Brigadier General Luke Cropsey, Department of the Air Force Integrating Program Executive Officer for Command, Control, Communications and Battle Management, Holds a Background Briefing

Reporters sat down with Brigadier General Luke Cropsey, Department of the Air Force Integrating Program Executive Officer for Command, Control, Communications and Battle Management, for a background briefing on the C3BM and Advanced Battle Management System and C3BM integration and modernization efforts. This transcript was edited for length and clarity.

Brig. Gen. Cropsey:
Thanks for the opportunity to chat with all of you today. There is a lot going on in this space. I thought what I do is give you a little bit of brief professional background on just me personally, and then you a little bit about what I think the 'go-do' is from the Secretary on this front.

[Cropsey Experience]
As kind of a background on me, I'm a '95 Air Force Academy guy, graduated with a degree in mechanical engineering, Materials Science Degree from Michigan State, and then a System Engineering Degree from MIT. I also attended the National Defense University and spent a year at the Eisenhower School.

I have almost 30 years of work in engineering and programmatics inside of the Air Force acquisition community - everything from F-35 bullets to intercontinental ballistic missiles - and I've loved every single minute of it.

It's been a tremendous set of experiences, which kind of brings me to where we are today , in regards to the command, control, communication and battle management front.

When we say C3BM it's kind of an acronym packed into what we're doing regarding exercises command and control, the communication hooks and our process of doing it.

I'll give you a general program description, and then I'll tell you a little bit about what I've learned in the last 60 days of my 'listening campaign' since I've started on the job.

[C3BM Mission]
I think overall, what the Secretary is asking us to do inside of the C3BM program office is provide an integrated battle network that's delivering resilient decision advantage. All of that is oriented around our ability to beat the pacing challenge that we have in front of us.

To that end, there's are two things that are important to note:

The first, is a how do I get survivable command and control? What does that mean and look like when you're inside of a peer fight against somebody that has the ability to actually target your C2 functions -- as a set of targets themselves. Part of this is about changing the paradigm on how we do our command and control across not just the Air Force, but how that then engages with the

joint fight, in terms of the JADC2 connection, as well as with our sister services and their concepts around how that happens.

The second part of it is then how do I employ that survivable C2 to support a combatant commander's scheme of maneuver with regards to how they intend to fight the battle, win the war.

They're two separate problems, but inextricably linked in the sense that on the one hand, I'm looking at C2 as a function that I have to protect. And on the other hand, I am addressing C2 as the element behind how I'm going to actually go command and control the forces that I have to get to the battle outcome that I need.

[Integration Challenges]
Those sets of problems or challenges introduce an interesting set of integration problems that have to be solved. There are three integration problems.

- The first integration problem is technical and that's probably the one everybody thinks about first. And it's - how do I actually make the physics of this problem close? In terms of the ability to go from find, fix, track, target, engage and assess set of functions - the things that we think about when we say 'kill chains'. A kill chain is composed of those functions. And my ability to do each one of those functions is a product of the things that I have across my force that gives me the information I need to make those decisions.

  And so the technical problem - the technical integration challenge - we have is how we combine all of those different parts and pieces across that whole kill chain, across that find, fix, track, target, engage and assess set of activities, so that we can make the effects that we need happen – the actual reality in the process of doing that.

- The second integration challenge that we have is what I'll call an infrastructure integration challenge. And this gets to the idea of the networks, different security levels and what I call the 'digital design space' that we have to integrate around. All of those -- all of those networks and security functions and digital engineering capabilities have to actually come together in a way that will allow me to do the first integration problem.

- The third integration problem is how do I do all of that inside of a structure that is designed to do platform problems? If you think about the way that we plan, we do requirements, we budget, we do acquisition programs--they're all kind of weapon system centric in the way that we think about and execute them.

  This problem is fundamentally different in the sense that we're trying to do a horizontal integration across all of those individual platforms in order to create an effect in the battlespace. In order to do that, the processes that we use to do the requirements, to do the acquisition and do the budgeting, have to be looked at in kind of fundamentally different ways so that we can integrate those -- those processes to support the kind of system of systems that has to exist for that -- for that overall effect to be generated.

So three integration problems that we're trying to solve kind of all at once and in a way that stay aligned. The technical piece, which I think is the obvious one, the infrastructure piece that gets to the networks and the security piece. And then the process element that gets to how the department does the PBD cycle--and the way that looks and feels.

