's been doing it for 20 years. So, today we are focused on an unfulfilled requirement that has been out there across all our COCOMs for a persistent overhead sensor that's resilient, that's survivable, and most of all, that's affordable.

And there is urgency with getting this into our COCOMs, especially US Homeland COCOMs in Guam, which is US Homeland, specifically Guam. And this is a requirement that's been out there for many years, not specific, unanswered. The 2022 Missile Defense Review from our administration today, that is a requirement. In testimony this year, the Commander of NORTHCOM, General Van Herck, "Where is it?" You can say the same with Admiral Aquilino, "Where is it?" And it goes across our COCOM force. And we tend to get focused on the really cool stuff like the hypersonic glide capability, where the proliferation of the threat is coming low, slow, and down below. And that is where our competitors are massing capabilities to do that. And that threat has to be seen, has to be acquired, has to have fire control on that before it gets 25 miles out, which is 100 foot from the sea level is what the terrestrial radars have today.

So, it is a pressing issue, but it is a joint requirement. Let's just think through this a little bit. If you go back in the history of this type of surveillance, you can start it right at World War II in 1942 where we had 89,000 ships go across the Atlantic with balloons that protected them, overhead surveillance. And you go to the forties and fifties when we had to take on the Russians and we had balloons for surveillance. And you can go all the way to the 2000s when our US Army used it for Afghanistan. And today, probably the second country in the world that's getting hit, Israel has got a dirigible up called the Dew that's working that. And in our country, we've got... Our border patrol has balloons up, but our country doesn't.

And so, this has got to come to a movement to get this thing done. And this is where we're trying to educate and advocate for this concept. It's not a specific system. It is a concept that has been asked across the board on it. I've had some opportunity way back in 2000s to be at the Dugway Proving Ground in Utah to see some of those way back when, when this was still a requirement unfulfilled. And we've had our SHIELD program come up and study this problem. It's a challenge. So, today I think we've got a great group here and certainly we want to expose that and explain the best we can on this requirement. So, I'd like to introduce our first speaker today and he's a great one.

He is without doubt, on this specific subject, probably the best in the world, the best in the world. Dan, I'm going to throw that at you. You are the commander of the Army Space and Missile Defense Command for a couple of years, but before that, you were the chief of staff at STRATCOM and before that you were the commander of the Army Test and Evaluation Command, ATEC, which tested this stuff.

And then before that you were the commander of the biggest missile defense group we have in the Army, the 32nd AAMDC. So, you have all those qualifications to bring forward that. Dan's a great one, he's a West Point grad and a Green Bay Packer. So, I want to introduce Dan. It's all yours, sir.

LTG Dan Karbler:

Hey, thanks very much, Riki, and I slightly correct the record because I don't want General Jen Dickinson to think I'm taking credit for commanding the 32nd AAMDC when he in fact commanded it while I was out in INDO-PACOM, commanded the 94th. So, I just want to make sure that he had the 32nd, I had the 94th, which as we know INDO-PACOM is responsible for 52% of the globe. So, we were the majority stakeholder in global missile defense. Hey, thanks very much for giving me the opportunity to talk on this particular subject.

There's just a ton of information that I'd like to share here and I'll do my best to sort through it and I look forward to comments and questions that will come up. So, let me just rewind the tape back to 1995, if you will, 1996. I was a captain. I just wrapped up a job as the aide-de-camp to Major General Costello, he was a Fort Bliss commander. And he sent me down to the Director of the Combat Developments to do requirements work. In 1996, we wrote what was called the AEROSTAT Joint ORD, Operational Requirements Document. And the AEROSTAT Joint ORD, the JORD as we called it, became the genesis for then JLENS, Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System. And the JLENS, as we're familiar with is what was... We tested it extensively at Dugway. We tested it extensively up over the National Capital region there in proximity to Aberdeen Proving Grounds. And as we know, the tether broke and we shut that program down.

Before all of that happened though, after the AEROSTAT Joint ORD, then which became the JLENS operational requirements document, that platform was approved. It was JROC approved. It went through rigorous analysis of alternatives. We worked with the Navy, we worked with the Air Force to find out, "Hey, what is the best capability to give us an elevated sensor that gets us fire control quality data, gets us surveillance capability?" As you said earlier, Riki, it is persistent. It is able to detect map of the earth flying objects that have a very small radar cross-section, be able to integrate and meet requirements for things like integrated fire control, engage on remote, and contribute to a single integrated air picture. And we went through the analysis of alternatives in the run-up before we deployed the JLENS. And we looked at J-Stars, we looked at AWACS, we looked at Hawkeye, we looked at tower based platforms, we looked at the whole host of capabilities that would provide us an elevated sensing capability.

And without a doubt, the JLENS platform was the one that came to the forefront. And so, we tested it. And out of Dugway Proving Ground, it showed phenomenal capability, phenomenal promise, both from the surveillance side and the fire control side. And so, to help explain that too, so there was actually, there was two AEROSTATS. One had a surveillance radar on there, which allowed us to look. Because that JLENS was up at 10,000 to 15,000 feet, it was able to overcome things like curvature of the earth, terrain masking, and it was able to look out pretty far, and I won't talk the ranges here, but look out significantly farther than any ground-based radar could. It was able to look out persistently better than AWACS could or Hawkeye could because it was persistent. AWACS has got to be on orbit, Hawkeye's got to be on orbit.

