A Fireside Chat with Col. Joshua Koslov, 350th Spectrum Warfare Wing Commander
April 19, 2023

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

I'm Orville Wright, your President and CEO of AFA. And again, it's an honor to be here in person with all of you. And we're counting, I think about 600 online, Josh, so you're popular.

Col. Joshua Koslov:

It's a spectrum.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Again, Colonel Koslov is the Commander of the 350th Spectrum Warfare Wing, and the first of its kind wing that stood up under Air Combat Command in June of 2021, after the Air Force rightly recognized that its electronic warfare skills had atrophied in the decades of counterinsurgency operations. With the shift, as we all know, to great power competition and China as a pacing threat, the electromagnetic spectrum is more important than ever to successful joint warfighting operations. Essential, in fact, any sort of future fight that we would visualize, because the joint warfighters, the joint force, relies increasingly on the electromagnetic spectrum to fight and bring integrated lethal and non-lethal capabilities to the enemy.

The 350th is tasked with making sure the US and its allies maintain a competitive advantage over adversaries in the EM spectrum. Josh, "Mule," as the wing's second commander previously led the 609th Air Operations Center at Al Udeid, Qatar, where his team managed the largest non-combat evacuation in history. And a war story around that, if we have time, would be interesting, for sure. Josh is a senior navigator with more than a thousand flight hours, including 217 combat hours, including time in the EC-130 Compass Call. Josh also has commanded in combat three different times. From the squadron to the group level. He's a distinguished graduate of the Air Force Weapons School, and has held several staff positions, including as Chief of Strategy, Plans and Competition for Pacific Air Forces, and is also a former legislative fellow on the Hill. It's a privilege to be here with you today, Josh. And so no one wants to listen to me anymore, so over to you.

Col. Joshua Koslov:

Well, thank you sir. It's a pleasure to be here with you today as well. And to AFA, thank you for what you do for everyone and their families. It's a tremendous opportunity to be here to speak about the wing and EW, in general, today and I look forward to the discussion, so thank you. And thanks for everyone being here today, and also those of you online, so I'm sure there'll be some challenging questions. I look forward to it.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

As always, special thanks to our sponsors. They're listed here right now on the screen. The partnership between AFA, our sponsors as we constantly build an ever stronger team between department of the Air Force leadership and industry is really the secret sauce to stay ahead of pacing threats. So again, thanks to those who build and field leading edge capabilities to fully arm and equip our Airmen and Guardians. Well, let's get started.

Col. Joshua Koslov:

Yes, sir.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

The 350th is often called a first of its kind wing. Josh, if you would, please walk us through a little of that, and include, if you would, your primary focus now and going forward as you evolve and continue to grow.

Col. Joshua Koslov:

Absolutely. Thanks for the opportunity again, and thank you for everyone listening out there. So the 350th Spectrum Warfare Wing is a functional wing assigned to Air Combat Command. We're aligned to the United States Air Force's Warfare Center, which gives us extensive opportunities to influence the operational test and training infrastructure. And I'll talk more about that as we go through the day here. What I would say is it's a little bit of a return, a back to the future moment for the Spectrum Warfare Wing, because those of us who've been around for a little bit realized that at one time at Eglin Air Force Base, the Air Force once had the Air Force Electronic Warfare Center, and our wing is basically trying to recapture of a lot of the work that the Center provided the Air Force back in our historic days.

The wing has three primary missions. It's mostly based at Eglin Air Force Base in Florida. Our three primary missions are rapid reprogramming, target and waveform development, and assessment of our EW capabilities in the Air Force. We have two operations groups right now. The first one of those is, for those of you who know the history of the 53rd Electronic Warfare Group, we've pulled that group into the wing, and have renamed it to 350th Spectrum Warfare Group. And that group reprograms every single asset in the United States Air Force. Over 70 platforms, 27 countries up to date. And just to put it in perspective for you, we do every single F-35, we reprogram every single F-35 in the world. Allies, friends, partners, et cetera. And we run from 5th gen, or new capability, all the way down to things that have been in the Air Force inventory for a long time. We'll just say it that way.

The second group is the 850th Spectrum Warfare group. And so they are primarily the folks that are going to develop our target and waveform capability, and manage the databases and the tools that we use to rapidly reprogram the assets that we have today. And in that group today is the squadron that does a mission called Combat Shield, which many of you're probably familiar with, which is the way that we assess our EW ... or assess our readiness in our EW systems on our jets and aircraft today. We're going to grow that capability. That capability is something that needs to get much more robust, and so we're building the 950th Spectrum Warfare Group out at Robins Air Force Base in Georgia. And that group is going to be solely focused on EW assessment across the Air Force's enterprise.

That'll be things like large force exercises, a much greater 5th and 6th gen capability of assessment, and then truly an end-to-end assessment of from a war reserve mode being detected through the process of getting re-engineered and put back into the jet as a piece of combat capability, being able to give the Chief of Staff of the Air Force some true essay on how we do those things. Those are our three big missions. The big priority I have right now with the wing is, A, collaborating with our external stakeholders to include industry, academia and organizations such as AFA, and those folks, to talk about the wing, and then really making sure that we do a good job of developing and growing the 950th. That's our immediate kind of tactical task.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

I shared with Josh my own story that goes back to the days of Desert Shield and Desert Storm, and the legacy, the incredible legacy, of Eglin, and what is today, obviously, the 350th. When the Eglin team

showed up in Qatar, December of '90, and made sure all our ALQ-131 pods worked. Surprise. They didn't. They weren't going to work in combat, the opening days Desert Storm. The team that is your legacy made sure that our pods or jamming pods, radar warning receivers were absolutely leading edge. And again, many of us are alive today, because of the legacy of your incredible team. So if you could talk just a bit about how you're deploying the fight, certainly Combat Shield, but there's a very rapid update loop such that you keep all the databases, all the broadly defined [inaudible 00:07:47] databases constantly up to speed. And while you're in Eglin, you really are around the world, and deployed constantly in the fight. So talk to me about that would be great.