You'll hear me talk a lot in terms of the Q&A about integration. You'll hear me talk a lot about our ability to make the problems solvable because of the level of complexity that is involved in this. So how do I avoid the trap of trying to boil the ocean as we're solving this? And part of that will involve these kill chain conversations around being specific about the things that we're trying to accomplish.

And the other thing that you'll hear me talk about consistently is a term I'm using called the 'battle network'. And it's probably helpful for me to define that upfront, because you'll hear it over and over again and it's not necessarily a term that has been previously articulated. When I talk about the battle network, I'm talking about the composite set of things that are operating and connected for the entire command and control structure that function effectively. That's going to include things that have to plug into that kill chain like sensors, fighter jets, and satellites. You kind of name the things that have to be integrated. It includes the communication networks that allow message trafficking data and command and control functions to be executed across time and space. It includes the computation that has to happen around the data and the ability to generate decision quality information for somebody to look at and make decisions around. It involves the ability to actually assess how well all of that is happening. So when I say battle network, I'm talking about the composite picture of all of those things in a aligned and integrated way that -- that allows me to produce the outcome that a combatant commander needs.

[C3BM Structure/Leadership]
The other thing that I think is important to mention upfront is that in addition to standing up the program executive office for C3BM, the Secretary also hand-picked Dr. Brian Tipton who is serving in the role of the Chief of Engineering. And I think there's an important distinction to make here.

Under the role that the Secretary gave me as the integrating PEO for C3BM, he intentionally combined two specific authorities that have been in two separate places. There is acquisition-related authorities that are tied to the DAF RCO's execution of the ABMS program. And then there are Chief Architect Office authorities that were tied to the chief architect.

And what the Secretary did when he stood up C3BM is combine those authorities under me. My office is composed of the ABMS program that used to be under the RCO, and the Chief Architect's Office that used to be under Preston Dunlap. Those two offices now exist under me in a combined program executive office.

In the process of doing that, the other thing that happened is under that role of chief architect, the SECF also reintegrated the concept of having your chief architect and your system engineer in a single place. He did that in part so that the connection between the architecture and the actual design of products would be tightly coupled.

If you're looking for somebody that is kind of rolling in behind that chief architect role, that person is Dr. Brian Tipton, but he has more than just the chief architect authorities. He also has the system engineer and authorities that are needed to actually affect that battle network from an acquisition design standpoint.

I just wanted to make those distinctions clear, because I think as we're moving forward, there's been some conversation about, well, how is this different or the same from what existed prior?

Those are probably two key points that I want to emphasize as we're moving forward. We have a program executive officer who has combined PEO and architecture authorities. And we have a chief of engineering that is both the chief architect and the chief system engineer on the program. The integration of those roles is going to be important as we move forward to make sure that we have tight correlation between the architecture element and the product element.

[60-Day Observations]
What I'll do is close with a quick recap on kind of some of my observations from the first 60 days on the job. One thing that I will tell you is that before I got into this particular role, I was not, I guess, appreciative of the extent of collaboration that is going on across the services in this particular area. I had the opportunity to go out to Project Convergence 22 that the Army ran out at Camp Pendleton. I had the opportunity to go out and talk to the Navy and Project Overmatch in NIWC out in San Diego. I was able to talk with Lt. Gen. O'Brien from a JADC2 perspective. In fact, we had a conversation just yesterday. There was actually an amazing amount of -- I'll use the Army term here -- of 'convergence' between and across the services and with OSD around how we're getting after this problem that, quite frankly, I was not expecting. And that was a refreshing surprise when it -- when it came to the degree of alignment that is already happening on that front. From my experience in the last 27 years of working inside of the department, there is really an almost unprecedented degree of collaboration that's going on grassroots-wise across the services in this particular area.

I'm actually hugely encouraged by that conversation. I think it's worth pointing out upfront that that's going on, because we're not going to solve this problem separately and independently. We're going to have to solve it together collectively as a joint team. I was also hugely encouraged with the conversation I had with Lt. Gen. O'Brien and the efforts that are ongoing down on the -- on the Joint Staff with regards to some of some of the conversations that are happening there, as well.

[Leadership Support]
With that as kind of my -- my opening pitch - I just came from talking to the Secretary before this meeting. He is absolutely committed to figuring out how to get this integration problem moving forward in the right direction. And he is absolutely committed to making sure we've got the right resources and authorities behind what that looks like and how we do it. Every time I see him, which is frequently on this topic, that's the first question he asks me – 'are you getting what you need in order to get this thing going?' I think we've got the right senior leadership level of engagement on this. We certainly have the Secretary's attention and, no kidding, everywhere I've gone it's been nothing but, hey, how do we help you be successful in this? I think there's a wide

recognition that this is a problem that we have to get after. And we've kind of got a set of integration challenges in front of us that we need to figure out how to tackle hopefully as a team.