Plus they have other missions that they needed to be able to do. And that was a surveillance platform. And then we had a second radar, which was the fire control radar, which was on the second balloon. And that was able to provide fire control quality data, meaning it was able to provide the exact enough measurement data on a track that was flying that we could guide a missile launch from any launcher, whether it be Patriot or Aegis BMD, we could launch any missile or off of a fighter and we could launch a missile off. And then that fire control quality radar, after taking a long range surveillance queue, the fire control quality radar was able to then provide that data to the interceptor in affected engagements.

So, in tandem, those two AEROSTATS, surveillance and fire control, provided an incredible elevated sensing capability at high altitudes to be able to look long range, survey fire control, enable us to take advantage of the max kinematic range of our interceptors then too, because again, we weren't beholden to the earth's curvature or any kind of terrain masking limitations that we might have. It enabled to affect those engagements farther out. From an air defense perspective, my mission command is I want max attrition as far forward as possible. When the threats are coming in, whether there are multiple cruise missiles, UAVs, you name it, I want to be able to max attrition as far forward as possible. I don't even want them getting close to my defended area or my defended asset. And again, an elevated sensor allowing me to look out over that battle space farther away, allowing me to help enable long range engagements, the JLENS was a good solution for that. Also, the JLENS allowed us to contribute to what we call engage on remote.

So, traditionally you'll have a launcher, you have an interceptor and it is beholden to its organic radar. So, I'll use Patriot as an example. So, we have Patriot launchers, you have a Patriot radar. The Patriot radar sees a target coming in, it tracks it, it provides fire control quality data, and then we shoot the Patriot missile out at the target, and then it's able to affect the engagement. What the JLENS allows us to do is an engage on remote. So, the JLENS now is, like I said, at 10,000 to 15,000 feet, it's looking out a long, long ways. It is able to provide a fire control quality track to the Patriot interceptor and the Patriot interceptor can go out. No longer is it going to be limited to this terrestrial based Patriot radar, but instead this elevated sensor which is seen much farther away. And again, being able to then take advantage of the max kinematic range of the Patriot interceptors. And in the case of PAC-3 or MSE, we know that those missiles have got pretty good range.

I would say we are trying to... Riki, you had mentioned that it's an unfulfilled requirement. I would say it's a gap in a recognized requirement right now that we have. We are trying to fulfill requirements for our ability to sense. So, let me start at the high level. When we look at the work that MDA is doing with the HBTSS, for example, the intent there is to be able to develop a constellation that will give us fire control quality capabilities so that we can see enemy threats burned to death and then be able to provide fire control quality information down to the effectors or the interceptors across the different services to be able to get at in the case of the HBTSS, hypersonics.

But there's no reason why, I don't see any reason why that air picture that the HBTSSS satellite constellation's providing would not be provided and federated it out to all air missile defense users to take advantage of the air picture, take advantage of the fire control quality information that's being provided to develop a single integrated air picture, then that shooters would be able to take advantage of. We have things like ALPS, SPY-1s and THAAD radars and Patriot radars and TYP-2 et cetera. And HBTSS at that level, that constellation is just going to help improve our situational awareness. And then

if I took it one level up too, we also have OPIR, Overhead Persistent Infrared Radars, which do help us in terms of early warning as soon as we get adversary missile launch, those OPIRs are also being able to detect those launches and be able to provide and contribute to the overall situational awareness in air pictures to our different operation centers.

I want to talk a little bit about defense of Guam too. And the architecture that we are working through right now with the Missile Defense Agency and the services out there, we're working through that architecture. I'm a believer that we should provide an elevated sensing capability to the defense of Guam. We need to be able to provide something that isn't limited, that isn't going to allow curvature of the earth or train masking to impede our ability to look farther out, sense farther out, provide fire control quality information out. Because having an elevated sensor in the defense of Guam, again allows that surveillance to go out, allows fire control quality data to go out, which then will enable longer range integrated fire control. So, imagine if you will, an elevated sensor that's at 10,000 to 15,000 feet providing surveillance and fire control quality data, and I have an Aegis BMD or an F-35. That F-35 could be out in cap.

The Aegis BMD could be out doing its mission. But now because we've got a long range surveillance, long range practical quality radar picture that we're providing, maybe that F-35 takes shots at cruise missiles a long way away, maybe the Aegis BMD is able to take shots farther away. All part of providing a layered air missile defense in the defense of Guam. We don't want to necessarily have to wait until the terrestrial base launches, whether those are Patriot launchers or SM-3, SM-6 that are back on the island. Again, we want max attrition as far forward as possible, and again, in an elevated sensor, capability will allow us to do that. And this is an elevated sensor that is higher than what we could do on a tower mounted sensor. Tower mounted sensors, we have those, we test with those.

We have operations with elevated sensors that are on a tower, but that's just not high... To me, why would we limit ourselves to a 200-foot tower, 300 foot tower when we know and we have the requirement for an elevated sensor at 10,000 to 15,000 feet and we've demonstrated that capability? And the last thing that I'll leave you with too, because we're talking a lot about sensing, which is super important, is I'll give you a Ring doorbell analogy that I like to use. Now, if you have a Ring doorbell and you put that on your front door, it's great because you can watch everything that happens on your front porch and you can watch the UPS person drop off a package. And then Ring doorbells then, a lot of times, we see it on YouTube or whatever, we'll see some thief come and pick up that box off your front porch.

