

Leveraging Combined Joint All-Domain Command and Control

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Brig. Gen. Daniel C. Clayton:

All right. Good morning, everyone, and welcome to our panel on Leveraging Combined Joint All-Domain Command and Control, CJADC-2. Since this is the third day of AFA at 7:30 in the morning after Fat Tuesday, the fact that all of you are here means that you're just as passionate about command and control as we are. So thanks for being here. I will say that oftentimes today, command and control is discussed in terms of having more robust connectivity, better access to data. However, I would say from our perspective on the Advanced Battle Management System Cross-Functional Team, it's more about information and decision advantage. So whether that's from the land, the sea, the air, space or cyber, the data and the information necessary to make those decisions is what we're really focused on. And how do we do that differently than we have done in the past.

Brig. General Luke Cropsey, my partner in crime here in the front row, will be talking about this more in a couple hours in the big auditorium, but I think for this morning's panel we have three phenomenal experts from industry who are going to help us guide through this conversation. So with that in mind, we have Mr. Conn Doherty to my right, Vice President and General Manager, Battle Management Command and Control and Autonomy Solutions from Collins Aerospace. To my left, we have Mr. Bob Ritchie, the Chief Technology Officer, Science Applications International Corporation, SAIC Incorporated. And then finally, we have Mr. Chad Haferbier, Vice President, Multi-Domain Solutions Division, and the Manager at Leidos. So I'll ask each of them to give a brief introduction and then we'll go through a few questions and start the conversation. So Conn, we'll start with you.

Conn Doherty:

Thank you, General Clayton. Good morning and it's great to be here. So thank you. As mentioned, I'm the vice president and general manager of our Battle Management Command and Control and Autonomy Solutions under Collins Aerospace, a RTX company. Our portfolio was actually created in the middle of last summer. We did a realignment of different strategic parts across all of RTX, so Raytheon, Collins, Pratt and Whitney to really try to bring together complimentary capabilities that can help accelerate CJADC-2. And that's our focus and we'll talk a little bit about that today. Thanks again.

Brig. Gen. Daniel C. Clayton:

Awesome. Thank you. Bob.

Bob Ritchie:

Hey, everyone. So as mentioned, I'm the CTO at SAIC, which SAIC is nice enough to let me keep that title, even though that's probably more my night job than my day job. By day, I spend most of my time as the community practice lead for Cloud One, technical advisor to programs like ABMS, CBC2, and SDA's BMC Cubed. And I am very passionate about what we're talking about here today. It's been kind of the length of my career is software-defined infrastructure, software-defined mission outcomes, and getting the right data to decision advantage. Thanks.

Brig. Gen. Daniel C. Clayton:

Thanks, Bob. Chad.

Chad Haferbier:

Thanks, General. Chad Haferbier, Multi-Domain Solutions, Vice President for Leidos. Very proud to be here today. I've been involved with ABMS since it was AIR and not advanced, and the progress being made is tremendous. What we are doing here at Leidos is, I drive the corporate strategy to ensure that we are of a total commitment to open architecture, non-proprietary solutions to enable that perpetual advantage, perpetual modernization for things like ABMS and the goal for ABMS and CJADC-2 across the joint force. So very happy to be here and looking forward to the discussion.

Brig. Gen. Daniel C. Clayton:

Awesome. Thanks, Chad. All right, we'll get into a few questions. So first off for you, Chad, what recommendations do you have to accelerate the progress of CJADC-2 through the services?

Chad Haferbier:

Yeah, I would say the Air Force is certainly going after what I would recommend across the joint force, especially with General Cropsey sitting right in front of me, I'm not going to question anything he's doing. But heterogeneous environments, commitment to heterogeneous environments, you're never going to have greenfield. ABMS is certainly doing that. They know that they're going to have to be forward compatible and backwards compatible with legacy systems. That's something that I think definitely is being embraced by ABMS and the DAF Battle Network approach. Another thing that I would recommend is, how do you look at risk. When you avoid risk to all end, if that's your top priority, you're not going to make a lot of progress.

