Virtual CRT Riding Shotgun Death Valley to Gold Rush

[Riki Ellison]
Good afternoon, ladies and gentlemen, from a muggy spring day here in Alexandria, Virginia. I'm Riki Ellison. I'm the founder and chairman of the Missile Defense Advocacy Alliance. Our mission is pure and has been with us since 1980.

We are all about putting missile defenses in place, developing them, deploying them, evolving them to make our nation safer and the world a safer place. And there's absolutely no question what is happening and how important these systems are today. We were with the United Arab Emirates two days ago, and they are taking the brunt of the Iran missile and drone strikes.

Sixty percent of all Iran's strikes on all the GCC and Israel are going into UAE. And we've been there with them years and years ago when their IMD Center, THAAD batteries, their THAADs are performing outstanding, their Patriots are performing outstanding, and they have had a 92 percent success rate on the kill rate. We also know that we still have challenges with the drones, the Shahed drones, which is natural here, but that is where we, as a world and as a missile defense advocacy, need to fill that gap, all gaps, but that gap needs to be filled with urgency.

This is our 96th Congressional Roundtable, and it's a fun one. This is Riding Shotgun, from Death Valley to the Gold Rush. So, we're going to cover that ride, Gold Rush, Golden Dome, and how that process is today, how we can make it better, quicker, more urgent for the warfighter and provide the warfighter and nations, because nations buy a lot of the missile defense from our country, as we've been ahead of it on that.

So, today, you know, when you create championship teams, you create world championship teams, everybody kind of thinks that it's all about milk and cookie and having the right personalities, and everybody kumbaya. It's not. You have to have superstars. You have to have a couple, Bill Walsh always says, with a team of 52, you only need two of them, two or three, because you get more than that, you have some issues with the whole team, but you have to have one, and I'm so excited that we have one that's speaking to us today, and that is Shotgun Browning.

And I just want to express how I ran into Shotgun, because in Ukraine, they came to me about three years ago, with this instrument, which is an acoustic microphone. And it was phenomenal, and there are now, you know, 15,000, 20,000 of these all over Ukraine, all over their borders, all around their defended areas that are tracking class three Shaheds and intercepting them with automation with 30 mm and 50 cal.

So when I brought this, or they came to me, I brought this directly to the three combatant commanders, starting with USAFE General to present that, and they said to me, “Riki, you've got to go see Shotgun.” And I took it to NORTHCOM Combatant Command, and the warfighter was Glen, and he said, “Riki, take it to Shotgun.” And I went all the way to the Indo-Pacific, and “Riki, take it to Shotgun.”

So that tells you something, that's our warfighters at the highest levels, you know, one guy in the department, in R&E, and he'll explain his position to go to bring this. So that's how I met Shotgun. And just phenomenal, energetic, I won't say exotic, but I kind of get to, he is something special.

And he took that and ran with it. And we put it in our testing cycles throughout our country. And we got, obviously, NATO to purchase all those things for Ukraine.

They are desperately needed in Europe, but also in the Middle East. But I'd like just to introduce Shotgun here and let him introduce himself to all of us. So Shotgun, and please start off with why are you called Shotgun?

[Tom Browning]
Hey, Riki, actually, I'm going to start off a little differently, just to say thank you for two things. You talk about, you know, superstars make amazing teams, and you have an amazing collection already on your board of directors. And the opportunity to join that family, join MDAA and be on that absolute team of superstars is something I'm really humbled to be part of.

You know, like every good call sign, my call sign is based in my own personal buffoonery. And, you know, when you, in the F-15, we call using the gun the sport of kings. And so when I was a young F-15 pilot, I was on a mission and ended up killing—you know, the end result is it didn't occur—but in training, killing an F-16 and F-18 both with the gun.

And what you learn with a gun is if you get all excited, and you're pulling on the trigger, you tend to spray bullets all over the place. So on the ground, I was so happy that I killed two different airplanes in this very complex engagement using the gun and using the sport of kings, only to find out that I had used all 940 rounds well before the first guy was dead. And one of my seniors who was pretty upset with how badly I did it said, “why do we give you a gun that even shoot one bullet at a time? We ought to just, you know, put a shotgun on the end of your airplane. You pull the trigger once, 940 rounds come out,” and somebody else laughed and they said, “Browning Shotgun,” and the rest is history. And I got good.

So, you know, it was all about learning about what you need to work on. And yeah, so it goes without saying, you know, the standard, how do you know someone's a fighter pilot? Wait five minutes and they'll tell you.

I started out in the F-15, and I want to just touch on a few career path points that I think are pertinent to the discussion. 1995, we had issues with the diminishing manufacturer supply on some of our electronic attack capabilities in the F-15. And that resulted in a call to industry to replace that system.

When I retired in 2015, we had not replaced that system. And this was, I think, a real early indication of the speed of industry and the speed of software development that just grossly outpaced. So what we ran in 20 years is, oh my gosh, this is the greatest idea. We finally have a new system. Wait, someone just came out with something. Pause. Let's try to do that. Wait, there's a new idea, a new capability. Pause.

And the end result is we went 20 years without that enhanced capability. Later on, I've had the opportunity of flying, honestly, the best F-15s in the inventory up in Alaska. F-15s that were modified to integrate an active electronically scanned array radar.

So way, way, way better radar. And what was really important to me on that side was, had we taken the radar and only used it, and it was for cruise missile defense, and had we only used it for that, it would have been insanely wasteful for the taxpayer. And the reality is, is we got this new cutting edge technology and used it.

When the user actually got out there and used it, we came up with amazing new tactics, techniques, procedures, new ways of enhancing every aspect of aviation based on this cutting edge technology that worked into capabilities within the F-22 and the F-35. Two other service data points real quick. I had the opportunity to be the commander of NORAD's exec on 9-1-1.

So I was in Cheyenne Mountain on 9-1-1. We had well less than 50% of the nation covered with radars. And I'm just talking the border, not even interior.

We had 14 fighters with heat-seeking missiles on alert. That was national defense. That was it. That was everything. Now, we did a Herculean job, amazing work across everybody. But it showed how amazingly naked we were as a nation with respect to defending against any sort of problem.

And at the time, it wasn't that big a deal because there weren't UAVs with thousand mile ranges and capabilities that you could buy off the shelf that could do damage. So it was a different era, but it showed me the desperate need for what MDAA is doing. And then forward that to me being the vice commander of Air Forces in Iraq and watching a really low-tech adversary, the Iranian-backed militias, launching at our soldiers and airmen and Marines and sailors.