But you know what? Without an interceptor there, without something there to apprehend the suspect, all you did was survey it. So, we have to make sure that when we talk about sensing capabilities, it has got to be tied to some sort of shooter. And my follow onto to the analogy is what I would like is a Ring doorbell and if it sees somebody picking up a package off my front porch to steal it, we have a device that would spray gravy on the dude and then we open up a door and a German Shepherd goes out there and goes ahead and attacks the person on the front porch and then it saves your package from being stolen. So, a little bit of a humorous analogy there, but anyways, just again, that's what I wanted to share with you a little bit. There is a JROC requirement when I was on the joint staff in 2000 working at them called JTAMDO.

I briefed the requirement for the theater, air and missile defense operational architecture to the JROC. And a major piece of that JROC briefing was an elevated sensor because it contributed to the four cornerstones of theater, air and missile defense, which are engaged on remote, integrated fire control, single integrated air picture, and automated battle management aids. 23 years later, those core tenets of the theater air missile defense operational architecture are still there. And it's my belief that we got to get after providing the elevated sensor capability already approved by the JROC and maybe the first place to take a look at putting that would be in the defense of Guam. So, thanks, Riki, for the opportunity to talk and I look forward to the questions. Yeah.

Mr. Riki Ellison:

Dan, I just want to follow up with you. From your perspective, why haven't we got this thing in place? We're spending 6 billion plus to create an architecture. We've had years to study this. What's holding this thing up to go to those next steps to get this thing moving? And then just on a follow onto your doorbell deal, is it viable to have a DE weapon on one of those airships, if you're talking about one shop one deal in the future? But I just want to understand that first problem probably the most for us to understand if it's you've done all this work, you've got the... Why are we still not even close to getting this thing in place?

LTG Dan Karbler:

Yeah, so complicated answer to that. When the JLENS tether broke and it floated out over Pennsylvania, that caused frankly just embarrassment within the Department of Defense and some consternation. And unfortunately we really didn't want to overcome that. And so, we mothballed the program and then we shut it down. And I think that's unfortunate. We often talk about when we're testing and we expect people to fail, we expect that you fail and then you get better. In the instance of the JLENS, the tether failed under extraordinary circumstances, that a bunch of different things align that result in this tether failing, but nonetheless, the requirement was still there. But we were embarrassed about it happening, and so, we shut it down. And if you remember back in those days, there was no shortage of commentary, there was no shortage of people with extra time in their hands to make jokes about it.

And the American public still maintained a sense of humor. But really, it was a good capability, and I will defer to Corky and Ty a little bit, but we test airplanes and jets all the time, and tragically we even lose lives when we test these platforms. But we continue on with it and we continue to test and then field. And for some reason the JLENS, when its test didn't go very well, we shut it down. The defense of Guam gives us an opportunity to revisit the decision there, and include it in the architecture. The second piece is the cost. So, the cost of the JLENS was pretty high, but it was something that was accepted. And again, when we went through the analysis of alternatives, cost is also factored in there. And once you looked at how long it took to keep an AWAC on station or a Hawkeye on station in the crews, et cetera, et cetera, again, the JLENS cost, per hour, was significantly lower than any of the MANDA airframes.

Now, your second part of your question, can we put a DE weapon on that? So, one of the things that we learned as we were going through the requirements process and some of the testing of the JLENS was everybody loves to secure the high ground, to use the SADC model. Everybody loves key terrain, and there was no more key terrain than 10,000 to 15,000 feet above. But as soon as you start trying to put

other things on that platform, you're going to take away from the capability of the radar because it can only be really so big to hold different components on that platform. And so, as soon as you start to want to add a DE weapon on there or an additional COMMS package or a chem-bio detection equipment, I mean, there was a whole bunch of different modules that folks wanted to try to plug in there.

But as soon as you put it on that platform, more and more weight comes on there, so now either the aerostat envelope has to get bigger, or you're going to do a bunch of trades. And instead what we did was we really looked at making this sole purposing. Now, that doesn't say though that the air picture provided by the JLENS or by an elevated sensor couldn't be part of integrated fire control. So, if I have autonomous drones that have a DE system on there that are flying around, there's no reason why that air picture couldn't be provided then into that autonomous drone that's maybe got DE capability to let those drones then use a DE effector on a target. So, hopefully that answers your two questions.

Mr. Riki Ellison:

Yeah, That's great. Just one little more question just for the public to understand LEO, LEO and resiliency of LEO, why those don't work for low and slow down in the lower atmosphere and how you have to have a layered thing all the way down and I guess SDA is doing that or space. So, just educate a little bit.

LTG Dan Karbler:

Yeah, sure. So, that's why it's proliferated. So, you want to have proliferation because we never know exactly where an adversary is going to launch a hypersonic from. It could be from terrain, it could be launched off from a pylon underneath the wing of an aircraft. It could be launched out of a submarine. So, that's why having proliferated LEO of HBTSS is important. And MDA, that's what they're working towards with the Space Development Agency. They've got the first test articles up there that we're doing right now. But again, it's got to be a layered approach.