And so I think to accept some risk and embrace some failure so that you get outcomes in a more rapid fashion, to me is a good approach. And I do see the Air Force embracing that. So those are two things. Another thing that I also see the Air Force leading is how do we work across the joint force? How do we lead with the Army, with the Navy, and even into the Title 50 side of how can we convert multi-domain, multi-service, multinational data into information? Back to your point.

Brig. Gen. Daniel C. Clayton:

Awesome. And I'll just note for the audience, from our perspective, everything that we do is the DAF Battle Network. So it's the Department of the Air Force. So it's integrated by design between the Air Force and the Space Force from day one. So oftentimes some of our partners in the joint world will make that comment of like, "Hey, you're not joining enough." And we're like, well, we are because we're DAF by design. It's the Air Force and the Space Force working together from day one. So I'll turn to Conn briefly and say from an industry perspective, what barriers do you see and all of us moving the ball down the field and achieving the vision of CJADC-2?

Conn Doherty:

Yeah, I think there's primarily three. So first is kind of organizational alignment, both on the government side but also on the industry side. The second would be collaboration, and the third would be infrastructure. So from an alignment standpoint, Secretary Kendall's announcement I think is very exciting and pushing the Air Force forward. I think on the industry side we need to do some of that as well to stay aligned with that change. I think some of the things that we've been doing is hopefully moving in that same direction, that alignment is just absolutely key for us to make sure that we're helping each other accelerate and that we don't see any kind of disconnects. Oftentimes industry is a reflection of our customers and how we organize. So I think that's something that we'll have to work

together on and is a great opportunity. The second, as far as collaboration, similar to CJADC-2, communication is absolutely foundational.

We need more communication between customers, industry, industry customers, across customers across industry. So it really is in all directions. It's been talked about by other speakers, just more open and frequent communication so that we're aligned. We don't have disconnects, et cetera. The last one on infrastructure, I think we're making some strides here, but right now it's taking a lot of time to build out infrastructure and the more we can predict that based on feedback from customers, we can really get ahead of that. One area here, I think on the industry side, we can actually maybe collaborate a little bit more and we're building out a SAPF space in Dallas that's going to be a shared space for industry partners. So things like that so that we don't have to each be building our own facilities, networks and the time it takes to do that is something that we need to really be open to and come together and work on.

Brig. Gen. Daniel C. Clayton:

Yeah, I appreciate that perspective, especially the second point on collaboration. That's something that again, John Cropsey and I are working on with, again, it's really based on Secretary Kendall's leadership and guidance to say how can industry and government work together better in the future to solve the operational problems that we're all going to be faced with. So thank you. All right, Bob, we'll turn to you and ask a similar question, but specifically, how should the services leverage software in this realization of CJADC-2?

Bob Ritchie:

Thanks. So I'm going to open up with my bias. I'm a software engineer by trade. So in all ways is the simple answer to that question. No, but I think kind of embracing the software-defined future is one aspect of it. The fact that we have software-defined infrastructure, software-defined networking, software-defined data access policies, security enforcement point policies, policy enforcement points, having all of that software defined allows teams that are traditionally siloed to come together, work together, and then doing that in a controlled space and leveraging some of the enterprise advancements from DAF, whether it's Cloud One for software-defined infrastructure across the cloud providers, down to the edge, or programs like Platform One that establish some facilities for reusable code across the entire DOD and even with our coalition partners, it allows us to move faster by focusing on our mission outcomes.

Lastly, on that front, the collaboration space there to be able to focus and my favorite use case is CBC-2, again near and dear to my heart. I'm biased there, but allowing multiple software providers to come together into a government owned and controlled space that's not only operational for C2 systems, but for them to experiment and simulate results as part of that kind of end-to-end digital thread has been really powerful with getting non-traditional contractors and vendors in the space and contributing to the fight.