Q: Thank you for taking some time to talk with us. Can you lay out some of your priorities? You mentioned not boiling the ocean. What do you think are low-hanging fruit here that could be integrated more quickly? And what are some of the high-value targets that might take some more time, but need to be the priority?

Brig. Gen. Cropsey:
To be honest, we're still doing that analysis right now. I don't have a, I'll call it, a list for you with regards to that. I will tell you from a methodology standpoint, the way that we're getting after that. Dr. Tipton is running a set of assessments around answering that question over the next couple of months, and actually that is one of the due-outs that I owe the Secretary the next time I see him.

My marching orders are to have that initial set of go-do's. I call it kind of the 'start-change-stop' analysis for what we have going on. And then are there things that are missing that we need to get after that aren't currently in the portfolio. That assessment is what we need to try to get after in the next 120 days.

Q: Back in the early days of ABMS, we heard a lot about the focus to define capabilities to get to the warfighter very quickly. Then there was Capability Release #1 - the pods and KC-46. Then Capability Release #2 to follow, and I think was even a release #3. But since those announcements never really came to fruition, what's happening with those areas? And you had mentioned needing to overhaul the acquisition process. Can you expand a little bit on how you can get after that?

Brig. Gen. Cropsey:
Maybe let's say that in a different way. I think what I was trying to communicate isn't so much that I need to overhaul any one of these processes as much as I need to find a way of integrating them.

Right now, the way that the current process works and kind of, I'll call it, the corporate structure is I've got a requirements owner and the A5 that works the requirements with a lead MAJCOM, usually ACC or Global Strike command. Those requirements get built. And at some level, they get validated – the capital "R" - requirements process. That requirement then gets handed to the acquisition community to kind of go flesh out an act strategy around how we would actually solve that requirement. And then that generates a budget wedge that gets handed to the A8 in terms of the amount of money and the phase of those things have to get done.

That is start to finish, we go from requirements of the program to budget. That is the set of processes inside of the department. And It's not even just an Air Force thing. The way the department and the PBD process itself works with Congress is designed around what I'll call an organic kill chain kind of a perspective.

Back in the day, Vietnam era kind of perspective, which is one that was designed and built by McNamara, you could put a pilot in a jet with a bomb and they could find a target and kill the target without needing to go talk to you or otherwise reach back to anybody for help. And we built the system around the idea that you needed to be able to integrate at the platform level for that combat effective mission to be real. The whole process is built around a platform-centric view. When you talk about a system of systems problem where you no longer have the ability to execute on an organic kill chain, which means that you have to go bigger than the platform, those processes that have been built around those vertical platforms now have to be integrated differently for you to get to that system of systems.

When I talk about the battle network, our ability to understand the various things that all have to collectively go together through those processes now require another level of analytical rigor, another level of understanding how individual platform choices affect the whole battle network. And that's a level of integration that we haven't really figured out how to do, I would say, at kind of the base-level for how to operate the whole department.

And that's been the classic challenge. You may have heard the Secretary say it's the hardest problem he's handed over to somebody to go figure out. A lot of that is baked into the structural challenges that exist across the department and how we execute those requirements, acquisition, and budgeting processes that are designed around those vertically-integrated platforms.

So I don't know that it's 'broken' in a sense that any one single set of processes needs to be rewired. I think it's more about how do we integrate those processes that are designed around those platforms to actually work for a system of systems in a horizontal-integration problem. So that's kind of how I would respond to that first piece of it [question].

[For the second part…how I would characterize the Capability Releases] The RCO has been, I think, extremely effective at putting definition around what CR1 looks like: there is a clear set of deliverables associated with CR1, there is a timeline, there's an operational requirement associated with those things, and there's an RPRV. All of those things have kind of been laid flat from an acquisition standpoint. The nominal framework that was used when CR1 stood up was that we would do this kind of in subsequent ways. CR1 would happen. And then based on what we learned and kind of how the needs matured, we would have subsequent CR2s, CR3, etc…etc.

I think what we're finding as we're getting into this is that structure of one to two to three may not have provided the flexibility associated with the way that we need to think about addressing the level of integration and the level of complexity around what that looks like. You could also look at it as a nomenclature around how do you continue to evolve the capability, that you're trying to put out, time over time?