And unfortunately, getting lucky a couple of times because pretty much our defense on base was go hide in a bunker. So leaving uniform, I had an amazing opportunity to join the Defense Advanced Research Projects Agency, DARPA. And I got to stand up a really unique office called ACO to execute an activity called Assault Breaker 2.

And Assault Breaker 2, the foundation of it is very classified activity, but the foundation was we are getting to a point where it is really challenging to deter large adversaries short of saying, if you don't stop that, I will nuke you. And so the concept was how do we change the way we present forces to keep our adversaries thinking and keep them believing that we have the best conventional force on earth and we have the ability to apply that. Throughout Assault Breaker 2, we had the opportunity to kind of look at a clean slate across DOD and how DOD uptakes technology.

And we walked into a lot of, and we will touch these, I know, as we are talking, Riki, but we walked into a lot of really insane problems and highlighted some of the challenges with transitioning technology. And the final step in this journey is Heidi Shyu, the Undersecretary of Defense for Research Engineering in the last administration, saw this challenge and elected to stand up a new Assistant Secretary of Defense for what we called mission capabilities, which was partnering with the technologists, partnering with acquisition,

partnering with the joint staff to figure out how we can accelerate integrating new technologies to advance our conventional forces.

[Riki Ellison]
Okay. I want to give you a couple of compliments too, sir, because, you know, you were looked at very seriously to help with the Golden Dome. So that's an acknowledgement that, of the qualities that you have to do that. So thank you, Shotgun.

Before I get going, we have a new guest here that I want to introduce to everybody. He's our new MDAA Director of Academic Programs, Studies and Analysis, Ron Christman. And we brought him on board to win.

Another player, another great player with us. He's got 39 years of experience in a wide range of senior analytic and management positions with Defense Intelligence Enterprise and Department of Defense, including experience in the planning program, budgeting and execution. He has 15 years of sustained experience mastering intelligence knowledge on all foreign missile forces worldwide, the support of operational planning, target system analysis, long-term defense resourcing, investment decisions, allied and multinational staff talks, and deliberations in missile defense agency, the combatant command, the joint staff, congressional and service-specific forms.

He has six years of sustained experience in multiple U.S. nuclear command control and communications, NC3, enterprise lines of effort, operational planning assessment, concept of operations development, program of record prioritization and oversight, and the defense acquisition system. But most of all, he's an original USC SHIELD graduate of our program and his capstone project, which is so relevant, then and it is now, Accelerating Solutions to Defend Against Hypersonic Threats.

But he's going to be with us. He's with us, but he's going to be with this conversation. But I'm going to draw it back to Tom, to Shotgun.

Let's just start off, I think. Shotgun, what is the process to bring a system that's not a program of record into the building and to make it what the warfighter, at the end of the day, give to the warfighter? From the exotic capabilities all the way down to the non-exotic capabilities, what is that process and the evaluation of it to go all the way through?

Can you just explain to everybody how you can put a product that you've got through the process to make it a program of record for our COCOMs to use?

[Tom Browning]
Sure. I will try. So let me throw a caveat up front because this will be important across our conversation, I think.

And that is, there have been a lot of changes on both requirements and acquisition, a lot of opportunities for change within the current administration. So things are evolving, things are changing. And frankly, over the last 12 months, things have changed that I'm not even aware of.

So assume everything I'm saying right now is as of when I left government about 18 months ago. And all of the problems still exist. There's some really good work ongoing to try to address those problems.

But foundationally, we start with foundational science. And in DOD, there are both – and it gets confusing because there are terms about the readiness of a technology. We call it TRL, Technological Readiness Level.

And then money for how we spend money is actually divided into sections based on the maturity of a technology. But foundationally, whether it is a service, whether it is an ally, whether it is an industry partner, whether it is my heart and soul, DARPA, there are individuals who are seeing warfighting problems and working on new and exciting technologies in hopes that those technologies might make us better, stronger, faster, cheaper.

[Riki Ellison]
So, Shotgun, just to start, do you have to get requirements from the warfighter to start this process to do this, or is that in addition to this? And again, those requirements are obviously way over the top and have slowed everything down.

[Tom Browning]
Great question. And the answer is no. In fact, I would argue – and I'm not speaking for DARPA, I'm speaking as an alum – but one of the things that DARPA points out is DARPA doesn't do, quote, requirements.

And the point is you want at those lower levels of technological readiness, you want free thought to be out there. You want people to think of crazy, exotic ideas. So, what I would say is there's not requirements, but there's needs, meaning everybody's watching CNN, everybody is seeing the challenges that the warfighter faces and are looking for new opportunities.

So, I would say the more technologically mature a product gets, the more important it is that it aligns with requirements. But when – and I am a former requirements officer.

[Riki Ellison]
Yeah, but Shotgun, I mean, like when you built the F-22, F-35, you did the requirements 10 years before that thing came out. No, that's what – You can't – help me explain that. They're putting requirements on that product's not even out there, and some of those things are already done by the time it's out.

[Tom Browning]
Yeah, sorry, Riki. I'm kind of building a wristwatch a little slow maybe, but the requirements are about buying things, not developing things. So, if that makes sense.

And there's nuances there even, but fundamentally, people look at science, people look at technology, and try to come up with ways to help. As those things are proven possible, you have something when you enter requirements called an AOA, an analysis of alternatives. So, as things are proven possible, they are now alternatives.

So, if a laser was mature enough to shoot down a bad guy airplane, then it would be one of the things you would consider in an analysis of alternatives to meet a requirement. So, there's –

[Riki Ellison]
So, Shotgun, how do they get to that? I mean, do they have labs to get to that now? How do you even get to that level? Is it free or – I mean, just help us understand that.

[Tom Browning]
Yeah, so, as you walk through the maturity level of technology – and so, as I said, there's TRL 1, 2, 3, 4, 5, 6, 7, 8, 9. And as you go through those levels – and this is part of the Valley of Death. In fact, I would argue one of the biggest problems within the Valley of Death is there's a transactional activity as you go across there, meaning those who do the underlying work honestly hand the football off to completely different people who do that mid-level work, who, if they're successful and somebody wants to receive that football, hand the football off to those who do prototyping.

And then those who do requirements write requirements. And then those who do acquisition work with industry to try to fulfill those requirements. And then an industry partner develops the product that's going to be bought.

And if that sounds laborious, it is. And if it sounds time-consuming, it is.

[Riki Ellison]
How much time is that right now? What is that time? So, you just covered.

How much time is that?

[Tom Browning]
So, I will give you an example. And this is a scary example, but it's the truth. When I was retiring from the Air Force in 2015, we were working on requirements for the F-22 follow-on because we would want to start buying it in 2035.

