

## A Fireside Chat with Col. Nicole Petrucci

April 24, 2024

**Lt. Gen. Burt Field, USAF (Ret.):**

Welcome to Air & Space Warfighters in Action. I'm Burt Field, president and CEO of your Air & Space Forces Association. Thank you to everyone joining us online today as we talk about the Space Force's electromagnetic spectrum activities. Colonel Nicole Petrucci is the commander of Space Delta 3, one of the Space Force's Integrated Mission Deltas, IMDs. In October 2023, Chief of Space Operations, General Chance Saltzman, designated Space EW and positioning, navigation and timing as the two deltas to test out the integration of operation and sustainment authorities under a single delta as part of the service's efforts to optimize for great power competition. This means Colonel Petrucci is responsible for organizing all aspects of electronic warfare readiness, including personnel, equipment, training, and sustainment. Colonel Petrucci, thank you for joining us today. We look forward to diving into this critical capability and what you've learned over the past six to 10 months, but first, I want to take a moment to give special thanks to our sponsors listed here on the screen.

We are grateful for their continued support because, without them, Warfighters in Action would not be possible. So let's get onto the questions. First off, Colonel Petrucci, again, thanks for being here. And the first one that I'd like to delve into is about the links between the satellites and the ground. All satellites depend on that electromagnetic link to receive commands and to transmit data, which is why the ability to protect our links or to deny an adversary's link through space electronic warfare is so important. Can you talk about how Delta 3 is leading efforts in that regard?

**Col. Nicole Petrucci:**

Well, when you talk about satellites, they've just become more and more important, right? There's more information that travels over satellites today more than ever. So it's very important commercially, so it makes sense that it also follows in warfare. So what does that mean, right? We talk about a lot about air superiority coming from that Air Force lineage, and that is being able to deny the enemy use of that airspace while we use the airspace at a time and place of our choosing. So it makes sense that we also need that for space superiority and what that means. The biggest part with the links is I was looking the other day about, and we'll just say EW because electromagnetic warfare is very hard to say, so we'll just stick with that one for here.

**Lt. Gen. Burt Field, USAF (Ret.):**

Sounds good to me.

**Col. Nicole Petrucci:**

The older term you made here is electronic warfare, but because that kind of warfare has bloomed to mean more than electronics, it's actually just being in the spectrum. That's why we say electromagnetic now. So the first time they actually did EW was during the Boer War in 1899 to 1902, and it talks about British soldiers would use their search lights to bounce Morse Code off clouds to disrupt transmissions. The Boers figured out what they were doing, and they did that right back. So that was the first instance of this, very crude, but it's grown over the years to include many different types of satellites.

In Delta 3, we specifically focus on satellite communications, but there's many other types of electromagnetic warfare, and so that includes more than us, but we're just going to stick to, Hey, what

are we doing for Delta 3? And so that's part of, we'll talk a little bit later about IMD and what that means to us and how we're expanding it on that front, but also just satellites are getting more specialized. There's more of them. You need to be able to affect them in different ways. And so Delta 3 is really on that forefront to make sure that we are keeping up with the enemy so that we can help protect our links, but then also deny the enemies theirs as well.

**Lt. Gen. Burt Field, USAF (Ret.):**

Excellent. Okay. As I mentioned in the opening, and you just discussed, you're one of two provisional Integrated Mission Deltas. So what authorities are now aligned under your leadership, and what improvements have you seen when it comes to delivering warfighter effect because of this Integrated Mission Delta concept?

**Col. Nicole Petrucci:**

Right. The idea of the IMD was to bring together that operations, acquisitions, cyber, and intelligence under one commander. So you can have that efficiency of command to be able to, what it does, in my mind, is we're able to cycle a minor military advantage into a major military advantage quicker. And so by having one commander that directs that, we're able to do that. And so, as part of this Integrated Mission Delta, now ours is a little bit different than PMT. So I am the commander of the Integrated Mission Delta, which we just still call Delta 3. We just added some responsibilities to it. I'm the commander, the vice commander is a senior material leader, so that is Colonel Eddie Gutierrez, and he helps me with that acquisition side of it. Now, what we have gotten is the sustainment of our counter communication systems 10.2, and so that is the EA, the electromagnetic attack system that can degrade, or disrupt, or deny enemy satellite communications.

So we have sustainment for that one system. We do have other systems, so we have electromagnetic surveillance system, which is we call Bounty Hunter. That one, it doesn't quite belong to the Space Force yet. It still is in the Air Force, and the Air Force does sustainments of it through the Lifecycle Management Center. That will be brought into the Space Force. We're trying to figure out how to do that, bring it into the Space Force, but also bring it into IMD, so we can do that sustainment as well. But because we do have our partners, so we stood up on IMD. The other, a partner to that, is the Systems Delta, which is through Space Systems command, and they have one for EW and they also have one for PNT. And so that's more the development side of acquisition. And then we do the sustainments.

But as I said, right now it's just for the one system. It's just for the counter communication system. So it's just for CCS, but we're expanding it to our other systems as well. So we do that sustainment, and then we also have cyber personnel that are in our unit, and we're able to move them so that we can better make sure that they get their professional development and keep track with their peers. And then also intelligence. So we always had the 71st ISRS, so the Intelligence, Surveillance, Reconnaissance Squadron Detachment 3 was assigned to us through Delta Seven, which is our intelligence squadron. They've always been with us, but through IMD, once all the paperwork's done, we say this is the longest adoption in history. Once that paperwork's actually signed, they'll belong to Delta 3.

And what we do is not that we didn't have great support or great partners with Delta 3, but what that means is when we deploy out the door, we'll be able to add that intelligence person as part of that force package that goes out the door. Right now, because it's through two different Deltas, they're separate, and sometimes it causes a little bit of confusion, or maybe we don't identify a person soon enough, but with this, they train with the crew, they go out the door with the crew, so they'll be more integrated. That squadron has different flights, and the different flights support the different squadrons and the different weapons systems as we go out the door.