If we think about the problem that we have in a classic kind -- here's the box and I deliver the box. Then here's the next box and that's the next CR. Then we're not going to get where we need to go. Instead, we need to think about what we're doing in the -- in the context of this particular problem set, more in almost a software kind of a way where we're thinking about continuous capability delivery and our ability to basically evolve the baseline for the C2 problem in a continuous kind of a way that allows us to react at both the speed of how the technology itself is

evolving, because it's evolving really fast in this space, and quite frankly how the threat is, and the pacing challenge is evolving.

Between those two things as you're looking at the problem space that you have. One of the challenges that the Secretary handed us is how do you structure an acquisition strategy around something that's moving that fast?

And I think part of what we have to go look at is kind of some of these underlying structural models that we typically have for hardware-centric programs that look at - you know - block upgrades. I've got a Block 20, a Block 30, a Block 40, and say, from a C2 perspective, when you're talking to a battle manager and trying to find a way of actually addressing the scale, size of this problem in terms of the number of targets, the speed at which they're moving, the distances over which they're operating, there is going to have to be kind of a different mindset around how we get after that kind of a problem.

I think what you'll see as we continue to evolve this conversation is that there's this digital infrastructure piece that's baked into the ABMS portfolio of programs that we're getting after that's kind of this underlying enabler. And there are, we'll call them the 'mission pieces' that are running on top. CR1 is kind of one of those things that are kind of in the middle where it's acting as a gateway. But it's not tied necessarily directly to a C2 function. I don't have a battle manager stuffed in that pod. It's really how do I get the comms to where the battle manager is. it's kind of that in-between zone.

I think as we're continuing to evolve our understanding of what our comms problem.

There is C3 for a reason. There's the command and control (C2) part of the problem and then there is the communication part of that problem, which is the third C. They're two very, correlated and highly independent problems, but they're different problems.

The problem with CR1 piece is trying to get after is really the communication part of that problem. And, again, that space is evolving very rapidly. Part of what we're doing as we're working through that sequence of events - is understanding how the communication aspect, the network aspect, actually evolves with both the technology and the pacing challenge so that we're staying continuously relevant to the fight.

I'm not sure how the nomenclature, to your earlier point -- CR2, CR3, CR4 -- plays out inside of that construct. But what I do want to do is I want to be really clear in the way that we communicate 'capability', so that there isn't any ambiguity around where and how that program vector is moving with respect to what the warfighter needs.

Q: Now that you've met with your service counterparts, what is the Air Force going to own in JADC2, and how will you ensure that you won't duplicate efforts like with the Army, with the Navy, etc? And is there room potentially like down the road for a joint program with all the services?

Brig. Gen. Cropsey:
The joint program question is kind of outside of my purview. But I think the way that I would answer the first part of that question with regards to duplication is when you look kind of across the JADC2 domain and how each of the services are going after that problem set, the way each of us are kind of approaching it are kind of specific to the stressing challenge that each service has in the domain that we operate in, and that has actually generated from my perspective an interesting set of complementary approaches.

If you were to sit down and kind of dive into the guts of Project Overmatch--kind of the way that the battle management component to ABMS has been formed and where the Army is going in Project Convergence, they're all kind of pointing at different facets of the kind JADC2 size of this program.

I think the tactical answer to that is the fact that we actually have really good comms going across all of those programs right now about who's doing what at a very technical level, in regards to what that looks like and how it -- how it synergizes.

Q: And just a quick follow-up. Will you all start -- and maybe you already are -- meeting regularly like monthly, quarterly?

Brig. Gen. Cropsey:
There's a lot of ad hoc, grassroots level coordination happening right now - even at my level. So I'm going to give you just a couple of examples -- the Navy sent out an email to kind of the joint team and said, 'hey, can we get together and have a conversation around kill chains?' And that's just part of the daily email traffic that goes through my inbox. I had another conversation with Lt. Gen. O'Brien yesterday on kind of the same topic.

I guess the formal battle rhythm – i.e. somewhere on a calendar that you can publish - I don't have one of those, but I can tell you that a week doesn't go by that I'm not having a conversation at either OSD, Joint Staff, Army, Navy, A&S, R&E--there is a lot of conversation going on, in a very positive way. Not just, meeting for meeting's sake, but in a much more of targeted specific [conversations that] we need to get to some of these concrete outcomes.

Q: What kind of authorities do you have over the other PEOs to make sure that everyone's on the same page and they're not sort of deviating from, you know, the ABMS construct and what your office is trying to do? How do you keep everyone in line, basically?