So, we were working on requirements purposefully 20 years before we were going to buy the platform. It's that crazy.

[Riki Ellison]
The technology for those requirements in 20 years would definitely have been changed, correct? I mean, how do you justify it?

[Tom Browning]
And frankly, what the warfighter needs, and frankly, who the warfighter is, right? And that's the point, Riki, I guess, is that I have a phrase that I said all the time in the Pentagon, and that is the Valley of Death is not fiscal, it's informational. We don't have a process that allows the technologist, back to your point about requirements, we don't have a process that allows the technologist to very rapidly understand the user needs, and for the user to very rapidly understand what is even possible so that we can very quickly go from the realm of the possible to new capabilities in the hands of the warfighter.

The system's just not built that way.

[Riki Ellison]
Let me go back. So, how did people get into this to start? And if you look, I mean, I got a chart here that came out, I think, you know, this is from 2024, it's like $250 billion in revenue from the top six defense contractors.

How does anybody compete against that? That obviously would be the process or understanding the process. Is it fair?

And I know we have to have that because those exotic weapons and scale up. We could just talk to that on entrance into the game here.

[Tom Browning]
Yeah, so the entrance into the game is hard. Again, I'm going to go back to that term, the Valley of Death, and go back to the point that what we commonly say is, I don't have the money to buy that. And with a near trillion dollar budget, it is untrue that we don't have the money to buy it.

The challenge is understanding that it is something that we need to buy. So again, the process in this transactional nature and the different kinds of money that you get from Congress to do the different stages of this, I would argue, is an extraordinarily causal component of uptaking new technologies and bringing in new commercial partners. But the people you work with in the government to develop things are actually completely different people than the people you work with in the government to buy things.

And so there's an impedance there between the two that absolutely makes it challenging. And the second part is, and this is another one that I think has increased in importance over time, is the fact that our problems are becoming increasingly domain independent. So our problems are becoming very joint at a time where we still purchase things specifically by service.

And I'm not necessarily recommending specific changes there because we've got an amazing infrastructure of how we do things, but take defense against drones. Every service, every domain has that problem. Air and missile defense, every service, every domain has that problem.

Long-range fires, I now have amazing long-range fires from the land. I have long-range fires from the air. I have long-range fires from the sea.

We are buying all of that independently and separately by service instead of, now we're doing requirements through joint, but fundamentally we're buying things independently. So what I would say is one of the biggest challenges is getting something that has proven itself as a great technical solution for a warfighter problem from that development community seamlessly into that acquisition community, especially for a vendor who hasn't been working with DoD, is hard. Does that help?

[Riki Ellison]

That helps. What's the percentage do you think of going into the Death Valley? You've seen some great products, so I'm sure you've seen a lot of innovation that's been spectacular.

How many of those really are able to sustain that and get through it and come out to the warfighter? And what's the average time that would be?

[Tom Browning]
I think that's a tough question. The reason I say it's a tough question and this is right thing, right time, right problem. We are amazing as a country at getting things in the hands of the warfighter.

So when problems occur and we clearly need a solution.

[Riki Ellison]
Like the AMRAP, right? The AMRAP would be a great solution.

[Tom Browning]
Absolutely. And I would argue a whole lot of the counter IED capabilities that came out of industry, that came out of DARPA during the height of the Sunni triangle period was amazing. The fact that we got stuff in the hands of the warfighter very quickly. The problem was there was no tail to a lot of those programs.

We got ahead of requirements and acquisitions, so it made it very difficult to create a sustainable tail for a lot of those things. But what I would say is obviously what we're facing is the transition path for a lot of things is, I would argue, a very, very low percentage.

[Riki Ellison]
A low percentage to get through the process, correct?

[Tom Browning]
Yes. And let me touch on why one of the biggest problems that I think exists. In the last administration, this administration, we've all been doing a whole lot of work to try to affect this. But the challenge is at the end of a development program, you haven't created something that is product worthy, meaning that there's work that still needs to occur.

There's prototyping work that needs to occur. We don't have, now Strategic Capabilities Office is an entity in what I'm going to talk about, but they have very specific vision. We don't have a joint prototyping agency.

So if someone like DARPA has an incredible idea that shows promise, that proves itself out, to get into that prototyping phase, you've got to, DARPA literally has to market it to services and try to convince them that they want to uptake it and do that 6-4 or do that prototyping activity.

[Riki Ellison]
So you're competing with all the services to have their own prototype?

[Tom Browning]
Absolutely, yes.

[Riki Ellison]
It'll go right into Golden Dome. Shouldn't Golden Dome be able to do the whole joint thing with this innovation or not?

[Tom Browning]
Yeah. And what I'm going to say right now, again, zero barbs at anybody in the industry, zero barbs at any service who's trying to do their right thing or the joint staff. So I was present at the meeting that caused JADC2 to occur and then evolve into CJADC2.

And the whole point of JADC2 was if we go on a path where I am taking independent service capabilities and at a time of need trying to translate, connect, and create this Rube Goldberg solution, we're not going to win the next fight. And this realization that we need to look from a fully integrated domain-independent joint viewpoint first and then develop the capabilities independent of service that would meet those needs.

[Riki Ellison]
Do we do that today with any joint? What do we do? Give us a product that's done this from the joint perspective.

[Tom Browning]
So, there was a tongue-in-cheek joke that was said, I won't attribute it right now, about three years after JADC2 started.

And it was, we asked for JADC2 and we got SADC2, service all domain command control. And again, that's not a barb at the services because it's the way we buy things. So what I had was an amazing team of sailors trying to solve this problem, an amazing team of soldiers trying to solve this problem, an amazing team of airmen trying to solve this problem.

And if you look at Army, Navy, Air Force, all of them have different, yet really amazing work at a joint solution. Because we don't necessarily have a way of resourcing a truly joint solution.

[Riki Ellison]
But is Golden Dome the way now to truly do this?

[Tom Browning]
So it could be if Golden Dome was given the mandate, and they may already have this, but if they're given the mandate and the resources to develop a truly joint solution, and we need to delegate that down to the services. Now you can go with a lead service, right? You could pick an individual service to own this, to own that.

And really what we're talking about is the joint task force or combatant command level, command and control architecture that allows an open environment, that allows open APIs, government owned APIs, that industry partners, whether it's new weapons, whether it is new concepts, whether it's new software, be able to really aggressively and rapidly integrate new things. Just like you have your iPhone, and I don't have Army, Navy, Air Force, Marine Corps, Space Force iPhones that all have different operating systems that a vendor would have to, you know, write an app that would be able to go into that specific phone. You

know, everybody understands the way, the things necessary to integrate their capabilities into that, and they can jump into the marketplace and integrate.