Col. Joshua Koslov:

Absolutely. Awesome. Yes, sir. I appreciate it. And just real quick. With me today is Tech Sergeant Ryan Benedict, who is our 350th Spectrum Warfare Wing NCO of the Year, and he actually executed the Combat Shield mission. And so if you guys do have questions about that, Ryan's here to answer those, because he's smarter than I am. And to the guys back home in the pod shop port who are listening, we're still working on those pods, sir, so maybe we could talk about later. So the specific question about rapid re-programming. So the way I talk about that, sir, is let's talk about ... let's put ourselves in night one in Taiwan, in the straits of Taiwan, and there's a fore ship of F-35s. They're leading a strike train for bombers. They're going to launch some standoff weapons, because we have to kill boats in the strait.

The data that the F-35s are running with inside their jet is awesome. It's the best that the 350th Spectrum Warfare Wing could produce that day. But the enemy gets a vote, and so they're going to transition to some mode that we haven't seen before, and they're going to be successful in engaging and destroying an element of that fore ship. As that pilot perishes and leaves the earth, that new war reserve mode should, and will, transition itself into the ABMS, electromagnetic battle management environment, I'll talk a little bit more of those in a second, and get to our engineers at Eglin who will very quickly be able to parse that new piece of information, and optimize the mission data file running inside the F-3. But not just the F-35. So this is the challenge and the mission of the Spectrum Warfare Wing.

Today, all of those 70 systems that I've talked about, as EW has atrophied, really what the problem has been is that we've stovepiped and channelized based on platforms. And so the ability to move information and data across platforms has become almost impossible. And so what we're trying to break down is a industrial production based timeline, and create a modern timeline by which we can take data from the F-35, reprogram that into F-35s, but also put it into every other jet that's going to be penetrating those WEZs and MEZs as we go forward into the fight. And we have to do that on the timelines prescribed by General Wilsbach, and the PACAF fight, and we're working really hard to meet that objective today for all of our systems. Some of them will be a little bit easier than others. Does that answer the question, sir?

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Perfect. I'd build on that a bit. You all come across to me with a joint warfighting mindset, a warfighter's mindset, that every threat's a target.

Col. Joshua Koslov:

Yes, sir.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

And could you talk a bit, at the unclassified level, on how you look at today's modern integrated air defense systems, whether it's a Russian IADS or a Chinese IADS, because I know you look at it in total, again, as a target set.

Col. Joshua Koslov:

That's right.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

And so you might just build on that idea a bit. Again, every threat a target.

Col. Joshua Koslov:

Every threat is a target. So the first thing that I always talk about is that the spectrum, I'm a EC-130H guy by trade, the spectrum is inherently coalition, and it's inherently joint. So right now, this organization in the Air Force, we're out in front of our peers in the joint world, but the joint world is working to catch up. But it's going to be a joint fight, a coalition fight. We talk about rolling back in IADS what the ... there's lots of elements that go into that, and we grow up on the SEAD triad. And so you have early warning radars, you have HARM shooters, and you have jamming platforms. You combine all those three things and then you create a lane by which your strikers could get through.

It's still there. That those basic premises of suppression of enemy air defenses is still what we're trying to do today. It's just more modern. The adversary's going to be more agile, they're going to move faster, and so we need the systems, and the communications capability, and the Airmen, and joint warfighters who can understand what the JFC or the CFACCs objectives are that day, and make decisions in order to support the actions that we're trying to achieve to meet those objectives. So the example I use at the unclass level often is a SAG, a surface action group, in the PLA in China. And if we go fight a SAG, it's going to take a number of joint navy and air force assets.

And on that SAG there's probably five to seven boats, but there's probably 45 EW targets that we need to be able to cover down on, and either take away, deceive, defeat at a time and place of our choosing based on what the mission commander's asking us to do when she calls hike at the line of scrimmage. And so what I would offer is that we've allowed ourselves in the Air Force, in many ways, to be focused solely on the kinetic aspect of killing targets, but there's a lot of ways to neutralize a target, and the spectrum provides one of those. And then with the budgets that we have today, if we can use less weapons or less assets, and tell the CFACC or the JFC it costs X to kill a SAG with good EA, good EW, we, as a nation, are using our resources a little bit better.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Perfect. Josh also mentioned that one of his best friends that he grew up with, including Weapons School, shared background, was one of our previous guests, [Colonel] Putman, who's the new SPACECENT Commander. So there's always every day, a teamed effort, if you will, "One team, One fight," to quote Secretary Kendall. Air and space. So how's your wing day-to-day engaged with your Guardian counterparts?

Col. Joshua Koslov:

Really good question. So we're not doing it well enough right now. All right? So I think that there's a huge portion of space that basically is electronic warfare support and electronic attack, and we've got to get better at linking what we're doing in the 350th Spectrum Warfare Wing and what's going on in the

deltas out there. So we've got to get better at that, because as we develop combat capability in our wing, as an example, if one of my engineers develops the best CSA-9 waveform, I've got to be able to put that across our platforms in the joint coalition world to include the space forces, and I've got to definitely get better at that.