Brig. Gen. Cropsey:
The good news is we all have the same boss. And actually on the PEO front, I only say that a little bit tongue in cheek. For example, Mr. Hunter two weeks ago held a PEO roundtable. It was, I call it 'an acquisition in the family dialog', where he had all the PEOs together at the same time at the same place. Maybe, unsurprisingly, I was on the agenda.

I mean, I think we're having a very healthy dialog and discussion about exactly how to answer your question. Because on the one hand, every single PEO is write a direct report to the SAE. I

mean, it's that way for a reason. The first thing I'd say is I'm absolutely not going to get in between one PEO and the SAE as some kind of an intermediate stop. That's not going to happen.

But what is happening, I think, in a very healthy kind of way is we're having a very frank dialog and discussion about – 'How do you do this horizontally integrating thing inside of a structure that's built around vertically integrated platforms? What does that look like? How do we do it? What authorities does the integrating PEO need to be able to execute at an architectural level?'

So if I say, 'Hey, look, you have to be able to connect into the battle network and you have to be able to connect into it with kind of the following set of physical, logical, and data interfaces.' And I hand that to you as a drive requirement for you to be able to meet on your program, we know how to do that. You integrate those into your program requirements, you cost them out and then you have a conversation.

I think where we're going in that discussion is 'Okay, great. You're funded to a certain set of requirements. I just handed you another one. To what extent are you capable of absorbing that additional requirement with the existing resources that you have? And where you don't have those resources?'

Then the question gets into are you going to provide those with the requirement? Or are you going to adjudicate where my requirement falls with all the other requirements that I have so that I'm not getting shredded in the process?

And that conversation is ongoing.

It's a complex topic. And we're working through how we actually, pragmatically develop an answer to that set of questions. But I think most of the authorities that are needed to -- to resolve that all sit within AQ and SQ, because I'm having the same conversation with the Honorable Calvelli as I am with Honorable Hunter. And both of them are absolutely committed to figuring out how we make that work.

Q: Just a follow-up question related to kind of cross DOD coordination, what is your relationship or level of communication with the CDAO when it comes to JADC2? Secretary Kendall kind of indicated that the then Deputy Secretary Hicks kind of indicated that the CDAO was going to be at least trying to sort of oversee on a software level kind of the integration between the services. What kind of dialog are you having, or meetings are you having with the CDAO, or is that still kind of up in the air right now?

Brig. Gen. Cropsey:
I'm actively working through a whole litany of different stakeholders that have parts and pieces of this conversation. In fact, I'm meeting with the new AI2 office later this week to have more of this conversation with regards to kind of how they see, on the OSD level, the operating model that they want to try to start to instantiate around how they do exactly this problem at right now the OSD level?

I think there is a lot of good dialog happening there. Back to your point earlier, there are standing things on the calendar with regards to some of those kinds of meetings that we're obviously integrated into, and that dialog will continue to happen. And I think to the Secretary's point, he's looking to me to kind of provide a more consistent single point of dialog and discussion into that joint environment, especially with regards to the material integration side of this.

Again, I'll reemphasize that Brig. Gen. Valenzia and Maj. Gen. Olson own the operational conversation around what's happening in this space. I am really from the material standpoint and what we're actually going to go buy and field. I'm kind of that voice back into the OSD discussion, and that's where I would look to integrate with the CDAO office, with the AIT conversation, back down to the Joint Staff with like J6, JADC2 element to that.

I'm focused on that aspect of it - I think I'm kind of that touch point.

Q: Thanks for doing this, and I apologize if you might have answered this already. But you were asked the question about the low-hanging fruit in terms of what the new office would accomplish. Can you talk about what maybe the things that would take the longest, or maybe not fully come to fruition?

Brig. Gen. Cropsey:
There is an existing program of record for ABMS. There's three lines of effort associated with that portfolio of programs. I've inherited that lock, stock, and barrel. There is that Airborne Edge-Node work that CR1 represents, there is a cloud-based C2 effort that's ongoing and then there's the digital infrastructure component to that. Those all have program cost schedule and budgets that are associated with them.

In addition to those programs of record that are already on the books, there are a number of additional efforts that are outgrowths from the operational imperatives work that happened over the last year that we're also looking at how we integrate into that portfolio of programs and how we provide capability with regards to our engagement with both INDOPACOM and with EUCOM, and the Air Force components associated with those AORs.

That work is also ongoing.