Oftentimes we will talk about the silver bullet. We want the silver bullet to take care of everything. Well, also, there's no such thing as a silver sensor. Sensors have got different capabilities based on power and energy outputs, and so, if we try to... Going back to my JLENS discussions, if you try to put everything into a sensor, pretty soon it's just not going to be able to do everything. So, that's why we've got to have proliferated LEO, HBTSS, and we've got to have other sensors in the architecture all contributing.

Mr. Riki Ellison:

Thanks. Thank you, Dave. That was great. Ladies and gentlemen, our next speaker, we're going to shift over to the operations of the Air Force. He was the deputy commander of staff for the operations for the US Air Force. He also commanded the Warfare Center at Dallas Airbase. But I'm biased, but I think he's the best F-22 pilot in the world and we are fortunate to have him. Charles Corcoran give us a thought through the Air Force operations and how this fits into that and the new requirements going forward.

Maj Gen (Ret.) Charles "Corky" Corcoran:

Thanks for the kind intro, Riki. Thanks to the other panelists. I'm going to pick up right where General Karbler left off because those are fantastic comments and I want to hit on specifically the max attrition

as far forward as possible. I love that. And if I could add more to that, I would say preserve commander's decision space. So, if you want to talk about this from the operational perspective, Riki, you mentioned requirements earlier and this goes back 20-30 years. If you want to really elevate that discussion, you'd say, "Well, requirements for commanders to have SA goes back to the documented history of military."

Every military is looking for that recon, looking for that SA, what's out there, what's beyond the horizon. And so, that has not changed. And once balloons came along and then power, and then spacecraft, that allowed commanders to see farther out and that gave them the ability to have attrition further forward, to preserve decision space, know what's going on. Today, we're talking about joint all-domain command control and we're saying sense, make sense, act. It all starts there and you can't do that if you don't know what the heck's going on. So, that's what the operational commanders are screaming for. And so, if you look at the COCOMs around the world and how they're dealing with this right now, let's start with the homeland. And I'm going to use the word criminal. It's criminal that we don't have the capability to surveil what's coming at the homeland to identify it and to track it and if necessary, engage it as far away as possible. We saw this with the Chinese balloon, and how could we not know? How could we not know?

General VanHerck is held responsible, held accountable for defending NORTHCOM's AOR, and he does not have the ability to sense, make sense, and then act because we have to deal with something as simple as this elevated sensor. Admiral Aquilino and General Cavoli wants SA he said, "Go around all the CO COMMS." So, what are the operational commanders have to do? Since we haven't put this in place, this persistent affordable capability, they have to burn our high-end expeditionary assets. So, there's a fight, but we have 31 AWAC in the United States Air Force. At any given time, only about 40% are flyable. Everybody wants every COCOMM. Why? Because we haven't put in place the more affordable capability we're talking about. So, General VanHerk's keeps up those sorties here at the homeland when Russia flies two U-95 near the coast or when the presidents travel somewhere and he's responsible for surveilling that area. Instead of having in place, in our homeland, where we control the territory having to place these sensors, we're having to use the expeditionary sensors that Aquilino and Cavoli and others need.

Meanwhile, you go over to General Cavoli's AOR. He's got to deal with a potential Russian cruise missile threat to the NATO. What are we doing there? We've sent AWACS over there, some of the few AWACS we have, we've got F-22s over there, F-35s, we're burning those airplanes up, flying them left and right. We're taking E-2s out of the carrier, air wings, and so stripping that important air wing from its capability and then burning sorties there. All this could be done in a much more affordable fashion, a much more persistent fashion if we simply leverage the capabilities that General Karbler was talking about, him and his teams worked so hard to develop over the last several years. If we do that, then we preserve the readiness of the systems and the readiness of the individuals who operate the systems for a potential high end fight.

And I'll add on because I don't want to keep rambling because we're running short on time, there's also a deterrent effect here. If the bad guys know that you can see what they're doing, what you're sending their way, that they're going to be held accountable, then I think that makes them think twice before they actually launch something. I'll take this even to the narcotics. There was a counter-narcotics fight. There was an article that came out this morning, the US marines are taking a page out of a narcotic

trafficker's playbook and building a low profile unmanned resupply vessels. How do you track those? Elevated sensors. And so, we have got to get after this, we've got to get after it now. There's no excuse for not doing it on our home turf here. There's no excuse for, not in Guam, is our home turf like you said. There's also no excuse for not helping our allies do it because again, if our allies have these capabilities, then again we preserve the high-end manned aircraft for expeditionary operations should a fight occur. I'll stop there.

Mr. Riki Ellison:

Thanks, Cork. Can you talk to... Because it somewhat seems like the E-7's the be all end all answer to that. Can you talk to that? Can you talk to the overhead horizon radar that we're putting six of those things in? Can you talk to the terrestrial answers possibly to this balloon and from your perspective, why haven't... I mean, these are solid arguments. Why hasn't this thing just made in place? So, that's-

Maj Gen (Ret.) Charles "Corky" Corcoran:

First off, layered approach, what General Karbler said. So, there's no one single answer. We need to get after all the things you're talking about. E-7, if we're all thinking alike, we're not thinking. We're just thinking E-7's going to replace the E-3 and that'll make everybody happy. Again, we're going to be burning an expensive manned asset that doesn't have the persistence of something like the JLENS or light capability.