Brig. Gen. Daniel C. Clayton:

Thanks, Bob. And I'll just note you'll probably hear more about this again from Luke and I later today, but the fact that CBC-2 has already been deployed to the Eastern Air Defense sector last fall and then the Canadian Air Defense sector last month is pretty impressive. And so again, for most of the folks in the audience, we've a hundred percent moved beyond lightning bolts on charts and we're actually into actual deliveries of real capability for the warfighter. So I appreciate that. Chad, since Bob also brought

up allies and partners, this next question will be for you with respect to how does industry lean forward or think about being integrated by design with our allies and partners in this CJADC-2 space?

Chad Haferbier:

Yeah. So that's something we take very seriously at Leidos. We are really positioning ourselves to help in the joint fight and in the mission partner environment. I know that there's some efforts as U.S. [inaudible 00:10:39] gets modernized and opportunities there to collapse those networks into a more modern infrastructure. I think that's something that we're really investing in, multilevel security and ICAM solutions that will enable quick, rapid data sharing at the right levels with zero trust principles being observed. Another thing that back to what the Air Force is doing is a fundamental shift away from a platform centric acquisition, which is how you get to those outcomes where you get lots of users on the same kind of baseline. So the fundamental shift away from platform centric to more of an architecture centric acquisition approach, I think will pay large dividends in our ability to integrate not only across joint force, but across nations.

Brig. Gen. Daniel C. Clayton:

Thanks Chad. And I'll also just note because we have several of our allies in the room, thanks for being here. From our perspective in the ABMS CFT, our transformational model has kind of done that functional decomposition and we've shared that with all of our Five Eyes, NATO's to include France and Japan as well. And so getting them to buy in on the front end of this architecture and this understanding of how we're trying to build it from the bottom-up I think is going to be very important in the future. So Conn, this question is for you next and it gets to some of the, we talked a little bit about backwards compatible and forwards compatible, and so from your perspective, how has Collins Aerospace addressing the need to create the CJADC-2 network of heterogeneous systems that have to behave homogeneously?

Conn Doherty:

So I think it's really critical that we first take a kind of top-down macro look to understand kind of where the vision is, where we want to go and do that in a way that, as mentioned earlier, it's open, it's multi-domain from the beginning. It's grounded on really solid systems engineering and includes digital engineering from the very beginning. I think the ABMS digital infrastructure is going directly in that vector and making really good progress. And so I think that's kind of the leading light for us as far as where we're going. With that though, you need networks that are bridging those heterogeneous networks and building a homogeneous network to the extent you can. From a Collins Aerospace perspective, we're kind of attacking that in two ways. So one is developing really capable wideband multi waveform systems that can be able to effectively speak multiple languages depending on what networks available to them.

And then the second one is building out intelligent gateways. So we've been investing a lot into this, trying to create bridges across networks that can do the data management, do the networking that is required to actually get the data where you need to get it in a form that's usable within the timelines that is needed. The third I would say is really accelerating and pushing that tech development and testing, demonstrating in relevant environments. So we've been working on large force exercises over the last five or six years, taking capabilities, showing the maturity, showing where they have weaknesses so that we can invest to close those gaps. And they also have been really helpful to also bring in allies. So it's not just the Air Force or multiple services, but the allies as well. To Chad's point, look at how do we push the data across those different types of security environments in an effective way? And so just

coming back to ABMS, I think we're making great progress. We'll have a lot of work to do ahead of us, but that is one of the key points that I think we are attacking.

Brig. Gen. Daniel C. Clayton:

I appreciate that perspective and as everyone in the room knows, we are faced with this challenge of both trying to ensure that our warfighters can fight tonight as well as design and build an architecture that is what we would prefer in the future. And this gets the previous comment about getting away from platform specific warfare as opposed to systems specific warfare. So appreciate those points. Okay, Bob, turning to you now, as we all know, command and control is probably going to be more dynamic in the future. It'll be less static. And so with the anticipated fog and friction of war in the future, what types of tools and analysis does SAIC believe the warfighter needs in order to make these CJADC-2 decisions?