I think I can also expand the dialog to include things experimentation-wise that are also happening underneath the Chief Architect's office that is now part of the architecture and system engineering team under Dr. Tipton; things like the Integrated Warfighter Network, the IWN.

The beauty of having these portfolios now combined under me is that I now have the ability to directly integrate what was being done from an experimentation standpoint under the Chief Architect's office directly into the ABMS program. And so we're actively looking at --- to your point, where is that low-hanging fruit that's running around out there that we can actually provide a direct inject into a program of record around and start to get to more of that continuous capability evolution.

The IWN is an example of what that would look like. You know, we're in conversations with Air Combat Command around how that that C2 capability evolves with regards to where and how that looks over time. That may also have an impact and a direct influence on kind of some of those near-term things that we need to go look at. But that's kind of where the thinking is right now with how we would do some of those near-term integration problems with capability in the near-term.

Q: There's several new aircraft on their way, such as the E-7 Wedgetail, the B-21, that tie in with this effort. Can you talk a little bit about how you and your office are working with the teams that are working on bringing these planes into the Air Force to make sure that from the start, they're set up properly for C3BM capability?

Brig. Gen. Cropsey:
The good news is there is a PEO that's running every single one of those [programs] that I spent the last 27 years in the Air Force growing up with. If there's questions about how the B-21 is integrating into this, the good news is everybody that's running the ABMS program is literally sitting on RCO billets, because it just came out of that program. We have a ton of connective tissue with the folks that are running the B-21 program. Right on some of these other fronts, General White and I go back years. He is actively engaged in dialog with me on -- on what it looks like on the fighter side, just like RCO is on B-21. The team working [Inaudible] with regards to where Brig. Gen. Buck Rogers is at, I'm having the same conversation with him, as well.

I think the -- I think the way that we get to a more fundamental level of integration, kind of where maybe the point of this question is at, though, is by actually pulling these conversations out of PowerPoint and into a model-based system engineering environment. So to address the size and complexity of the problem, we're going to have to fundamentally think through the design space using those digital engineering tools that are available now to make -- make these things a reality as a way of controlling a complexity.

The goal -my goal -is that as we stand up and start executing on the architecture and system engineering front is that we're going to build that out inside of a model-based system engineering environment that allows me at an engineering level to interface with each one of those platforms and -- and be able to give them very specific requirements when it comes to the physical, the logical, and the data interfaces that are going to be required for them to be able to plug in to me.

Q: You mentioned that you can take one of these research and development programs and put it into a program of record. Are you referring to like the Valley of Death problem? Could you talk a bit more about how you are actually taking or plan to be taking research [Inaudible]? How are you going to be directing that into these programs?

Brig. Gen. Cropsey:
That's actually a great question. One of the advantages that I have is the fact that I am literally a compilation of different organizations and people that are now all oriented around and focused around the same set of problems. Underneath the Chief Architect's office, I inherited a set of AFRL billets with 50-pound brains on them that were all working different aspects of

architecture things that are now being realigned underneath Dr. Tipton as part of that architecture and system engineering office that I just talked about.

The beauty of that is that I maintain all that connective tissue that that team has at Wright-Patt, Rome and other AFRL locations that have been engaged in this conversation for literally the last several years. My ability to actually reach back into that R&D 61, 62 network and kind of do that tech scanning. And it's not just AFRL, it's also AFWERX - and they're standing up an integration prime kind of capability. I have plug-ins there.

There's literally, multiple feeds all coming in through that pipeline. And the way that we're intending to organize around that is to have the architecture and system engineering team be able to run through the operational analysis, identify where there are specific areas in that battle network that need additional capability provided to them, and then use that very specific analytical assessment around those capabilities to drive the demand signal back out into that R&D community in that commercial environment.

Then as we're getting inputs back out of that, harden those up from an acquisition standpoint so that we can drop them into a program and then scale that capability, and own that entire pipeline. So without having to kind of piecemeal that out, I'm in a position because of the way that my organization is designed on the integration front to have direct pulls out of those different environments.

Q: I wanted to ask about the digital infrastructure piece. In September at ASA, they announced a new consortium that is focused on that. So are they still doing their work or is that paused while Dr. Tipton is doing that assessment?

Brig. Gen. Cropsey:
Yeah, here's the good news - Dr. Tipton, up until late spring timeframe was actually the chief engineer on ABMS. Then he ended up going up to MIT Lincoln Labs over the course of the summer, and now I've been able to hire him back. So there's actually a ton of continuity with the fact that I've been able to get him back as the chief architect.