So if Golden Dome was empowered to that level and ran down that path of being the center of a new integrated joint capability, independent of service, independent of vendor that allows an open marketplace, I think it would be phenomenal.

[Riki Ellison]
But let's go right into the real world right now and getting our forward bases, joint forward bases in the Middle East with innovative technology as rapidly as possible. Do we have that same problem that only has to go through each of the services to get there? Can we do it jointly, like you're saying, to push this thing through much faster than what's going on today?

[Tom Browning]
Yeah, and again, I feel obligated to continue to say this isn't about, nothing I have said is meant to be negative towards the services. And I would argue we are doing the best with the processes that we have today. There's a second thing that I want to touch on real quickly, because I think it is, if I had one message, it's probably the most important message I'd love to get across on how we can break that logjam on the Valley of Death.

And I jokingly call it “the first one sucks.” In the way we do things in DOD, again, I've got to write requirements for what I need, not necessarily fully understanding what's possible. And then I've got to go out and seek to buy something to meet those requirements, a very rigid process.

In the public sector, you don't do it that way. And there's a term called iterative development. And that iterative development is the idea that I know the very first product's not going to end up being what the customer wants.

And back to my point about flying those advanced radars in the F-15, the customer may decide to completely change the way they do things because of that new technology. And therefore, that would completely change the requirements and specifically what I want. So what you really want is you want a partnership between the operator, the acquirer, and the developer to very rapidly iterate on what has been proven technology.

So you take an electronic attack capability out of DARPA, you go, holy cow, if this matures, this is amazing for the warfighter, you get that in the hands of the warfighter and you partner. And again, this is a blueprint for Golden Dome, but you partner those creating the technology with those who control both time and treasure, with those who need the capability, and you do professional experimentation very rapidly to allow the warfighter to use the tool to frankly tell them, tell everybody this sucks, this isn't actually what I wanted. So that part two sucks a little bit less, so that version three sucks a little bit less, to the point where you are able to refine both the user's needs and how they would use it, the cost, the amount of time to do this, and what is technologically possible, but you're doing that hand in hand.

And once you've gotten to that third, fourth generation of the iPhone, now you absolutely go into traditional acquisition and you buy that at scale.

[Riki Ellison]
But Chuck, and is this in our test ranges, this development, or is this out in the warfighter field doing that application of the...

[Tom Browning]
So both, both, Riki. So I think, you know, George Rumford and I've talked about this a lot in our test community, it's amazing, but there is a difference between test and experimentation. Test is what you do to prove that something works, right?

So you test against knowns, you experiment because of unknowns, right? Meaning that I experiment to prove that this is something that we need, and then I test to make sure it meets all the requirements and the warfighter's got something that works. But the two are partners, they're partners, they're not.

And the problem is that we as a DOD, now, you know, R&E has gone through amazing moves in the services, frankly, in the COCOMs over the last couple of years, but we historically didn't experiment, okay? We demonstrate and we test. And this experimentation is the idea of allowing, think of it this way, allowing the technical capability and how the warfighter wants to use that technical capability evolve in partnership, not, again, not separately.

[Riki Ellison]
I got it. The combat and the innovation is going faster than anything you can do in test ranges or experimentation that's happened in Ukraine for the last three years on some of this innovation and what's happening right now. Why aren't, how do we adapt to that? Why aren’t our guys over there figuring that out to use and steal or take or whatever?

[Tom Browning]
Yeah, again, you know, I'll say it this way that, you know, if I, and this may not be a good analogy, but if I go out during the day and my iPhone crashes 15 times, I'm upset, right? I didn't get my phone call, didn't get my text, things didn't work. But it is a really, really, really mature piece of hardware.

And so, I guess the point is I don't want to choose. When something is immature, I want to get it in the warfighter really quickly so that they can meet whatever threat we have that we aren't able to meet right now. I want them to be able to provide feedback.

I want them to be able to use it as quickly as we can safely get it in their hands. But as it, as it refines down to an enduring product, I absolutely want to test it. And I want to make sure that we are giving our, you know, our warfighter the most reliable, the most capable things.

And so, what's cool is we don't have to choose. We can be agile, we can be fast, we can be iterative.

[Riki Ellison]
But you're not getting the warfighter the stuff right away. I mean, they need it right now.

[Tom Browning]

You're still, you get it to them right away, but you continue, again, you continue to mature, you continue to work on it. And for those things like a cell phone that I'm going to, that I know I'm going to need for a very long time, you absolutely let the test professionals make sure that it's going to kick ass, even if it sits on a shelf for 20 years. You know, so the, so there's, there's test and experimentation can't be opposite things.

It needs to be a spectrum and it needs to be a partnership.

[Riki Ellison]
And you're aware of the GTAT that Frank Lozano and the Army's doing with the stuff up front on the edge, being able to take it to the warfighter. So that, I mean, they're innovating by bringing the technologies right into the fight on the edge.

[Tom Browning]
Riki, I do think every service is doing the best with what they have. Every COCOM's doing the best. So this is, again, this is about creating an architecture where money is less specific to the phase of action, where we aggressively experiment with promising technologies and where we aggressively get things out, you know, that, that emergency or early operational capability, we get stuff in the hands of the warfighter to use against our most difficult challenges as quickly as humanly possible.

[Ron Christman]
And sir, one, one example of the partnerships you're talking about that might be useful examining how they're going about it organizationally and process-wise is the U.S. Army Next Generation C2 effort, where they're using that so-called characteristics needs statement, where they kind of make a high-level articulation of what the problem is, and then get the partners, R&D community operators, etc, to kind of organize around that and, and have these dialogues to kind of, whatever you want to call it, spiral development toward a solution that's exactly where we're pointing at.

[Tom Browning]
Yeah, it is exactly what I'm talking about with two, two deltas a little bit. And that is, you know, again, this isn't as black and white as I'm going to make it right now, but, but we, we tend to either refrain from or are unable to consider the actual commercial developer, a partner in that process.

You know, we, we surrogated over to the DOD development community, and some of that is probably a good idea, but what we want, again, what I want is area of development where I'm rapidly iterating on the needs of the warfighter, the amount of money I have, the amount of time I have, and what that actual commercial provider that we have elected to, to bring into that family for that component for that time to do.