Bob Ritchie:

So one of the key dimensions that we believe is foundationally important, and you kind of touched on it right at the beginning, is kind of that integration and fusion of data across heterogeneous systems and the ability to physically co-locate data but logically segregate it through kind of more advanced software-defined RBAC and ABAC on that data, unlocks an ability to reduce the cognitive load on the warfighter. In terms of, instead of having 12 or 14 screens that they're looking at across those non horizontally integrated platforms of your, now getting to more not only fused data sets, but instead of dumping all the data into one view, leveraging the fact that the data can all be aggregated together and now we can have applied whether it's rules engines or models that are trained on that data to help augment and take some of that cognitive load away.

So an example, anomalous track detection in the NORAD Northcom use case on CBC-2 is a great example where before there might be disparate screens that all that is going on in the warfighter's head, especially during the fog of war, as you mentioned, the friction of war, the ability to kind of reduce that cognitive load and let the warfighter focus on command and control as opposed to having to fuse data is really a key element.

Brig. Gen. Daniel C. Clayton:

I appreciate that. And because I'm clearly not as smart as these three gentlemen, I always try to go to analogies that are useful for the average American or the common person, i.e. me. And so for me it's about DirecTV. So the example I used is 15 years ago, it's great that you have 2000 channels. You could probably only watch one at a time, maybe two if it's picture and picture, but then you're trying to do that fusion of data at the same time. And so a hundred percent concur of the better we can get the single screen with the exact right information that that decision maker needs, the better.

So following up with you, again, I'll just say that as our near peer competitors continue to try to disrupt and deny what we're trying to accomplish across multiple domains, where is SAIC focusing development efforts to allow assets to operate in an isolated fashion at the edge and then resynchronize with the larger force packager cloud. And again, because I like analogies, this is probably kind of like when all of you flew out here, you put your phone on airplane mode and then you landed and you took it off and then a whole bunch of stuff popped up and you're like, oh my god, what did I miss in the last two hours while I was on my flight? So how is your company tackling that?

Bob Ritchie:

Yeah, that's a great example and it's kind of leveraging the open systems architecture that Chad was highlighting is designing these systems of systems to be redundant and resilient both from when they're

globally connected, whether we have reach back through multiple channels of comms to CONUS cloud hosted systems, but then also locally in theater, the ability to have a local network mesh and comms mesh that that integrated data picture needs in order to ride on. And then the other kind of aspect of that, again, I'm a software engineer, so it's going to be a software answer is having everything software defined allows us to practice distributed GitOps across that cloud to edge, so that we're able to pull updates when I have connectivity, you have a much better IT and OT operational control of the software and the data that's flowing and the distributed aspect of that.

And to pull on your analogy from a DirecTV standpoint, it's kind of the internet service provider that we're all really comfortable with, the ability to have high connectivity back to an ISP used to be for only areas where fiber was ran. Now you have the advancements in kind of space stage comms with Starlink and those are some of the communication channels we're taking advantage of at CBC-2 today. And then SAC Envisions will be taking advantage of in our Talk L packages in the future to have not only highly resilient comms, but almost making it to a point where it becomes non-productive for a pacing threat to disrupt our comms because we have so many channels we can hop to.

Brig. Gen. Daniel C. Clayton:

And again, only because I'm the simple person up on the stage here. For me that is, I think again, most of you probably have one if not two cell phones in your pocket right now. And the fact that inside of those cell phones, there's an algorithm that's, right now, it's going I don't care about that wifi signal. I don't care about that cell tower, but this wifi signal over here because Luke and I are friends and I've been to his house before. And so that signal is actually stronger than that cell tower or there was a power interruption over here with his wifi router. That's already baked into most cell phones today. So is that a similar model for what you're describing?

Bob Ritchie:

Yeah, absolutely. Absolutely. And to that end, and one of the really interesting things, I don't work for SpaceX. In SpaceX, I don't own stock, they don't pay me, but they have a really interesting advancement and they partnered with T-Mobile, and I wasn't tracking this until last week when I was on a panel with them where they actually have a Starlink uplink baked into the T-Mobile phones now so that if there is no 5G coverage, it auto hops to 5G via Starlink without having to go to Costco and buy the kit. And so as that advances moving forward, imagine having a secret or as we kind of build this homogeneous network, logical homogeneous network, now at the end user device, I don't have to make that same cognitive decision.