I don't touch any space assets right now. Professionally, we do have a lot of good relationships with the Space Force though, and then if we're going to develop ... if we're going to be able to build, for the CFACCs of the world, operational warfighting capability that isn't just focused on technology but the application of the technology, you have to have a Guardian next to an Airman when you're talking about parsing out those targets that we talked about with this act.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Well, as General Brown has shared, and Josh made the point too, over time, our kinetic interoper, our non-kinetic capabilities across the Air Force have atrophied a bit in an environment where we had air superiority every day for 20 years across the Middle East. Not true anymore. Air superiority can never be assumed. So as electronic warfare capabilities also atrophied, some perspective that you'd share in terms of your own leadership and the hard work your wing is doing, and the collaboration that you get across government, and certainly with industry, to more rapidly achieve those objectives you have, keep the bad guy's defense even, turn every threat into a target.

Col. Joshua Koslov:

Yes, sir. So really, really good question. Thank you for that one. How I'll start off with that is that I view it as a readiness challenge. I put on my warfighter hat, and how do I make the force ready to execute combat operations? And so being aligned to the Warfare Center, and having the touchpoints across the 57th Wing, which is your weapon school and your red flag exercises, and then the test center and the folks that are out at Nellis Air Force Base, and the Pacing Campaign plan challenge, that China based Pacing Campaign plan that we're executing in the Warfare Center, allows me the freedom and the maneuverability and the ability to really increase the Air Force's overall readiness on EW and spectrum operations.

And so that is the first thing, just the ability to go to a red flag. Recently, we went to a red flag and we had our own DLO where we rapidly reprogrammed. So very quickly we had threats that were out of phase, blue guys died because of that. We Combat Shielded their systems. Their system said, "Yeah, the stuff's loaded correctly." We tested our engineers in order to reprogram at a rate that would've supported the tempo at the red flag in order for their next sortie. And we learned a lot of lessons. And we did that at an analog level with legacy assets that probably aren't the folks that are going to be there on night one, but we're ingraining a mindset that this is a data-centric capability, and that when I get killed on the range, I need to ask, "Was my data good?" And so that's a really important piece right there.

And so that alignment within the Warfare Center to attack the readiness problem in the Air Force is huge. And that allows us the ability and the credibility to work across with our industry partners, and our academia partners, and who are critical to the success of this. So I talk often, some of you in this room are people that I've talked to, to industry folks. I need to, because the Air Force does need capability that can attack our EW gaps. And so the five things I need in order to realize our vision, very quickly, are ... they were on the slide up there, but I'll say them again. Crowd-sourced flight data. So what that is, that's the ability to prioritize the assets of data, EW data, targeting data, put it into one data architecture that I can then share across multiple platforms.

I'm giving you a little bit of a Pollyanna version of that because there's a lot of SAP classification problems, multi-level security problems. There's a lot of data transmission problems. There's widgets that have to be purchased and bought for each of those things. What I would say, it's not just a Spectrum Warfare Wing problem, but it's also a test problem. And so the test community wants to use that same data to test. The ways and means of the way we would use the data are the same. The end states are just different. I'm generating combat capability, it's squirted into jets, and they're developing new test DLOs. Data architecture's very important to that.

The next thing I need is EMBM, electromagnetic battle management. I know General Cropsey's one of your next folks that's coming. EMBM is not different than ABMS, it's part of ABMS, but it's the way we move EW data across platforms in the fight in order to meet the JFCs objective. It's the network by which we'll be able to get the information we need to rapidly reprogram and transmit new wave files. And I envision Eglin, being a node on that net, and being a warfighting organization from the panhandle of Florida in order to be able to meet the timelines that we have.

Now one of the things that I talked to industry a ton about is this term cognitive EW. And cognitive EW, depending on where you sit, is a buzzword or means something specific. And so, for me, I think that, right now, any future where we're talking about cognitively attacking targets at the edge is a little past the technology we have today. We're probably at least seven years away, eight years, nine years away from those type of capabilities. But what we could do is that we get all that data that I talked about in one place, is develop the AI algorithms by which we could process all of that data faster in order to really hone in on the capabilities that we have to develop, the new threats, the new war reserve modes if you will. And then through partnership with industry, academia and all the folks that do this work, make our data accessible so that we can develop new jamming techniques against threats or new attack techniques against threats at a much more timely capability.

And then, finally, is just being able to assess all that. Today, for me to assess anything is a very limited capability, and that's really the promise of that group that we're building up there at the Air Force. So when you talk about readiness, that's a big long readiness discussion. With a partnership piece in the middle of it, and we start talking about readiness, you have to be able to assess something to say you're ready, and I've got to get better at that for the United States Air Force. Does that answer the question, sir, or?

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

You bet. I would just build on that. Clearly, to my earlier point, you're working hard with the resources you have available. My guess is, and you've got a great deal of INDOPACOM experience that the demands for everything you bring to the joint fight continue to increase. So obviously, in INDOPACOM, Admiral Aquilino, in his big exercises, just the exercises, and then going to Europe, General Hecker, and certainly, the Middle East and General Grynkewich, you're again, you're popular.

Col. Joshua Koslov:

Yes, sir. Yeah.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

And could you talk a little bit about that demand, and do you have what you need, in resources and people, to meet the joint warfighting demands? And then, if you could, there's a lot of discussion among us about the joint warfighting concept. And obviously classified, but joint warfighting is certainly a mantra for all of us in industry, Air & Space Forces Association ... how do we support the joint fight?

Col. Joshua Koslov:

Well, yes, sir. That's really good ... so as like any commander or leader at all levels, the requirement to resources disconnect and managing that risk is where I spend most of my time. So the short answer to your question is I don't have enough people, I don't have the right facilities, and we're working with the Air Force and ACC to get there. Just to put that in an order of magnitude is like today I have over 200 military vacancies, and over 200 civilian vacancies in the wing today. And we're going to continue to grow. It's actually good that I have all those vacancies, because I only have about 50 more seats to give in the facilities that I have today. So that's a challenge as we're a growing organization. Just building an organization is really hard, but we have a team that's really positive about the effort there.