And that is what you've said is a great example. There are examples across everything, but again, the challenge is there are pockets within individual services. Riki and I have talked about this, but how we treat drone defense versus how we treat short range air defense versus how we treat ballistic missile defense as completely different service ecosystems, as completely different architectures, when in reality, I want the same picture, right?

Meaning that that operational picture is, I want to know where the bad guy stuff is, whether it's low, you know, low fidelity, high fidelity, little guy, big guy, this air and space defense issue is a spectrum. It's no longer easily divisible into short, medium, and long range. And it's because of that, every service has fundamentally the same requirements.

[Riki Ellison]
So I've been around… The Missile Defense Agency did a remarkable three-year deployment of GBIs 20 years ago. Is that a way to do this?

They're supposed to be able to create capabilities rapidly, quickly. How do they fit into the IMD game right now, from your perspective?

[Tom Browning]
Yeah, here's what I think is. I think when that occurred, very, very, very few entities on earth could create something like we created, you know, for integrated missile defense, you know, so the cost of the weapons, the complexity of the weapons, the architecture lent itself to a very, very large program, in the greatest country on earth. And it also to a degree, because of the needs of those weapons, and because of the unique nature of attacking things at exo- and endo-atmospheric, allowed it to, I would argue, de-conflict in many ways, from what a carrier task force cares about, for what an air base cares about, what, you know, what an army post cares about. So, in a funny way, iit played nicely with others.

And what we've evolved to with very, very long range UAVs, and the ability to greatly decrease, you know, the bar of entry into attacking people with precision at very long range, is that's collapsed. So, you know, so do you give MDA everything down to, you know, Class 1 unmanned vehicles? Probably not.

But do I allow Army, Air Force, Marine Corps, Navy, Space Force, all to create their own bespoke solutions to that? Probably not. Right?

And so we're, so like I said, that part of the challenge right now on, I would argue, Homeland Defense, but this is forward-based defense in the Middle East, is like I said earlier, it doesn't divide itself into the right chunks anymore. Meaning that I, everybody cares about the same airspace. Everybody likely has effectors that can affect that same airspace.

And so we all want to be in a common picture. And we all want to have a common understanding of who ought to employ weapons against what, and we have not created our systems in a way that makes that easy.

[Riki Ellison]
Shotgun, how do you— we talked about the problem, what is the solution? What is the bureaucratic, what is the solution to make this change go much faster than it is today? You've seen it, be bold with it.

[Tom Browning]
Yep. So again, my paid political announcement for wimping out on this, and that is, there are amazing people trying to do all of this, and they may actually be succeeding further than what I'm going to convey right this moment. So, so let me go with that.

What I think is, and there's a, again, I'm not going to do necessarily name shout outs, but there's an individual I worked with a lot who really focused on this idea of mission-based acquisition, meaning I don't buy something for the Air Force. I don't buy something for the F-22. I do all of that, but that's not necessarily the focus.

The point is that looking at things through a mission lens, right? And we've started to do that through the capability development process with the joint staff with ANS and R&E. That started a couple, three, four years ago in a way that I think is moving us along the right path.

But the idea is to look at the problem that warfighter faces, address that independent of service and domain. And if we come up with a single solution that transcends service, that transcends domain, whether you pick a lead service, you create an organization like MDA, I don't necessarily care, but you need to get, put a single entity in charge of doing that. So that's, that's part one is, is mission-first in addressing those joint requirements versus breaking everything down to—

[Riki Ellison]
That's Golden Dome.

[Tom Browning]
I know, I agree. Number two, Riki, is breaking down the walls on money. And I'm not a money person, but this idea that I have to use different money for developing the product and different money from that for prototyping and different money from that… And it's not only just different money, but it's a completely different tribe, a completely different advocate.

So for rapidly developing things, and again, this is happening, but for rapidly developing things, we need to be able to go from—

[Riki Ellison]
But why did they do that? Because people were taking advantage of it? Why did they break it up like that? To check everything?

Because it slows the process way down, right?

[Tom Browning]
I've got ideas, but I don't want to, I'm not going to go down that path because I'm not an expert there. But suffice it to say that getting the trust from Congress, especially for those most difficult challenges to rapidly with a single pot of money, go from good ideas to actual capability in the hands of the warfighter, I think is a wall that needs to come down. And then the third one is this idea of iterative development, is get away from the transactional warfighter, tell me what you want.

And I go now into a dark room and find the things that might work. And it doesn't work. It's not how industry does it.

And you go down through all of the fun things you have in your house. And the prototype earliest version wasn't all that good. But that iteration between the developer and you, the user, is what involves capabilities in the private sector.

I don't tell them 10 years ago what I want in a cell phone and hope that they deliver it to me. It's that constant interaction between the developer and the user.

[Riki Ellison]
Those are the three things, right? Those are your three answers to that.

[Tom Browning]
Sure.

[Riki Ellison]
Next question is, how do we get commercial, Silicon Valley, how do we get them into the game? We've been trying this for years and years. I think we're starting to, but why is that so difficult?

Because the profit margins aren't there? The market's dominated by the big six? How are we not allowing our commercial big boys to come into this to help? How do you solve that problem?

[Tom Browning]
I got you. A lot of that is the things that I just talked about. Meaning, I would argue that, you know, again, entities like DARPA, as well as the services, and DIU's been great about this.

We are telling the cutting-edge technologists out there what we need. And at the development level, I would argue we're even funding and buying and working with a diverse industry base. It's that funnel that is the problem, that's preventing us from being able to rapidly take one of those and run across the finish line.

Another one that, and I said this in a different YouTube entity a while back, and I got someone upset because they go, “why aren't we buying commercial off-the-shelf products?” And although for managing our supply inventory, there probably are amazing, and I'm sure we're using them, but amazing capabilities out there that are, quote, commercial off-the-shelf. I would argue for most warfighter capabilities, there aren't, there just aren't.

There are commercial capabilities that with the right tweaks would be amazing. And so the point is that seeing that a vendor has a commercial product that, if it were altered, would be amazing for the warfighter is the key. And it goes back to that need to have a central repository for prototyping where I can find a vendor that has something that's not right, but holy cow, could be right very quickly, and be able to rapidly apply money against that, get that in the hands of the warfighter and use it.

That doesn't exist. So it's that industry 75% solution that could be 100% solution, I know is a limiting factor in the inability to necessarily, again, in that squishy land between product and warfighter.

[Riki Ellison]

Let's go into a more of a, more than squishy land. Let's go to Anduril and Palantir, and the Maven and the Lattice. And one, I think being able to do some pretty good data collection, the other promises, but they've never scaled it.