So, the E-7 should be preserved for expeditionary operations. We shouldn't have to use an E-7. I mean, you could use it on a case by case basis here and there, but you should be able to know what's going on in your own neighborhood without having to get manned assets airborne. Over the horizon radars are great. We're investing in those, but that's a surveillance capability. That helps with the decision space. I know something's coming at me, but it's not a fire control quality track, so that I can then squirt the gravy on that guy and send the German Shepherd after, him as General Karbler said. Why haven't we done this? I can't answer that. I just retired from that five-sided building. If I knew how to solve that problem, I'd be a rich man.

Mr. Riki Ellison:

Would you think it's an Air Force mission since it's in that domain, or is it an Army mission just throwing that or is it truly joint? And if it's truly joint, are we going to be able to fund?

Maj Gen (Ret.) Charles "Corky" Corcoran:

The end user is joint, the combat command is joint, I really have no... I don't care which service takes us on, but we should be able to surveil our own territory-

Mr. Riki Ellison:

Absolutely.

Maj Gen (Ret.) Charles "Corky" Corcoran:

... persistently in an affordable fashion, as taxpayers, we should be demanding it. Congress should be demanding and we should get after this yesterday.

Mr. Riki Ellison:

Thank you. Thank you. Okay. We have our next presenter, Ty Thomas, who was the former deputy commander for Pacific Air Forces. He's been a brilliant mind and he's in the right place to give us a strategic thought on the program and where we're going and we'd love to hear your opinion. Thanks, Ty.

Lt Gen (Ret.) Jon "Ty" Thomas:

Okay, thanks. Good morning, Riki and General Karbler and Corky, great to join you on the panel here and this is an awesome topic to go over and I'll start with pivoting off what you guys mentioned. We may have a listener out there that's saying, "Well, it's just not that simple. This is really complex technology and there's a huge architecture that's got to fit in and all that." And I'll concede that some of the technology may be complicated, but the principle, we all got to understand this is very simple. This is a layer in our sensing that's then going to enable the rest of our integrated air missile defenses to be so much more effective. And in the absence of it, we absolutely have a hole in our swing. And we know that this can work because General Karbler worked on the very program. It did work.

Yeah, okay, so there was a tether that failed, but the technology itself worked then and it's even better now. Are our sensors better now 15 years later? Yeah, I think so. And so, this can be done and the requirement for it is incredibly simple. Just to maybe add a little bit to what we said and introduce a few additional thoughts before we go to questions, Riki. What I heard and fully agree with is there's really about five requirements that go into this. We talked quite a bit about the first three. So, you need an element of persistence, okay? You have to be there, you have to see there. You have to consistently be able to do that. Second, you got to be able to do both surveillance and then also pass fire and quality tracks and the sensor, maybe a different sensor on the same platform to do the same thing.

The third is ability to communicate as Dan mentioned. If you want to be able to do launch on remote, you got to be able to pass a good track and you got the comp system to do it. But two, that we haven't really talked about, and this gets to Corky, your comments also about the almost abominable state of the fact that General VanHerck as the NORTHCOM commander can't see the approaches to the continental United States is relocatable. And my point there is that even if we want to economize some in the acquisition or procurement of this capability, we might be able to do that and it's by the virtue of the fact that we select a system that's relocatable. So, let's say that we don't have a reason to be concerned in Europe and we need to concentrate some more assets from the homeland or for the second island chain in the Indo-Pacific.

So, whatever system we choose that can be relocatable gives us that opportunity. We may or may not want to be able to use it, but I believe that the system needs to have some relocatability. That may suggest that airships may be a better opportunity than a tethered system, but it certainly is something that we should look at even within the NORTHCOM AO, maybe this is a Russian threat and we need to be more focused on the East coast. It doesn't mean that Russia isn't a Pacific power as well, but if you get the point that relocatability gives commanders options to see over the horizon as Corky pointed out,

that they need for that decision space with more mass and more capability than if they were fixed systems. And the last one we didn't talk about, but survivability is really important.

And some might go, "What, a tethered system? How could that possibly be survivable or how could an airship be survivable in the environment in which it needs to operate?" So, the second island chain is not the first island chain. There are plenty of air-to-surface and surface-to-surface threats to the second island chain. There aren't that many air-to-air threats to the second island chain. So, an airship or a tethered system probably is survivable in the second island chain. Far enough back it's probably survivable in Europe as well and certainly those things are going to be survivable over the continental United States and Alaska. So, it's an important factor, but it's not a limiting factor as long as we understand the environment in which they're to be used. So, I think those five qualities are particularly important. Corky kind of ran through the alternatives, but I'm sure some of the audience are thinking through the alternatives.

What I'll add to that is that we need systems like the E-7, the E-2, or the E-3 to be able to be forward. Particularly, I'll just use the Pacific fight as the example. Our best cruise missile defense of the second island chain is stopping the H-6 bomber from ever getting into a launch basket for the CJ-20 missile. We stop that, we just cut the threat to the second island chain by more than half. Guess who's going to identify those targets for our fighters that are forward in defensive counter air caps, the E-7, the E-3, or the E-2 in conjunction with the Carrier Striker, that is where we need them. Those are limited assets. They're highly relocatable because they're moving at jet speeds and that's exactly what we need them to be able to do. So, that's where those systems belong.