And so we know that we're not FOC, fully operationally capable. We're working with Air Combat Command, and I think we'll call ourselves fully operational and capable after the standup of the 950th. So when we have that third ops group to guide on handing over, and we're ready to go there. I worry that sustaining the wing is going to become hard from a personnel perspective as we divest platforms. Well, first off, we build electronic warfare officers based on platforms, and that's not the best way to do that. As we divest platforms or divest crew members off of platforms, your pool of electronic warfare officers gets a lot smaller.

And then unlike the Guardians, the EW, if you're a Compass Call guy, or you're a B-1 EWO, or you're a whatever EWO, you kind of stay in your tribe for a long period of time. And so being able to develop the crew force that can transcend the Air Force, and think Air Force wide, and then joint wide, is a challenge for us. Another challenge for us is we have an awesome group of engineers in the Air Force Engineer Corps that worked with us, and for us in the wing. They could probably do one EW assignment, and then they're on to the next thing. And so being able to retain that talent is something that I think about a lot. It's worrisome to me.

However I do, right now, in the wing, and what I'm trying to build to the wing is to be able to provide General Wilsbach and General Hecker the best in the world. So we'll be at Northern Edge. We'll be participating in that. Three of my squadrons are ... of the squadrons in the wing are taking a wing approach to how we participate in that exercise in order to provide joint warfighters the lessons that they need. And one of our squadrons is a joint squadron, it's the F-35 Squadron, the 513th, and so we'll be working directly with the UK and Australia, our coalition partners, to learn what we can about our approach with our coalition partners as well. So that was a long answer, but that balance of the requirements to resource disconnect is where I spend a lot of my time.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

And my guess is, again, in the context of supporting the joint fight, the evolving joint warfighting concept, you're thinking support for Air Force, Space Force and certainly Army, Navy, Marines every day.

Col. Joshua Koslov:

Yes, sir. Specifically to the joint warfighting concept, the fight in the Pacific is completely joint. Predominantly, the Air Force and the Navy earlier are going to be carrying the burden, but the Marines and Army are going to be there. And that's not a slam on anybody. It's just based on the time and pacing. And we've got to have an ability for if the Air Force or the Navy develops a waveform against Target X, that it can get validated and verified and passed through the guts of the system and into Air Force systems faster than we have today, because it doesn't exist today. And we've got to be able to have the people that know how to do that, and resource them appropriately.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Well, in terms of the going demand for everything the department of the Air Force brings to the joint fight, Secretary Kendall has masterfully, I think, put together his operational imperatives that resonate certainly across the Pentagon, OSD, and on the Hill with Congress. And then within that he's developed three cross-cutting task forces. One of them is EW. Could you talk about that a minute?

Col. Joshua Koslov:

Absolutely. So we participate in that. That's an effort that's being led by the department Air Force staff. The leads are ... it's a big team, and some of my guys participate in that effort. And so I don't want to get too far out in front of them, because they're briefing the secretary here soon. So I don't want to be the guy that screws it up or whatever, but ... it wouldn't be the first time. But the key there is my vision for the wing and where we're going is aligned to what the COET is trying to build.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Sure.

Col. Joshua Koslov:

And so the tension with the electronic warfare always is the buying of a widget versus the foundation of the capability and the resourcing. And so I think that's the challenge with the COET is that as we've built the wing, and we continue to realize how many foundational aspects need attention, there's a tension between what capabilities are we buying that are specific against our threat, which is the purpose of the OAS, which is a purpose of the OAS, versus building the long-term capability to sustain and maintain the spectrum capabilities. Phenomenal effort. Great folks are leading it, and it's going to provide some significant support, and change to the Spectrum Warfare Wing.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Well, we're big fans, obviously, also have AFMC, and the leadership, and General Richardson, Duke Richardson. So your collaboration, and your partnership with AFMC, such that the industry understands what you need, and you can get from development to acquisition to fielding as soon as possible.

Col. Joshua Koslov:

That's a really good question, sir. It comes up a lot, and so specifically with the spectrum, and I think that two things. First thing is I think we have to get a lot better, and we just have to figure what that is. And if those are joint organizations that are Spectrum Warfare Wing and other folks, awesome. If that's an acquisition organization within my wing, also awesome. We've got to find out what the right thing is, and start moving on that part of it. We collaborate very heavily with all of the research labs that the Air Force works with. What we don't do very well is identify what is the thing that we're going to buy, and then build a plan to sustain and maintain it within the wing. And so that's the thing that we have to be able to do.

If you give me ... I view waveforms the same way I would view a Viper, sir, is if you give me a waveform, I need the team that can modify the waveform as time and changes occur. I need to be able to store it in the right way. And that's the challenge with that. AFMC, what I'll say is that our wing's heritage comes out of the 53rd Wing, which is the Air Force's operational test wing. And so while we are not a test organization, test is very much in our blood, and will always be in our blood. We validate and verify all of the capability we develop. And we have these giant labs in our wing, and so we'll always have some form of test on our mind. And test, as you know, is closely related to the acquisition community, and

that triad is going to continue to work. And Colonel Bradley, who's the 53rd Wing commander, he's at Eglin also, him and I are working several initiatives together to mutually support our missions.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Well, outstanding. We're going to move to the audience here shortly. So start thinking about your questions, and we'll be passing around the microphone. As we transition though, Josh, you are very much a digital native compared to my generation. You get cyber more so than certainly previous generations. And as you build on the legacy of your wing, how are you thinking about all things cyber operations? So computer network operations, broadly defined exploitation, attack, defense within what you're doing every day within your wing's mission?