There's no program records. So there's that aspect of it. And then you have the biggest problem of all, which is open architecture and proprietary data, and that's how they're killing the government by taking proprietary.

And I don't think you can fight this fight today that we're going to go in with millions of drones or millions of unmanned stuff and all the data collection that you have to do for the Golden Dome or for the Middle East or for anything without having accumulation of all this data and not paying for it. So help me with that movement, because that seems to be how they're generating a lot of income because of that data proprietary. And I don't think that can go far in the big scheme of things.

[Tom Browing]
Yeah. So you're touching on, so I'm in industry now, but I'll put my government hat on for just a second. So the ability of the warfighter to frankly leverage what Palantir and Anduril have done so far is amazing.

So in fact, I was in an ops center—again, I'll keep it that vague—at one time. And I told, and I mean, this is a compliment to Palantir, but I asked a senior leader what the most important part of Maven Smart Systems was. And he pointed over my shoulder at two Palantir technicians. And he said "that."

And his point was the fact that he had people who understood the software physically integrated in his organization so that when he had questions, if he had changes, if he had ideas, it was immediately either handled, if it was handled up all, or it was immediately routed. And so it walks exactly into that insane need for iterative development.

The other side of the coin, though, so, and I know I'm not going to go into it, but when we kicked off joint all-domain command and control, and again, I know there's a C up front now, but one of the things that we pushed for was the idea of a government-owned core to all of this. And the idea was to enhance and simplify the ability for no-name vendors to find their way into the family, to be able to bring in unique and different applications. And so what you're seeing, I think, from Maven Smart Systems, what you're seeing, whether it's, I don't care whether it's Lockheed, Palantir, Anduril, others, is we have this, I want somebody to own that core architecture.

Nobody wants vendor lock on that core architecture. No one wants a vendor to own our data, and no one wants any company out there that wants to integrate an app to have to go through that vendor or have to be bought by that vendor. So, I would argue the work that both Palantir and Anduril are doing are exactly on the path that we need to be on.

We need the government, though, to figure out how to make that path, how to prevent vendor lock, how to make that path open, how to make that path opportunistic for the minds across industry. And let me say just one other point on that, that when CDAO first stood up, one of the most important and interesting discussions I had with them, and I actually don't think this has been solved yet, is I asked CDO and I said, we need a way of

buying software in DoD that attracts the greatest minds in America. And the reality is if you're going to buy 100 copies of an app, who's going to want to invent that?

And they get 100 copies, and then they walk away. So, it walks into subscription plans. But if I get into a subscription plan, now you walk into vendor lock, and you walk into all the evils that could occur because of a subscription plan.

So, we have this challenge where if I buy it outright, I don't buy the software in numbers that enable it to be lucrative and interesting to industry. But if I buy subscription plans, then I lock myself in, and there's some real ills there. And what sucks is when I left DoD, I don't think we were any closer.

So, I would argue a really important part is I want to take those minds in Silicon Valley and make them apply their thought, apply AI, apply everything to the DoD problem sets, and I want them to be successful because of it. And there really isn't, and I know there's some great work in A&S on enabling this, but how we go about buying bespoke applications that meet warfighter needs, but make industry just as excited about that as working on TikTok, which is going to have, you know, a billion people using it, is a really difficult challenge. And I think it's to the core of how we solve the application side of the command and control problem.

[Riki Ellison]
There's a phrase that's real now: AI or die. It is the accumulation, right? I got the dashboard, you can collect all the data, but you've got to make that data good enough for fire control.

And you've got to process it. So, there's another, the engines that have to supercompute AI, the process, we're not even talking about that yet. But that has to come in, and that's not coming from the government.

The big boys, Microsoft, Google, Amazon, that's got to come in here. And we've got, I mean, this is big stuff to be able to do data collection, the way it should be done, to do everything and to process it and put it on edge, to give it to the warfighter right there, to be able to shoot if it needs. Help me on that.

[Tom Browning]
Here's what I would say is, so I would disagree with you and say that is government, but bear with me for a second. However, I don't want the government developing and I want the best minds in industry developing it. So, fundamentally, I have data. I have agents and applications that act on that data. So, in the era of AI, I've got data that's discoverable. I've got agents that act on that data, and I have applications that use those agents, right?

So, I've got something that the warfighter uses that releases that AI on the data and gives the warfighter the information they need to do what they want to do. I don't want to go to Microsoft for all of that, any more than I want to go to Palantir for all of that, any more than I want to go to Apple for all of that, right? What I want to be able to do is create the best cloud providers possible at any given time to host that data.

I want to ensure that that data is discoverable. I want to have AI agents, plural. I want the best in breed AI agents to be able to ask on that data, and I want the best applications possible, independent of vendors.

[Riki Ellison]
How do you motivate them to do that, Shotgun? How do you motivate them to come in and take their time and effort off what they're doing, making lots of money to come work and do this for us?

[Tom Browning]
And, Riki, that goes back to the weird sidelight I just went into just 60 seconds ago, which is we need a fiscal way of making it lucrative to them to want to play. And that means that they maintain their own IP when they bring it into our environment, which means I need an environment that is not proprietary, that is not vendor locked. Because I want to bring in, I mean, that is the way this works.

I want to bring in applications. I want to throw them in the trash. I want to bring in agents, and when that agent is beaten by another company, I want to throw it in the trash.

But I also may want three different agents to be able to compare their results. And so what I want to do is empower the warfighter to create that collection of tools and be able to very rapidly move between vendor and rapidly move across the architecture. And this includes our allies and partners.

I can't do that unless I've got this underlying operating system and this marketplace that allows us, and all the companies we've called out, I'm all for them being the brains behind creating that underlying architecture. We just need to maintain the freedom of action to be vendor agnostic, to attract talent into that ecosystem.

[Riki Ellison]
Last one, because I'm going to ask Ron to ask questions after this. The fun thing I want to talk about is the cool stuff, the lasers, the electronic jammers, the radiation. We saw, I saw, I don't know, in the 90s, the ABL at 747 with a laser shooting a missile out of the sky.

Where are we? Where are space-based interceptors? Why is that so different? It seems like we have the tech, where is this stuff?

Why isn’t it in our warfighter's hands? What's the coolest stuff that's coming out?

[Tom Browning]
So I'm going to give you, and I apologize that this takes longer than you want, but I'm going to give you a little bitty vignette. So we had a, there was a electronic attack capability that was developed out of DARPA when I first got to DARPA, amazing program manager that gave us capabilities that, against systems that you would not think that it was possible to have capabilities against. I'll just say it that way.