Brig. Gen. Daniel C. Clayton:

I think that's a really good point that again, that's what C2 BMPEO and ABMS EFT are kind of taking that approach and methodology, which is how can we make the DAF metal network as resilient as possible? So for a lot of the operators in the room, you're all familiar with PACE plans, which are primary, alternate, contingency and emergency. The more of those options that we have out there, the more likely it is that you'll still be effective and successful in the future because you have multiple pathways and as you just stated, different classification levels to get that information through. So okay, this last question will be for each of our industry partners. We'll start with you Conn. So first up, what is your company doing specifically to address the increasing needs of the warfighters evolving CJADC-2 efforts? And we've kind of alluded to it already that the rapid pace of change in both technology and then software is probably making this a little bit challenging. So how is your company handling that?

Conn Doherty:

Yeah, my organization and our business was assigned the CJADC-2 lead for RTX. We have a initiative called Connected Ball Space that is coordinating across all of RTX. We felt the need that there needed to be a organization that was responsible for that coordination and collaboration across the company. And we have a extremely diverse portfolio. So across Raytheon with sensors and effectors, Collins with comms and networking and other capabilities, secure processing, even Pratt and Whitney, and understanding the advancements that they're making for different type of platforms. We're working together to see how does that all fill in CJADC-2 and do that in a coordinated way, not only within the company but also with our diverse customers. So have that dialogue with them as far as how do they see them contributing to CJADC-2 and then trying to connect them with the right people on the customer side to help them be a part of that solution. So that's really kind of our focus across the board and we believe the realignment from last year will help us accelerate CJADC-2 in the right direction.

Brig. Gen. Daniel C. Clayton:

Chad.

Chad Haferbier:

So we're obviously making investments as I mentioned before in IRAD, but I would say even more importantly is the talent that we're applying to these problems. A program like Chimera, which Leidos has partnered with Kessel Run on, I'm passionate about getting the best software developers in Leidos on that program to help them take that thing into the next phase and into scale. That's an example. Some of the best folks in the company are also working on the ESET team for ABMS. So really to me, that's how you really invest and commit to progress is bringing the best talent you can to those problem sets.

Another thing, much like Conn mentioned with RTX is we've also organized to optimize our ability to create decision advantage. In fact, the business unit I report through is Entitled Decision Advantage Business Area, and I'm the MDES guy for that. But we are aligning that so that we can also get ahead of where the puck's going with breaking down the stove-pipes between Title 10 and Title 50. That intel flavors is prevalent even though we don't maybe talk about it too much for good reasons, but our ability to convert that data into information is going to be critical and we want to position ourselves to meet that need now and into the future.

Brig. Gen. Daniel C. Clayton:

Bob.

Bob Ritchie:

So what he said. No, I'm just kidding. On the ESET side and ABMS DI, that's obviously really important. And to Conn's point, even a really great example of an acquisition vehicle that makes it a first class citizen for multiple vendors to work together on an open system architecture. So I'm very excited and we're, as Chad said, at SAC investing the same way and bringing talent to that program. I'd say also in that front attacking all the layers that we see as necessary. So building out NextGen networking capabilities across all the forces, expanding the reach of cloud one to now really encompass all forces. It's already hosting, certainly Air Force and Space Force systems, but also Navy, army, coast guard, NORAD Northcom use cases thanks to CBC-2, but Syncom, the transcom and many of the combatant command. So it's already becoming, the DAF has stood up this capability that's DOD wide.

And how do we make that and embrace it and work with DISA and Hack and OSD to expand that in a way that's complimentary to what they're doing with AWCC. And then lastly is kind of this decision advantage at the edge. So we mentioned we're really focusing on how do we make sure comms can't be disrupted, but also in good defensive programming, building systems that degrade gracefully. So like you said, when I'm flipped on airplane mode, I can still do my job as a warfighter, still have all the data that I need, maybe not as exquisite data as globally fused, but now I have locally all the data I need to still conduct war fighting. And so pushing the ability to connect and collapse that data down to the tactical edge, as far down to the decision maker as possible is another area where we're really heavily investing in.