Col. Joshua Koslov:

Awesome. So I stand apart from the herd a little bit on this one, so I'm looking forward to some engagement on this. But cyber is a domain based off the Department of Defense. The spectrum is not. And I fall on the other side of that, but I'm not going to revisit old grounds. But I do want to say that EW and cyber are different. Both the physics of the two things are completely different, but the way you develop the people who fly, fight and win and maneuver in those battle spaces is also completely different. And while there is definitive interactions, there is some differences that are really important that we have to address.

The first one is that, from a warfighting perspective, the authorities and employment of cyber happens vastly differently than electronic warfare. And so we have to be aware of that as we build plans and those types of things, because something you desire to do may be a lot harder to do than you think it is. The other piece is that I view the relationship of cyber and EW as combined arms. There's all these buzz terms, and I hate them, and if you've worked with me you know that. But cyber convergence, RF-enabled cyber ... like, there's all these terms that are out there that confuse and muddy the water. So what we're talking about is combined arms.

And what we're talking about is sometimes we're going to jam stuff in order to enable cyber to get into a piece of protected terrain. Or sometimes we're going to jam stuff in order to allow cyber to collect something. Just like we jam stuff in a Compass Call in order for an RJ to collect it or we jam stuff for an HTS Pod on a Viper to collect it. So it's a combined arms thing in my mind. And so what we have to build are the operational architectures and the operational experts that understand how to employ those two mediums. And for me, being aligned again to the warfare center and having the ability to test and train at the highest levels, allows me to make that distinction and that argument a lot more clearly. I think that there's definitive relationships between the two capabilities, but I don't think that they're the same, if that makes sense. Any follow-ups on that, sir, did I ... shots back?

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

No, I think that, obviously, you're thinking through this together in both a practical way, and an opportunistic way. So thanks very much. Well, I'm blessed by being wiser, never older, along with John Tirpak. So as the two relative seniors in our Air & Space Forces Association, we'll give John the first question, and then pass the mic around.

John Tirpak:

Thank you. Can you hear me? Okay. Yes, sir. One of the things we hear frequently is that the threat representation on the ranges is not up to speed. Is that something that's your responsibility or ACCs, and how soon do you think you'll get it up to where everybody will be happy?

Col. Joshua Koslov:

So it is my responsibility to inform General Cunningham, who's the Warfare Center commander, how ready we are to fight and win in this spectrum as it relates to the pacing challenge campaign plan. The idea that we're going to replicate, be able to do the things that we've done on the physical range that we did in the past, is probably an idea that's passed us in terms of specific replication of threats for lots of reasons. One, it's a lot harder to get adversary threats these days than it used to be. The second part of it is that the ability to train in the spectrum based off of the regulations in government and federal government regulations on what portions of the spectrum are available for the military is a difficult challenge for us.

Getting jamming clearances on the range is sometimes a difficult challenge for us. And so there's some human factors that, policy factors that get applied to that question as well. Now in the future, as we move forward, you will always have to have some sort of combination of physical skill, and then the virtual skill. And so I think the way we're going to truly get to a place where we dominate the spectrum is when our virtual capabilities allow us to execute all of our tactics across the various frequency bands, and allow us to really get a true representation of what's going on in an integrated fashion.

One of the things that I talk about a lot in different environments is that most of our old Combat Shield assessments, and red flag scenarios put us into a ... or test scenarios, put us into a 1V1 type of environment, and the that's not going to happen in the spectrum. We know that the spectrum is going to be highly contested, it's going to be many on many environment, and if I'm trying to sneak assets through a very protected wall, I need to be able to train to that in a more reflective environment that allows me to do that. So I think that there will always be some form of physical range, but it's going to continue to get harder to do, and for lots of reasons, and that the virtual world is an outstanding place for the spectrum to really hone the readiness of our warriors.

John Tirpak:

So you just anticipate healthy [inaudible 00:35:05], future micro [inaudible 00:35:09] future starting now, starting two years from now?

Col. Joshua Koslov:

I think you're seeing some ... I think the modeling and sim world today is showing definitive results in the readiness of our Airmen. And so I think that merge is already starting to happen, and I think that what you're starting to see is that the ability to make the range more ... like the physical ranges better, is a high interest, but the highest end training is in the virtual environment.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Please, others? Right here.

Tripp Raymond:

Colonel Koslov. Can you hear me? Yes. Tripp Raymond from L3Harris. Curious about your comment on how electromagnetic battle management is part of ABMS, and more broadly the challenging timeline that you're under to field some of those capabilities that you outlined in your strategic emphasis areas. How do you see your acquisitions' counterpart developing as you try to meet some of those timelines in a lot of those areas where it's not clear who is going to be responsible for the enterprise approach to fielding some of those systems at this early stage, but also looking at how quickly you're tasked to field some of those capabilities? Is that falling under C3 BM, at some point, with a specified task for spectrum capability or perhaps elsewhere?

Col. Joshua Koslov:

Good to see you again, Tripp. Really good question. So how I'd answer that is right now, this week, there's electromagnetic battle management analysis of alternatives occurring, and my team is supporting that. So it's very ... we're running at the same time as we're saying this is the way we're going to go. And so there's that first part of that. Your team's been part of that, and we appreciate their effort. The EMBM is something that the C3 BM PEO, General Cropsey, has not been focused on, because of the tasks that they have, but are aware of and are beginning to bring that on. The problem with the EMBM thus far is that there hasn't been anything to bring on. And so we're getting to that point. So that's the first answer.