It worked. We went to the Air Force and got, I ran into a microcosm of all of these problems. Point number one is the Air Force said, “well, did you try this? Did you try that? Did you try

this?” Because it was a development program that, you know, that was basically prototyping experimentation, which DARPA didn't do.

We were able to very rapidly cobble together some work in the Alaska NORAD region with this capability, with the warfighter and everything. We did it in two months. It was frigging amazing, the excitement of working at DARPA and being able to do things quickly.

And we convinced the Air Force that this really was magical and it was a thing to do. And the Air Force went to integrate it into their systems. And the way we bought electronic attack systems at the time would be like you going to Best Buy and going, “I want a PowerPoint computer.” And you walk out with a computer that does PowerPoint. And if you go, “well, no, I'd like to actually do Word also.” And they go, “ha ha, you didn't say that. You know, the requirement didn't say, I want a Word and a PowerPoint computer.” So there was not even such a thing as going to a new vendor for a unique application and integrating that into a jammer. It didn't exist.

And so it dramatically decreased the ability to get this capability by many years to the warfighter because of the fact that we don't buy open architecture. At the time, it was less possible. So bear with me.

But we don't buy that architecture to pull that in as quickly as we could. So the way we buy things as they're integrated is a big part of the challenge.

[Riki Ellison]
Okay. Ron, I'm going to put you in the conversation now with a short Q&A.

[Ron Christman]
One question I'd have for Mr. Browning is, how do we get more long-term forecasts about the future operating environment into the picture for all this R&D development? I come from Intel. So I know, unfortunately, too well the limits of what we're doing to really acknowledge the uncertainty when you look forward. Just think of all the things in the past that we haven't really been able to predict well. How does one get that into the equation in a way that's helpful for the R&D community?

[Tom Browning]
Yeah. And so this may not meet your satisfaction, but I think you drive that. You don't wait for it.

Meaning that I shouldn't be looking at, what do I need in 2050? I have to look at it, but... What we are learning right now is that time horizon is just a heck of a lot closer to us, right?

What I should be doing is aggressively modernizing those new technologies. DARPA is all about both creating and preventing strategic technological surprise, right? And the way you do that, and back to Riki’s point about lasers, lasers exist.

We've got amazing technology. We're just not using it. Why are we not using it?

And part of that is that the first one sucks, right? Meaning we are not going to get a perfect laser with everything figured out the first day you put it out the door. I've got to get that less than perfect example in the warfighter’s hands.

And honestly, with lasers, that's starting finally, starting to occur. But with these new technologies, the key is get it out of the damn laboratory, get it in the hands of the warfighter, and frankly, drive that future. Don't look with your crystal ball to try to figure out what I need to invent.

Invent things that drive the needs of that future.

[Riki Ellison]
Shotgun, can you address the space-based interceptors? We created that in the 80s, the Rods from God. Wow. Can we do it? Can we do it in three years? Can we have space-based interceptors, low earth orbit from an R&D perspective?

Can we do that?

[Tom Browning]
So for almost every technology you would bring up, whether it's lasers, whether it's EW, whether it's cyber, whether it is space-based interceptors, the technological answer to that is just a yes, period, end of statement. It is easy. But that's a “can”, right?

Is there policy in the way? Maybe, yes, no. Is there security in the way? Maybe, yes, no. Is it just really expensive? Maybe, yes, no.

So there are many, many, many things that interact and may limit whether or not it's a good idea. But space-based interceptors, A, I think, good idea. B, I think, absolutely, technologically in the executable column.

There's no question.

[Riki Ellison]
Can you talk about security real quick? Because of cyber and all that, that would seem to really slow down, being able to have closed security systems rather than open this thing up and just go. And I think that's... Go ahead.

[Tom Browning]
There’s a couple really difficult challenges on this, and I don't know that we have the time to touch on all of them. Yeah, one of them is our incessant desire to go, holy crap, that looks really cool, let me put it in a box.

And let me not talk to anybody about it, not let you play with it. And so I don't know that we over-classify, we definitely classify early. And what that does is that inhibits who you can go to learn about that.

It inhibits which vendors play. It inhibits the speed with which you do things. As you brought up, you and I worked on looking at the Ukrainian Sky Fortress system, right?

And one of the biggest challenges was how do I take a dirty piece of hardware, dirty in the sense that other nations might have put malware in there, I don't know, and how do I integrate that into a system? And that was probably, as you remember, one of the biggest

hurdles we had was I can't just plug that into my US system because it might mess up my US system. But that goes for information that I want to pull in.

And so on the security side, we've got to embrace zero trust. I think DoD is all over that. But we're not to the point, for me, zero trust is I get this Ukrainian sensor, and I plug the freaking thing in, knowing that the probability of that negatively impacting my system because of zero trust is very, very, very low.

The other one that I think we need to embrace is the idea of having a open source unclassified playground. Meaning as we get new capabilities, we need, I would argue, a standalone unclassified playground where we can bring all our allies in, we can bring industry in as a stepping stone to get onto those classified systems. But back to the Sky Fortress idea, the Ukrainian idea, at a time of need, I want to take everything every ally possibly has, and I want to plug that into my picture to get the best possible picture.

And that means ad hoc, very rapid integration of things that I don't trust. And so I think on the traditional classification level, by classifying new ideas and concepts very, very early, we make it really hard to mature them. And on the other side of the coin, because of our need to be cyber secure, we've created a walled garden that makes it really, really, really laborious and time-consuming to try to plug new ideas and new innovations into existing systems, almost regardless of classification level.

Does that make sense?

[Riki Ellison]
Yeah, absolutely. Ron, do you have another question?

[Ron Christman]
I'd be interested in your thoughts about emphasizing protecting the data, not just networks and what have you. Based on your experience, network systems, is it possible to protect the data in a way that you couldn't accept some of the risks that you're alluding to a few minutes ago?

[Tom Browning]
Yeah, well, there's a – this may get technical beyond my ability pretty quick. I'll say that. But obviously, there are ways of protecting the data from an encryption standpoint.

You know, one of the ones that – I'm going to twist this a little bit, and if I don't answer your question well enough, we can go back to it. But as you think about, say, Golden Dome bringing in FAA data, Golden Dome bringing in, you know, opportune data, you walk into a need not just to protect – I'll say protecting the data, but also, to a funny way, protecting from the data. Meaning, if there's a bad guy who is injecting, you know, an airliner as a bad UAV into an FAA system, how do I know that I can protect myself against that?

So, there's – so, on the data, I would argue it's a two-pronged approach. One is, you know, how do I ensure that the wrong people don't have access? I think there is a staleness to data in the sense that maybe we overplay that hand.