Brig. Gen. Daniel C. Clayton:

So I'm mindful that this has probably never happened in the history of AFA, but we're definitely below cost, we're ahead of schedule and these three gentlemen have clearly performed better than I anticipated I would perform. So we have a little bit of extra time here, but I'll offer it up again to each of these three gentlemen, any specific key takeaways that you'd like the audience to leave the room with? And Chad, I'll start with you and your company with Leidos.

Chad Haferbier:

Yeah. One thing that I've always found successful throughout my career when you're building a solution or working through an acquisition is early and prominent warfighter involvement, which you present for ABMS. And I think that is a model that should be observed throughout joint force. So thank you for what you're doing. The work you guys in Beep has been doing to kind of document the approach, I think really helps General Cropsey with his architecture focused acquisition approach and it helps the industry understand how we could optimize to meet those outcomes.

Brig. Gen. Daniel C. Clayton:

Thanks Chad. Bob.

Bob Ritchie:

Yeah, I guess foot stamping that, at the acquisition model that CBC-2 has leveraged, the software acquisition pathway, the more that that can be leveraged, I think as much as the technical advancements and bringing the right talent to the problem and kind of bridging the gap in terms of how do we make sure that non-traditionals are able to contribute to the fight, software acquisition pathway is a really excellent method for focusing on the objectives as opposed to iterating on a PWS. And it aligns exactly what Chad said on the architectural driven side. I'll also throw out there, and this is kind of, I hesitate to identify as a large prime because LinkedIn might blow up and say, oh, they're an evil large prime.

But one of the areas that I do see a lot of us focusing on and really successfully is how do we take the responsibility as traditional systems integrators, large systems integrators, moving to a more software defined system integrators, which allows us to kind of open the door and bridge the valley of death, if you want to call it that, the non-traditionals and the innovative startups have to get into the ecosystem. So the more that we can create integrated development environments that are secure by design and kind of managed by government programs, the less that barrier for entry is for those garage developers as SDA likes to call them, to be able to contribute to the fight. Because there's a lot of really passionate patriots out there who just don't have the facilities or infrastructure. So I think that's a really important responsibility and one that we're focused on.

Brig. Gen. Daniel C. Clayton:

Conn.

Conn Doherty:

Definitely agree with everything Chad and Bob said, I'd foot stomp a little bit. I go back to kind of collaboration and communication, at least from our perspective, we want to open up the community of people that can participate in helping solve this problem. It is really a community problem and we need everyone to be participating. So whether that is opening up facilities for non-traditionals or whether it's helping access contract vehicles, really trying to help drive that, I think can be a game changer. It kind of goes back to Chad's point about bringing the best people to the problem. That's not just best people within our companies. It's best people across our industry and other industries as we go attack this. And no one knows all the great talent or technology or products that are out there, but the more we communicate and share that, the more we can reuse things and not recreate the wheel and go faster. So I would just foot stomp that collaboration and communication really very broadly can really help us go faster.

Brig. Gen. Daniel C. Clayton:

Awesome. Thank you gentlemen. I will note in closing that that's one of the things that we also think we're doing slightly differently than maybe in the past, which is the close collaboration between the requirements and the operator community and then the acquisition community. And General Cropsey and I are also bringing in the resourcing community. So in the department of the Air Force, we're trying to ensure alignment between those three tribes for both the Air Force and the Space Force to ensure that the requirements, the acquisition and the resourcing communities for not the entirety of the DAF portfolio, not for all of C2, but just for the DAF Battle Network. We're starting to see getting the right people in the right room to have the right conversation actually starts to move the ball down the field a little bit faster.

So with that, this concludes the leveraging CJADC-2 panel. I'll just say again, thanks to all of these amazing and smart gentlemen for their time this morning. For all of you, please enjoy an extra 10 minutes of your morning back to get a cup of coffee based on last night. And then also just for everyone in the audience, just invite all of you, Ms. Heather Penney, Brig. General Luke Cropsey and I, all of us will be up on the stage over in the Aurora Ballroom to talk about connecting and empowering weapon systems at 9:45. So thank you very much.

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