Everything that you see that was kind of in play with regards to that digital infrastructure is pretty consistent with where we need to keep moving. They're up and running and they're actively on contract with clear deliverables that are needed out of that consortium, and they're full speed ahead.

Q: Okay - so it's not paused?

Brig. Gen. Cropsey:
No, not paused.

Q: I was hoping to kind of go in the conversation of working with other services. How do you get around issues of common standards, common understanding? I was out at the Project

Convergence '22 at Camp Pendleton, and there were some issues like even as basic terms, such as 'time on target'. One service had a different understanding of what time on target meant. How are you going to get through this common understanding and how do you avoid issues of any parochialism?

Brig. Gen. Cropsey:
I think the way to drive alignment in those kinds of conversations is by being very specific around the operational outcome that needs to be achieved.

I think if you take one thing away from this conversation, I would say that the way that the complexity of this problem and the scope and scale of this problem are ultimately resolved is by being very, very clear about the operational outcome that has to be achieved.

From a methodology standpoint, if you're like, 'Okay, Cropsey, what's your plan here for solving world hunger?' I would tell you that I'm going to start with a very, very clear understanding of the operational outcome that has to be achieved, and then I'm going to work backwards from that. Then if I can get my -- my joint service partners around the table and we can all get to a common understanding of what that operational outcome looks like.

I think Lt. Gen. O'Brien is tackling this one head on. If there is a OSD joint service common vernacular around what that operational outcome looks like, a lot of these definitional things get resolved, just in being very clear about the problem that has to be solved.

Up until this point, we can all talk and use the same words about what we're trying to get solved. But, you know, a lot of times we're talking past each other as some of that Project Convergence '22 demo pointed out. But as soon as you actually scope in the problem that I need this to happen, all of a sudden, those things all become exposed:

> *Ex. No, no, I said time on target. I said, yeah. Then no, no, no.*

Now all of a sudden, these disconnects get brought to the surface, and now you can resolve them. And resolving them, generally, is not a hard technical thing. It's just making sure that we understand that I'm using inches and not centimeters. So, okay, got it. I can do that unit conversion and we can keep moving. What's the next problem?

A lot of this conversation is really about how we evolve the dialog and the discussion, given the level of complexity. We kind of solve it like an onion. You keep peeling it back. And as we get one layer of integration solved, we find another one.

A lot of times people are like 'Hey, what did the RCO screw up that, you know, the Secretary needed you to go fix?' The short answer to that is *nothing*. Actually, what they did was they solved that layer of the integration problem to the extent that we earned our way to the next one.

And so here we are. We're now at the next layer of the integration problem that we need to figure out. It's sequentially moving out. And right now, you're starting to actually be able to have a

legitimate conversation about how the integration between the services and at the JADC2 level actually start connecting in equal ways.

We couldn't have had this conversation two years ago--we weren't there.

We are now.

If you kind of track the progress over time, there's a lot of people that throw darts, all the different ways - people are trying to attack this problem. And how can you guys not get your act together, right?
I would actually argue that what you're seeing is a direct artifact of how complex the problem is. We don't know what the solution actually looks like, and so we're trying different things in the process of understanding how to get to those solutions. And as those things come together and we're like 'ah, the Army just solved that part of the problem, and the Navy just solved this part of the problem.
The Air Force might have an angle over here.' When we start putting that stuff together, we're getting somewhere with it.

If you go back and you look at how even Project Convergence has evolved over the last three or four years--PC22 was not PC20. There's a huge set of evolutions that have happened there. That's a microcosm, if you can call that it a microcosm. That's an example of what's happening all over the department writ large around how the services are now starting to gel up around how to solve a problem. It's wicked hard.

Q: The Air Force hasn't done ABMS on-ramp for a couple of years now. Is Project Convergence, PC24, going to be the joint service way to get after some of these problems and understand some more, or does the Air Force thing to get back to doing its own sort of events?

Brig. Gen. Cropsey:
I think as a way of thinking about experimentation--you can think about experimentation, you can think about prototyping, as your opportunity to generate additional data around questions that you have or hypotheses that you need to go test. And your ability to collect the data at the scale that you need in order for that collection to be, you know, a valid replication of what you'd need to have happen is what generates these experiments at the scales that they are at.

The Air Force is doing all kinds of experimentation. The Navy is doing all kinds, the Army is doing all kinds. The COCOM exercises are another avenue where we can go generate data to answer questions and test hypotheses. The way that I look at the PC next conversation is as another venue, that is available at scale to go test hypotheses around what we need to do, in order to kind of take the integration problem to the next step.