But there's also making sure that I've got the pedigree of every single piece of data, and that as – and this is something that AI is really good at. As I bring data into an aggregated solution space, then I'm questioning every bit of data. And so, what I need to do is I need to tag that data at ingest.

I need to understand exactly where it came from, exactly how I got it, exactly the last time it's been manipulated. And then I've got to have, within that system, the ability to question every bit of that data. And as you see outliers, or you see things of concern, it highlights those so that you can either shut off that feed, or you can, you know, make sure that you're not polluting the system through bringing in the bad data.

So, it's interesting in that it's kind of a two-sided problem.

[Ron Christman]
Copy, thank you.

[Riki Ellison]
All right. We're going to just – last question, and then we'll do ending remarks on it. So, I want to ask you, in this automation where we're headed, where China could have 10,000, 100,000 automated cheap mass, how do you deal with that?

Because obviously our fixed sites are completely vulnerable to that. And that's proven already over in the Middle East with losing THAAD radars. We should be all over this on how to defeat that.

But that's coming at a very cheap price. It's not the hypersonic stuff. I mean, that's coming too, but the biggest gap right now is that.

So, how do you – go ahead. How are we going to R&D this thing?

[Tom Browning]
Riki, you already touched on this a little bit, but, you know, automation – and I'm almost happy you chose that word versus AI. I think both are important. But, you know, I get – some people get really excited and tied up about this idea of man in the loop versus man on the loop.

I actually think that's a red herring, and I think it causes silly arguments because the person who wrote the code and the individuals who set the algorithms to bound what that AI can do or what that unmanned vehicle can do are actually in the loop. You know what I mean? So, the reality is we need to embrace automation.

We need to embrace the ability of our systems to help us understand and then react to things at scale that a human could not do without assistance. But all that is, to a very large degree, is automation. It's ensuring that – and this gets back to experimentation and this gets back to test, frankly – is ensuring that we do the work so that, to the appropriate level of surety, we know that that thing is going to act within the bounds that we set, right?

And that requires experimentation. That requires test. And, frankly, it requires a level of risk acceptance that may make us uncomfortable in where things are going to make a wrong decision.

But embracing the need – and this was, honestly, from Assault Breaker 2, probably the most important thing – is, you know, we walked into this realization that what we call the operational level of warfare in the 90s is actually tactical. Because of the range of weapons and because of our ability of our sensors, we are able to think of a much, much, much larger volume of space and numbers of activity, all as one integrated ecosystem, all thought about at the exact same time. And that's where we run into this challenge where I'm transcending service, I'm transcending nation, I'm transcending domain, right?

So, it all comes back together. And as I said, everybody's trying to do the right thing right now. The world has just changed, and we need to rapidly evolve how we do things to meet those challenges.

[Riki Ellison]
What technology would that be to defeat that mass that cheaply? What do you think that is?

[Tom Browning]
So, again, I'm going to dissatisfy you. I think it's technologies, plural, right? When you watch what Ukraine is doing right now, every time someone's got a good idea, they're integrating it, they're pivoting to it, they're looking for – and again, this is back to that mission-based acquisition, right?

They have a problem, a challenge. Oh, my gosh, they're jamming my GPS. Who's got ideas that could help me still fly while they're jamming my GPS?

And aggressively integrating those technologies. And again, the irony is that integration with those technologies actually changes how they're doing business, and may even change who is doing that business. And it changes the requirements, and it changes what they want.

So, it's this idea of having a problem, very rapidly seeking a solution to that problem, and then integrating that as quickly as possible so I can address it. So, what I see is this, the key to success is not finding the laser, or finding the bullet, or finding the space-based interceptor. It's finding an architecture that allows us to very rapidly bring in the things that are most promising, and very easily eject those things that are no longer of value, and allow the warfighter to evolve both how they're doing things, and then what they need as rapidly as possible to keep the adversary guessing and keeping us in the driver's seat.

[Riki Ellison]
A hundred percent, and the warfighter wants layers. It doesn't want the silver bullet. It wants layers and layers all the way out further.

[Tom Browning]
Of course. But integrated layers, not bespoke standalone layers. Resiliency.

[Riki Ellison]

Great discussion. We can keep going on. We're over time already.

But I want to wrap it up, and our newest MDAA director here. So, Ron, just wrap up your thoughts on the conversation, and then I'll pass it over to Tom.

[Ron Christman]
One idea that came up to me that Mr. Browning said earlier is, you know, we need to go joint with the programs, not just these bespoke service solutions. Coming from an intel perspective, one reason to do that is just because the threat is multi-domain in nature. They will figure out how to come at you from multiple angles.

So, you got to have the agility to cope with that. Another thing in terms of, as we develop the technology, there's got to be a premium on protecting that process. Because if I've learned anything from watching the bad guys figure out what to do with the gap between cruise missiles and ballistic missiles, they went down the road of novel missile threats.

But also more recently with the drone context and the underlayer, you know, how we can minimize their sense of what the vulnerabilities are, you know, would help a lot because they're obviously going to eventually figure them out and pursue them. You know, there's different ways to do that. One is non-material solutions.

You just make them think, you know, the attack price is just too high to go down one of those roads. But those are a couple of thoughts that come to me being new to this process here. I usually just read the transcripts.

So, I'm glad to be here live and live from the limo or whatever. But here I am.

[Riki Ellison]
Thank you, Ron. Okay, Shotgun. Buddy, thank you for your time today from New Mexico, I think. But thank you. All right.

[Tom Browning]
Thanks, Riki. Again, a little bit humbled by you taking so much time chatting with me. So, thank you.

And as I said, most of the opinions I brought, while they're my own opinions, they're based on a lot of amazing people who are still in the system who are, you know, working every single day to try to make all of this happen. And it's pretty amazing.

So, thank you.

[Riki Ellison]
Yeah. Well, hey, great discussion. I don't think you can get a discussion that we just had to be able to explore that whole process and enlighten the people that are listening to this or reading this aspect of it.

You've made your statements, your thoughts have made our ability to make change fast. And I think it's all coming. We could have another discussion a year from now to see how accurate you have been in this discussion on how we got to go.

But we have to go. And it's being forced on us. It's being forced on us.

So, thank you for taking the time and effort to simplify everything, to be able to articulate it the way you can articulate that. I don't see very few people in the world could do what you just did over the last hour on this. So, thank goodness you're with us.

You're with us to help the world and the nation make this place a safer place through the evolution of missile defense and IMD, which is what we discussed today. So, thank you. Thank you, Ron.

Thank you, Shotgun. I appreciate the time.