I think the second answer is that the single biggest need, it kind of goes back to what I started with, sir, with ... the Air Force used to have a electronic warfare center, is that the challenge across the EMSO enterprise, electromagnetic spectrum operations enterprise, is that there's not one PO, dad, mom, for EW requirements. And so even in my wing, those 70 plus systems that I reprogram, each one of them have a different SPO, and a different set of requirements, and that makes that crowd-sourced flight data solution that I talked about that much harder to execute, because I've got to navigate across all that terrain. It's not impossible, but it makes it more difficult.

And then when you add in the complication of classification and organizations that can go fast acquisition and organizations that can't, it further complicates it. So Tripp, to your specific question, I don't know who's going to own that requirement, but the single biggest thing I need to have in order to be successful is someone that understands and knows all of the requirements. And so ACC is working, EMBM, they are being funded by Air Force staff 8260 to work that out right now, but in order to make that a real thing, there's some more work that's going to have to happen.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Great. Amy, did you have an online question?

Amy Hudson:

Earlier you had mentioned artificial intelligence, and the question was who's teaching that? Is that happening in your wing? Is that happening elsewhere in the Air Force, as you start to incorporate this more and more into operations? How are you addressing that specific piece?

Col. Joshua Koslov:

We're not teaching it. Understand the question I think is what they like maybe inferring on their question is how are the people that we have learning how to develop algorithms and make their job easier is how I'll phrase that. And what I'll tell you is that my Airmen are awesome, and they YouTube the heck out of things. So just recently we had a piece of homegrown software that we found a vulnerability in, and then we literally YouTubed had to fix that, and did that on our own. And so we're making it happen. And so that's kind of a basic level answer. But at the maximum, we're trying to develop folks that understand modern software development, and those type of things. Within the wing, we have some expertise in that.

We have a flight that works on these things for us, and so we're growing that capability. It's just very small. And so when I talk about AIML, what I'm talking about today is the ability to take the wall of ones and zeros off of an F-35 sortie or a B-2 sortie or a F-22 sortie, and to be able to quickly say, "This is the change I have to make," and then maybe get to a place where, based on the files and the ... based on the way we parse out the data, I can make the change automatically. I'm not there yet, but that's kind of where we need to get to. Does that make sense, hopefully, internet person?

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Over here. Please.

Guest:

Thanks. Good afternoon, [inaudible 00:40:47] from Microsoft. I'd like to go back to the modeling simulation conversation. What would you say your top two challenges are in executing modeling simulation in the context of great power competition, and executing at theater scale?

Col. Joshua Koslov:

Really good question. I can only list two. Is that ... so I think in the spectrum, honestly, it's the complexity of the interplay of the variables. And so for me to give you really good blue data on say F-35, which takes now your system to the SAP, SAR level probably, and then get really good data on red, and then be able to fly blue against red while adding in some jamming. And then you got to do all the J to S, the jam-to-signal ratio stuff that goes on with jamming, and then I throw in some decoys. And then now I've got to throw in how does the red radar react to the decoys? And so that many on many complexity of all the variables is one of the main things.

We have a 1V1 mindset. We can model 1V1 probably anything, I would bet you. We're pretty good at it. But that complexity of the many on many scenario is really the first part. And then the second part is how do you ingest all that data? Where does all that red, blue, white, green data go in order to make that simulation operate at the way you want it to is a really big challenge. So I guess if you drew the sum line on those two things that I just blabbered about, it would be dollar signs, because we've invented lots of really cool things, America can do that, but it costs money.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Other questions, please?

SMSgt. Wagstaff:

Good morning, Colonel Koslov.

Col. Joshua Koslov:

Hey, Wags.

SMSgt. Wagstaff:

Senior Master Sergeant Wagstaff from 89th Airlift Wing. As we move away from these large, crude ISR platforms, how are we developing the next generation of electronic warfare Airmen to have the mindset to fill the roles that you are needing at 350th?

Col. Joshua Koslov:

Really good question. So the way I'm doing it. So first off, personnel is going to be really important. So an implied task of the wing, just much any other platform in the Air Force, is to kind of be the shepherd of the career fields, if you will. And so we're working what we call the EMSO Talent Management Working Group, and we're trying to get our arms around all of the EWOs in the Air Force, and to deliberately develop those people. I was not deliberately developed for this job, but for this wing to be successful, we're going to have to develop people specifically for this job. And so that's ... we're trying to build that

capability right now. And we're working ... again, being part of the Warfare Center allows us to have that Air Force focus and vision.

So my wing, actually, is not just coalition and joint, but I have folks from Global Strike. I own all the Global Strike assets. I have folks from ACC, I have folks from AFSOC, and so I truly have the Air Force represented in the wing. And so we've got to pay more attention to it as an Air Force and a joint force. What I'd offer you is that the thing that I go back and forth with, this is just me kind of thinking out loud, is the operational warfighting piece of this, is being able to give General Hecker or General Wilsbach, who don't have the capability resident of their staffs today, a warfighting planning capability, operating capability that, in case of emergency, they need a break glass, we're there for them. They just don't have that today. Which, again, is why we're so insistent on raising the level of readiness across red flags, and weapons school sorties, and all the training that occurs throughout the Warfare Center's portfolio. So good question. Thank you.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Go ahead, Amy.

Amy Hudson:

I got another question on online. This one came from a spectrum defense operator who says they're often left on their own to find solutions, scrounge for funding, and develop and implement procedures. We do this often as a one person deep shop on installations to provide base asset protection as well as develop TTPs for our sponsored units. So the question is, where is EMSO for ground units, as well as, base defense being developed, if at all?