I'm actually agnostic as to kind of who owns the venue. The Army's got some venues. The Navy has some. The COCOMs have multiple every year. And so part of my organizational design is actually a capability that looks at all of these different venues that are available, both in the DAF and across the other services, and looks at all the questions and data that we need to be able to collect to make an assertion about where we need to go and the capability that we need to

deliver. And goes through and -- and analytically puts a framework around all of those different venues in both time and scale to say, okay, I need to go to PC next and I need to do the following things.

I need to go to the next overmatch conversation. I need to do X, Y and Z. When the Air Force does the next green flag or emerald flag or red flag or the combatant commands do their annual exercises, these are the things that I need to know and test as part of my campaign to build capability and scale the C2 architecture that we're trying to go do.

Q: I wanted to follow up with something that you were discussing earlier. You kind of suggested it seemed that, you know, these having these discrete capability releases wasn't necessarily the right mindset for ABMS. You sort of suggested maybe it should be a little more fluid than that. Is the Air Force getting away from that concept of capability releases, or were you just saying that --

Brig. Gen. Cropsey:
I think it's a nomenclature thing more than anything else. I don't think that the way that it was structured initially was ever intended to be static. I don't want you to take away from it, but I think just in terms of the way that we talk about it as almost like block releases is kind of where we're evolving the conversation.

So it's maybe less about the programmatic details underneath at how we're executing the programs and more about kind of the nomenclature around how we're talking about it. The way that I am describing where and how we're moving inside of the broader conversation for C3BM is also evolving kind of past where we started with the ABMS conversation.

That was two years ago. We've learned a ton in the last two years. I mean, if you think about where ABMS programmatically was two years ago and where the RCO has taken it in the last couple of years, it's night and day. And so you would expect, I would hope, to see learning and evolution occurring with regards to the way the program thinking is -- is also evolving with that learning.

Maybe a better way to characterize that would be to say, 'hey, look, our terminology around how we're looking at the progression of capability over time is also evolving, along with our understanding of the level of the problem, the complexity of the issue that we have to go resolve.'

Q: And are you moving away from this idea of ABMS on-ramps? You talked about all the various experimentation venues, but are you kind of getting away from that kind of formal concept of having these on-ramp exercises?

Brig. Gen. Cropsey:
I think the Secretary's been pretty clear that where we need to really focus on the C3BM front is in the ability to deploy capability.

Experimentation has a role inside of that, but it's not the end. I think the concern that the Secretary had when he kind of first rolled into the ABMS dialog and discussion was that it felt like the experimentation was the end. And his concern was that the experimentation is a means to an end, and what does that end?

That's the focus.

It's kind of the classic--don't fall in the trap of switching the means for the ends, because they're different. Experimentation is both a necessary and a healthy thing that we need to have incorporated into our plan to get to the end. But we need to be very clear about what that end state looks like.

I mean, in fact, if he [the Secretary] had any message for me earlier this afternoon, it was - 'get clearer on that, Cropsey. This is the target. Build me out the path that you're going to take to get to that.'

If there's some experimentation along the way that's required - he's all in on that. But it needs to be in a methodical, logical, disciplined kind of a way to getting to that end state.

Brig. Gen. Cropsey:
[Closing Remarks]
Hopefully you've kind of taken away the idea here that, as we flow the National Defense Strategy down through and we start looking at the scope and scale of the things that we have to get after as part of that. And as we talked about, how we integrate with the JADC2 environment that scope and scale that we have to be capable of doing is -- is a wicked hard problem.

As we approach the problem from an integration, the Secretary was clear as integrating PEO, my primary job is that integration function. As you kind of think through -- What's different? How does this kind of continue to evolve the dialog and the discussion?

That's the first word I'd start with - integration. How does the C3BM construct enhance or further affect my ability to plug in NDS JADC2 down into and through the DAF? And then as I do that integration problem, it's really three problems.
- It's how do we do the technical part of this - make the physics work. That's the first part of the problem.
- How do I actually do the networks, the security, the digital engineering, the supporting tools that are required for that first problem?
- And then how do I integrate the processes on the requirements, the acquisition, and the budgeting side to, right, effectively produce a system of systems capability that that battle network needs to operate at.

Those would my takeaways for you if you're trying to sum it all up. And all of that's oriented and designed around being able to provide that resilient decision advantage out to the COCOMs to be able to support their scheme and maneuvers.

SAF/PAO

Thanks, everybody, for joining us today.