They have exquisite capabilities, especially the E-7. That's what we need in that environment too because there's going to be massive electronic warfare going on and that's not going to be happening near as much far back where we need this overhead persistent sensor associated with defense integrated air missile defense of the second island chain. So, that's also an important distinction about why you need those high-end sensors out forward. Space, General Karbler brought up, Dan brought up about space. Really, really important that anything we put up there that's got the ability to feed in surveillance and even track quality data, contributes. However, as we talked about, it's got to be layered because persistence from the space domain is going to require large constellations.

Large constellations equate to cost. We may still pay that bill because that may be the only way to get after some of the targets that we're talking about, hypersonics in particular. However, there's still vulnerability in the lower earth orbit. I mean, it will only take a few firecrackers that go off in low earth orbit and all of a sudden everything that we have in low earth orbit is a risk. So, we've got to be able to back up that capability with something that's in the air domain and it's looking out at the ranges that we're talking about. So, we need to... To the silver bullet, there isn't one and we've got to have the layers and the air provides a huge portion of it.

Yeah. I'll close with, Riki, a bit of an answer to your question also that you posed earlier to Dan, which is why haven't we fielded it? I'll challenge our own defense community. We have about a 15-second attention span on the discussion about JLENS. "Oh, it broke its tether. It flew off into defensive. Why would we ever want to do that again? That was silly. Next topic." We have to actually be a little bit more willing to examine the discussion and go, "There was a lot that was gained out of that and it is now 15

years later and we really need to be able to have a deep conversation about it." I know that the CRT is an attempt to do that. And on the idea of hanging additional stuff on there, Riki, let's try to keep it as simple as possible.

The technology is somewhat complicated as it is. The principle is not complicated at all. But I think the first thing we should do is get up there, prove it, show that we can do all of the things associated with launch on remote, passing along, extending the capability systems that we got. Everybody's going to go, "Oh my gosh, look what we just did. Look what capability we just added to our system." And then they'll be asking, "Why didn't we get 20 of them last year?" Good place to be in, a little bit ridiculous of a discussion, but that's where I hope we're at in a few years from now. So, hope that helps. This is a great conversation and looking forward to questions. Over.

Mr. Riki Ellison:

Thanks, Ty.

LTG Dan Karbler:

Hey, Riki. Yeah, if I could, I just want to answer one of Ty's... So, one of the requirements, Ty, too with the JLENS was a mobile mooring station, recognizing that it needed to be relocatable. Now, it's not a shoot on the move kind of capability, but it was the mobile mooring station designed specifically to make sure that this was relocatable. And then another piece too that I failed to mention as part of the requirements was the robust combat ID that that elevated sensor is able to provide to be able to give the JFAC and the area defense commander confidence as we talk about max attrition as far forward as possible and joint engagement zones, weapons free zones, whatever measures that we put in place, the robust combat ID that the elevated sensor was able to provide them.

And then maybe last thing before we go to QnA, given how far we've come with sensor technology and the improvements there, given where we're at with balloon station keeping for example, and the ability to keep a constellation of balloons in an area, given AI, given what the commercial industry has done, this solution doesn't necessarily have to be the son of JLENS either. I think there are opportunities out there to explore other capabilities to meet that elevated sensor requirement again for improved surveillance and fire control range. Thanks.

Mr. Riki Ellison:

Dan, I want to just follow up with you. When you were doing the JLENS, did you have an exercise for the East coast or for the United States or for Guam? Did you position that and has it been tested for those regions to do that? Or can you go into that if that did happen and what perhaps is the architecture if you were going to go JLENS for the homeland in the US?

LTG Dan Karbler:

Yeah, so we did extensive testing at White Sands, Dugway, and then it was on station for quite a bit out in the Aberdeen area. And multiple different types of scenarios were run, both with the live JLENS with the live air set, but also as part of the Nimble fire series that we did at JIAMDO out in the Virtual Warfare

Center just so we'd explore different concepts in different scenarios with the capability. So, again, a robust amount of data went into this as part of the AOA and then as part of getting the overall approval from the JROC.

Mr. Riki Ellison:

Thanks, Dan. Okay. One more question before we go in. Ty, the same thing with MEO, right? If that LEO layer is susceptible for resilience and survivability, we also need to go to that next level, which I don't think we're at yet with the MEO level to be able to look down as well and integrate into that layer of defense.

Lt Gen (Ret.) Jon "Ty" Thomas:

Yeah. Well, I mean, but remember, the further you move away, the more you have R Squared working against you. This is reflected energy, you got to send it down, it's got to bounce off, you've got to detect it. And so, I mean, even LEO has that problem. You're scaling quite a bit. You're in the sweet spot almost with a system that's at 30,000 to 60,000 feet. You can see out at the range that you need to, you can put enough energy against the target that you're trying to see and get it back. That is a lot harder for orbit, not impossible, but definitely I think it's got to be low Earth orbit, otherwise you're just too far out.