Col. Joshua Koslov:

Pass. That's the answer, right? I don't know. So here's the thing. Let's talk about warfighting for a second. The Air Force has to do agile combat employment because we can't defend our bases. We have to spread out our forces in order to be able to fight and ... in order to give them a break before we aggregate them back again, and go into WEZs and kill things. We have to be able to do that. So part of that is the defensive red attacking our bases and our networks and those kind of things, and that's a piece that we got to continue to get after. And I don't have a good answer for you. What I will say is that EPs a little different than electronic attack, and so the work that those folks are doing, they're really good at it, and they do a really good job of catching and pushing red out of our networks a lot. And so it's just a different problem set.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Great. Any questions? Amy, one more.

Amy Hudson:

Another online question. There's a lot flowing in online. I'm getting a lot of questions from industry coming from different angles of how best to partner with your wing. So if you can speak to that. I know you addressed it a little bit, but ...

Col. Joshua Koslov:

That's a really good question. First off, we have a website. So we're on LinkedIn, so you can get us there. In August, we're going to have what we call Crow Summit. It's going to be a two-day event, and we're

going to invite a bunch of folks down to Eglin, see the wing and those kind of things. So those are tactile engagement opportunities that you have there. Air Combat Command is our parent organization, and so the A58 is the requirements focused folks there in the Air Combat Command, so a great place to meet with us as well is working directly through those guys. Another thing is I make it a point to be at AFAs and Association of Old Crow events. And so if you have something that you want to talk to the wing about, contacting me, letting me know, and working that direction is a way to do that too.

I think that a challenge, I use this analogy a lot, is we've all seen the person that has the hundred thousand dollars truck. It's got the rims, tinted windows. It's got the stickers, it's got all the stuff, and then they park it in front of an apartment with no garage, and those kind of things. And so my challenge with the industry folks is the bright and shiny versus the things that get after my big needs. I've got to rapidly reprogram, I've got to develop targets and waveforms, and I've got to assess. In order to do that, I need crowd-sourced like data, data architecture, EMBM, cognitive EW capabilities, and assessment tools. Those are the things I need. And so I focus and prioritize based off of that. And then I got to be able to train to all that, which is the virtual environment. So does that make sense out there, question internet person?

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Well, and I would just say, in my own industry experience, that's exactly ... as we all go through our education with industry over time, that's exactly what industry needs. A list of five. Just make it simple, and then keep saying it over and over with some level of consistency. What industry needs, really, what Congress needs, is predictability in department of the Air Force requirements that then lead to industry more targeted, more effective investment. Certainly on the IRAD front. Do you have any good IRAD ideas?

Col. Joshua Koslov:

So those five are the big ones. And so I think the challenge ahead of us is multi-level security, data architecture, storage, manipulation, and movement is really a challenge for us. So data coming off of highly classified aircraft, being able to be mixed in with data coming off of lower end classified data or aircraft, and systems, and then being able to be used across our wing. We have to be able to do that. And then, in that, I need to be able to prioritize whose data is better, and what systems are more important than others. And so in the old days we'd say EW is important, but the [inaudible 00:49:26] the guy. And so we've got to be able to say ... an EW radar, excuse me. We've got to be able to prioritize what threats are the most pressing to the warfighter.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

One more question building on that then. Your collaboration across the intelligence community, the IC community. As you have good friends in Space and you went through, certainly, weapon school with some 14 [inaudible 00:49:55], that are still good friends. So at both the department of the Air Force level and inter-agency and beyond, IC collaboration, which is obviously very central to your wing mission.

Col. Joshua Koslov:

100%. Everything we do today starts off with a really firm, good understanding of the IC databases that exist today. And so we have really good partners with NASIC, with MSIC, NSA. We're connected to all the right folks. The one growth area I think for intel, and I would be interested in what the Space Force says about it too, is intel support to electronic warfare. What are the things that make something a target? Not just the collection of the parametrics, but what are the nuances of those parametrics in order for

me to develop targeting capability. We're working on that internal to our wing. We currently don't have an intel specific unit. We have intel spread across the wing. I think we're looking to move to an intel specific unit that allows us to do our job.

And then that crowd-sourced flight data that I talked about is basically that's Title 10 data. It's operations data. We're not trying to break away from the intel folks at all. That data is something we want to give to intel professionals, also, for them to be able to use and manipulate and help us to kill faster, at the bottom line, at the end of the day. And so it's a very strong relationship. We liaise frequently with our counterparts. When our platforms find interesting things that are on the Title 10 side that don't necessarily make it through their priorities. We work together to resolve ambiguities and those type of things. And so I would say that, on our side, we are not risk averse in our workings with intel. On the intel side, we've got to pull them a little bit maybe to be more aggressive in terms of attacking red vice, providing information, if that makes sense.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Exactly. It's the persistent perennial intelligence gain-loss discussion, right?

Col. Joshua Koslov:

That's right. That's right. Jam to exploit versus jam to exploit.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

And the good news is you've got those relationships and those persistently developing good partnerships, if you will, with the IC. So it all works. Bright future.

Col. Joshua Koslov:

That's right. Yes, sir. I would say that a challenge is sometimes finding requirements. And so to the industry we're talking to, we're the top five IRAD, right? For me also, where do I target the wing? So when I was at PACAF, I had the opportunity to be the O plans guy, and so I know it's in the O plans. But you'd be surprised if you talk to the one EWO who's on the PACAF staff or the intel folks, what are the top 10 EW requirements that they don't exist in that format. They exist in terms of the number one threat is X, but when we break down that threat, what are the things that, from a spectrum perspective, we can get after. That's the next level of work that we have to find the agencies of the team and grow the people that are able to do that for us.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Terrific. We have time for one more question, then I'd like to give Josh the opportunity for a bit of a wrap up. Please? Or Amy online.