Mr. Riki Ellison:

And just clarify, is being able to self defend itself, like Dan said, because it can get aircraft up there in front, it can early warn to protect itself. So, it's not like a standing blunt that doesn't have an ability to self defend itself in the practical terms that people can understand.

Lt Gen (Ret.) Jon "Ty" Thomas:

Yeah. There's no place for these in the first island chain. I don't see that. It'd be a lot harder to close that case, but definitely in the second island chain and Homeland Defense, it's almost a no-brainer.

Mr. Riki Ellison:

All right, well, thank you. We're going to have our Board of Advisors, Dave Shank, former 10th AAMDC Commander opened up the questions today for the group.

COL (Ret.) Dave Shank:

Okay. Hey, thanks, Riki, and thanks for having me. I think we've got time for probably two questions and then remaining five minutes for closing comments and then back to you, Riki. And really what I have is I wouldn't call them softballs, but I'd like to lob them out there and maybe get some feedback from each of you. I've got two questions identified. We heard a number of terms mentioned: layered, networked, Corky mentioned commander's decision, General Karbler mentioned max attrition as far forward as possible. And I want to go back to the Ring doorbell analogy of General Karbler and you talked about that sensing of this type of capability or detection. No matter how you look at the process, detect, track ID, defeat, and then assess, how do you see these overhead persistent sensors? You talked a little bit

about space, but how do you see them communicating with space objects and each other? So, tying it into an overarching layered and networked architecture.

LTG Dan Karbler:

Yeah, sure. So, thanks, Dave. So, if you have the HBTSS for example, as MDA goes to develop, I would foresee that tying into C2BMC. And right now as we're developing different service requirements, recognizing the C2BMC is really the backbone for our global missile defense architecture. We've got to make sure that we tie into C2BMC, and from the Army side we recognize that requirement as we are going forward on things like IBCS. Over.

Maj Gen (Ret.) Charles "Corky" Corcoran:

Dave, I'll piggyback on that as well just as we need layered sensors, we need layered comms. So, I am fairly certain that proliferated LEO constellation is going to have more than one path to get data to the terrestrial and air systems. So, we've got to have multiple paths to give us resiliency and redundancy.

Lt Gen (Ret.) Jon "Ty" Thomas:

Dave, the only thing I would add is, I mean, if you think through the architecture, cognitively, maybe most of us, and I certainly was... Well, we want to have these sensors in the vicinity of the defended area. So, let's just use the second island chain as an example. But actually if we position them even further forward, maybe even so far forward that they're still outside any threat to the sensor itself on the platform, in this case it needs to be an airship or a balloon. But the advantages of them being further forward, you may not be able to communicate the line of sight with the defended area, but then you would go through the space layer that you're talking about. So, SDA tranche one or whatever where the platform with the sensor on it talks up, in the lower earth orbit it talks lateral, and then it comes down to the commanders and the effectors that are on a piece of terra firma somewhere on a ship. That could also be an important linkage in how you lay out this architecture. Over.

COL (Ret.) Dave Shank:

Okay, thanks gentlemen. And not a question, but just a point I wanted to make and something to think about based on the history that General Karbler laid out about the then Dugway Aberdeen Proving Grounds versus the now and the change of conditions from the nineties to the early 2000s to today. Just wanted to lay that out. Second question, and I think probably the last question again. And I want to stay on the topic of the virtual here. Can't see it, can't shoot it, and somewhat rudimentary, but I even espouse that one, you got to see it, you got to talk about it. So, meaning you got to share that information with those who either need to know or have a capability to do something about it. And then the third point is to do something about it. And I say all that, two of you, maybe all three of you mentioned allies at some point in your comments and you've all three served Forward and assigned responsibilities at the theater level.

And so, you recognize the challenges with allies and partner nations, but more specifically policy and authorities. Just like to hear a few comments from each of you based on how do you get beyond that

policy and authorities. And I'll use a quick example, right now, Counter UAS. If you have a Forward location, which is US soil in another country, once you leave that fence line, you're no longer on US soil. So, some challenges that exist there within that capacity of Counter UAS. So, I'll open that up for each of you to provide comment.

LTG Dan Karbler:

Sure, Dave, I'll lead off. The MDR, Riki talked about it, it recognizes the need to share information with our allies. We're not going to do this fight by ourselves. You've heard me say before that integrated air missile defense is a joint multinational team sport. And I would tell you that the data sharing authorities and the data sharing that's going on right now is significantly improved in the past three to four years. I'm not going to get any operational details of it, but we've leveraged what the MDR told us to do. We've leveraged what policy has allowed us to do and we're moving out. And some of that data sharing, it might not be as technologically... We might not be snap linking all the electrons together. Sometimes the data sharing is going to be a little bit more swivel chair working out of the same ops center together.

But nonetheless, we're data sharing and we are doing some of the technological data sharing. And then the last piece I'll leave with is with my JFCC IMD responsibility, we sponsor the Nimble Titan campaign where we have all countries that face a air missile defense threat. We're not just talking NATO, we're not just talking to the Middle East, we're not just talking about INDOPACOM, but everybody together participates in that Nimble Titan series. And when we get after TTX is we get after developing TTPs, policy procedures, et cetera. Again, that's part of data and information sharing and that's been a great effort and we continue to move out with the Nimble Titan. Over.