Col. Joshua Koslov:

Sir.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Get your microphone real quick.

Gary Durst:

Hey, Gary Durst with Deloitte. So the crowd-sourced flight data, all that stuff that you want to grab, Title 10, all of the stuff that NASIC's developed on the IC databases, order of operations-wise, where are you in the data architecture, data dictionary kind of work right now?

Col. Joshua Koslov:

So when I answer this question, what I talk about is the F-35. And what I'll tell you is that if I could solve the F-35, I could pretty much solve this whole problem. And here's why I say it that way. I'm pretty sure that's not a hundred percent true. But the F-35 is a coalition platform, it's a joint platform, and it's a sapped up, it's an acknowledged sapped up platform. And so if I can use F-35 data down to a secret level system, I've solved a lot of my challenges specifically with the new stuff that the Air Force is buying coming down the road.

And so that, I would say that, with the F-35, my biggest challenge is not the data architecture and those type of things, it's the amount of data, and the ability to parse through the data in a faster way based on how I'm manned in the facilities that I have today. But then, because of that, kind of going back, there's not one set of requirements in way that the systems ... the way I reprogram, I have to solve that problem 70 more times as we go through the process. We'll get there. We're not afraid of that, but it's a challenge.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

One last question for me. As you operate day to day across, and certainly your perspective as a career electronic warfare officer, I would offer never more important for our national security and certainly to our department of the Air Force mission. How do you see the officer and NCO electronic warfare expertise evolving over time? Where are you today? Where do you see it going? And we've had electronic warfare officers in BLOCK 50 F-16 squadrons, for example, and there's a training program either you run or we bill EWOs as an additional duty for ... have done it for F-16 pilots and I'm assuming for F-35 pilots. Could you talk about the profession of the electronic warfare officer a bit? Officer and enlisted.

Col. Joshua Koslov:

Absolutely. So I'll start with the enlisted force first. It's under duress, because if we divest key pods, those career fields will go with them. And so the guys in my wing that work on the pod shop, we've got to ... they're awesome. They're really, really smart, and there's not an EW technician career field, they're tied to platforms and things. And so we've got to make sure that we continue to develop those folks. It's the same problem that I laid out for the double E's, the 62 Echo guys. They need to get an EW tag on them, and we need to use them throughout their career. To your point about, we used to assign EWOs to Viper squadrons, we used to assign engineers and EWOs to U-2s, and B-2s, and those kinds of things. And we have to be able to develop that process, deliberately develop them to continue their career, to be squadron commanders and wing commanders, and go from there.

On the rated side, it's a challenge. It's going to be a little bit of a challenge, but the good news is I don't actually run the electronic warfare course analysis, but we're revamping that, and making it bigger, and more important. As part of General Cunningham's Pacing Challenge Campaign, we're briefing more EMSO into red flags, and those type events. So the people that are going to those events are much more clued in and much more ready in the spectrum than they were two and a half, three years ago. And so we're making incremental gains there. I think that we will have to think carefully, as a force, on how we develop this functional capability for the joint force in the future. Kind of going back to my first sentence, we're a functional wing inside Air Combat Command, and so I draw my expertise from

multiple career fields. And so in order to sustain that, it's going to take some careful gardening. That's how I answer you, sir.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

Well, there's no doubt in my mind, and then I'll give you a minute to wrap up here, you have the closing comments. But just listening to you, Josh, you have essentially the syllabus for the development of the electronic warfare expertise, professionals, that we've got to have. And the need is there. Clearly, the need is growing. So I think I've listened to your syllabus to build the future, Josh Koslov, and your list of partners. Well, thank you for your leadership, but please close us out.

Col. Joshua Koslov:

Thanks, sir. I really appreciate it. Those are kind words. Thank you everyone for being here today, and those of you out there online. Hey, the one thing I'll end on is what I always talk to my wing about. So in our wing, we wear a tab that says 2027 to impress upon us how close the threat is. And so in a lot of ways, we gave our pacing challenges a big headstart. We gave them a bigger one in the spectrum. And so we're behind, and so it's going to take a everyone approach to really realize the full vision of what the 350th Spectrum Warfare Wing can be. But we're doing amazing things right now. Today. And so I'm just really proud of those Airmen, and our civilian Airmen, and our contracting team, and the folks that we work with in the industry to make it go.

We're making it go. And so thank you for being here today and thank you to all those guys and gals. But keep 2027 on the forefront. The thing that's going to make us win or lose is how we integrate these things into the fight, and how we develop people that can talk to joint force commanders, and combined force commanders, excuse me, air component commanders, that's a beer, in order to integrate these capabilities into the warfighting regime. It's not enough to buy a capability. You have to know how to employ that capability with the rest of the joint force in order to achieve the joint force commander's objectives. And we can do that today in the spectrum. And that should be our objective every single time we step to fly or step to OM, to do our job. Thank you very much. It's a pleasure and honor to be here. Thank you very much, sir. I appreciate it.

Lt. Gen. Bruce "Orville" Wright, USAF (Ret.):

And again, thanks to all those that participated today in another Air & Space Warfighters in Action episode. Going on now, five years ago, when I joined this fight, I asked many of you, and the mantra, the plea, continues. Join the fight. Many of you have. When I look at this room, and I know those online, the Chinese don't like this. We have joined the fight. We are doing more and knowing many of you than you would give yourself credit for. You're pretty humble warfighters that never took down your right hand. So thank you for what you're doing every day to help defend this nation and help AFA accomplish our mission to support Airmen and Guardians and their families, and certainly effectively advocate for dominant Air and Space Forces. Thanks very much.