Mr. Riki Ellison:

Dave, I just want to comment on that. Dan, if we had this in Ukraine right now, if we had this capability, how significant would've that been to reduce the stuff coming in? I know they may have some, but I'm just saying this is unbelievable on if you could have that asset in something like that, is that viable in terms of effect of it, it would've had in this war?

LTG Dan Karbler:

Yeah, I'm not going to... I can't really speak to the hypothetical there not being on the ground there in Ukraine, but I would just go back to my earlier comments that elevated sensors bring goodness to the battlefield. It gives commanders decision battle space. As Corky was talking about, it gives us extended range, it gives us extended combat ID. So, an elevated sensor is going to help the commander's overall situational awareness in operations.

Maj Gen (Ret.) Charles "Corky" Corcoran:

I'll piggyback on that. Go ahead, Ty.

Lt Gen (Ret.) Jon "Ty" Thomas:

Okay. Just real quick, Corky. I mean, Dave, on the answer to your question, I think first is many of these areas we're going to have to be able to operate from the ally or partner's territory that we're defending. And so, it's likely that they would be quite interested in sharing the data and it should be a reasonable response back to us to be willing to share the data considering that we're helping defend their sovereign territory. Australia, perfect example in the Indo-Pacific. Second is that I think it's worth bearing in mind that this is a discussion about defense, not offense. Everybody is usually much more sensitive about information related to how we are able to target an opponent's capabilities and look deep and so on and so forth.

This we are not talking about. Instead, we're talking about characterization of objects in the air domain such that defensive engagement could occur through a variety of effectors as well as just simply awareness and so that a sovereign nation can understand what's going on in its sovereign airspace. So, I think those factors make it a lot easier to share. And I agree with General Karbler. We've made a lot of progress, particularly in the last five years about sifting through the things that were impediments. We're not perfect by any means, but we're better than we were a while ago and I think we can continue that trend. Over. Corky.

Maj Gen (Ret.) Charles "Corky" Corcoran:

Yeah, I'll just piggyback on what you said there, Ty. We share spaces with a lot of our partners UCUAE is an example where I'll offer air brace. They have people, we have people. A year and a half, two years ago, a lot of things were flying at them from Yemen and what did they ask us for? F-22's and AWACS. And I guarantee you if we had equipped them with some sort of elevated sensor, they would've happily shared information with us about what was flying towards the country and towards that airbase, so that we could jointly defend our people and their people along the ground there. So, I think it's a bit of a no-brainer from a defensive perspective like Ty is saying, and the actual threats throwing things at you tend to open up the policy options.

Mr. Riki Ellison:

Let's go around for closing comments. It's been a great discussion. It's been awesome. So, let's pass it around. And Dave, if you can start if you'd like, and we'll just go around.

COL (Ret.) Dave Shank:

No, I'll defer to the three panel members.

Mr. Riki Ellison:

Okay.

COL (Ret.) Dave Shank:

But what a great discussion to mention. Thanks, Riki.

Mr. Riki Ellison:

Corky, do you want to go?

Maj Gen (Ret.) Charles "Corky" Corcoran:

Yeah, absolutely. Persistent forward deployed elevated survivable sensors, are an arrow we need in our equip, we got to have, it's got to be part of our approach, preserve that commander's decision space, a trip as far forward as possible, as General Karbler was saying, we need to get after this yesterday as a mission. Thank you.

Mr. Riki Ellison:

Ty?

Lt Gen (Ret.) Jon "Ty" Thomas:

Yeah. If you're out there listening and you agree with us, then probably the only question in your mind is, "Why aren't we doing this?" And it gets difficult, so let's get after it. I mean, if you're part of the policy community, let's start pushing on the policy side. If you're on the resourcing community, let's figure out how we're going to resource this thing. And if you're one of the services, let's not argue about who's going to do it, let's just figure out how to do it. We can sort the rest of it out afterwards. This is an expeditionary capability that could apply to the homeland, but we've got to have it, so let's do this. Over.

Mr. Riki Ellison:

Dan.

LTG Dan Karbler:

Hey, thanks, Riki. Nothing I can really add to what Corky and Ty mentioned. But again, since 1995, I've been involved in this from the inception of a requirement to testing it to where we're at today. And so, the opportunity to discuss it is... I really appreciate that. And I'll just close with go, Pack, go, Riki. Thanks.

Mr. Riki Ellison:

Thanks, Dan. Hey, two things, the open architecture with our allies is huge. This could be the linker both in the Pacific, being able to share some of that information we would get from an elevated sensor. It's a non-controversial one, not a shooter thing. This is doable across our whole domains, but this type of information we have to lead. And that's the key here. We have to lead. And there's no better platform, I think the American public...

This is not an offensive system. This is a defensive system that protects their nation. There's no way. I mean, the public is 100% behind this. It's ridiculous that we do not have this. We're spending 6 billion on Guam without this. We're open in our borders here. It's coming. It's got to come. We're going to keep pushing that to move forward. But what a great discussion, thank you for your candor, thank you for contributing. It's there, it's real, it's been there. As Dan says, since 95. You guys have really helped, I

think, educate our public on why this is a requirement and why this has to be done. So, thank you very much. Go, Niners.