**Lt. Gen. Burt Field, USAF (Ret.):**

Well, it seems just based on that, that because you have these integrated teams that you deploy using these systems and because you have fingers into acquisition, or cyber, or back to the Intel, if you find issues, you are much better positioned to maybe solve those issues quicker than we would normally. Is that the case?

**Col. Nicole Petrucci:**

That is the case, and I think what it does two, it kind of does two things is one is as we stood up these Deltas, I think there was somewhere because you took two levels, the operations group level and that wing level, and put them together, some responsibilities stayed with the Delta, some went up to the field comms. We were trying to figure that out. So I think really what that Integrated Mission Delta was is it enabled us to build out our staff structure at the Delta, and so we're able to take on those responsibilities that the squadrons were doing, and instead of focusing on training and equipping their people so they can get ready to deploy out the door, they were worried about some of these other things. And so we're able to take care of that for them. And then we also interact with the field comm as well, and then we still have that partner with SYD, that's the EW SYD so that we can make sure that we bring everything online quickly.

**Lt. Gen. Burt Field, USAF (Ret.):**

So over the past 10 months or so that you've been in command, so do you have any specific lessons on these kind of capabilities that you're adopting and you're starting to exercise and starting to understand that, hey, here's some great lessons learned that we're going to transfer over to other people or that we're going to use in the future?

**Col. Nicole Petrucci:**

I think the biggest one is we were really in learning mode when we started IMD because we just didn't know what we didn't know. We had acquisition people in the Delta, but they didn't know how to do the type of acquisition that we were being asked to do with sustainment. So what we found with, because we have teams deployed out the door every day, if there's a problem with that system, we need to be able to fix it quickly. This just allowed us to do that faster. For instance, with CCS, there was an issue with a part. The part, it was fine, it just was degrading faster than normal.

So what we did is we were able to, as the sustainment lead, because we own sustainment for that CCS, we were able to convene, get an engineering solution, and then figure out what the problem was and then get a new part out to this field quickly before it became a problem, before it became a system, a fleet-wide issue. And the other part that we learned was very quickly is now that we're doing sustainment for CCS, we were doing it for the total force because we have reserve associate units and guard units that have these systems as well. So not only is the sustainment part of what we're doing, but we're also affecting everybody that is presenting that capability.

**Lt. Gen. Burt Field, USAF (Ret.):**

So that sounds fascinating. And so across those spectrums that you're, well, not the EM spectrum, but just these, whether it's cyber or Intel or acquisition or sustainment, what do you think being in charge of an IMD, where do you have the best effect that you've seen versus when you were in a squadron or something in the past? What does this really give you that you've said, Hey, because of these capabilities and authorities, now I've been able to solve this way better than I would've if I hadn't had these authorities with me?

**Col. Nicole Petrucci:**

I think the biggest one is just being able to own it. This is ours. We always had skin in the game. We were always part of the system, but we were one in many voices as we're trying to solve problems, as we're trying to get systems out the door, what this allowed us to do is it just gave us more buy-in and it gave us a bigger voice in that overall, what do we need the system to do and how quickly we needed to get it done? With that sustainment, we're able to prioritize what happens to our system because, with combatant commands, they may have requirements that we can't wait for that next block upgrade. So what we're able to do is quickly prioritize that and say, Hey, we really do need this fixed now so that we can make sure that this capability is offered to those combatant commanders that they need for their operations plans.

**Lt. Gen. Burt Field, USAF (Ret.):**

So it's not just readiness, it's expanding capability faster.

**Col. Nicole Petrucci:**

It is, and it's not to say that we never had a great partner in SSC, or the Air Force, or any of the other agencies that we worked with. What it allows us to do is it just allows us to have that bigger voice. We have set up a few forums, so with our EWSYD, we do have a board of directors, and we come together to make sure that we're all working in the same direction to advance EW, making sure that those capabilities are presented in a timely manner so we can get the systems ready, so we can get people trained up, and then get those capabilities out the door.

**Lt. Gen. Burt Field, USAF (Ret.):**

Awesome. So you just mentioned the 75th Intelligence, Surveillance, and Reconnaissance Squadron. So that's pretty interesting what they do and what you do is pretty interesting, but obviously, there's intersections and both to the benefit and to the detriment of each other's mission. So how does your Delta integrate and work with Delta Seven and that squadron?

**Col. Nicole Petrucci:**

With the 75th Intelligence, Surveillance, and Reconnaissance Squadron, what we do is they do like that advanced target development. For us overall, the way that we had developed targets in the past was very kind of linear. It was if we had a target, hey, this was the way to affect it. It was always this develops it so that you have a target, here are all the ways we could go after it and make it more of that joint targeting process, which allows us to be one of the tools in the toolbox to prosecute that target. And so we have worked with the 75th.

We continue to work with them. We do have support from Delta Seven even once all the paperwork gets signed and the ISRS, the 71st ISRS DET 3, becomes a squadron in Del 3, that doesn't mean that we don't depend on Del Seven for training. We also do exchanges so that people can get experience. With the kind of intelligence we need, it's a little bit different than what some of the other squadrons need to do that. So we're working that. They didn't stand up that long ago, and it's a very special skill that they have in that squadron. And so we don't want to be greedy and take it all for ourselves. We need to make sure that everybody's getting what they need from that squadron.

**Lt. Gen. Burt Field, USAF (Ret.):**

Oh, fantastic. So how about the Air Force? How closely do you work with counterparts in the EW world in the Air Force?

**Col. Nicole Petrucci:**

So we're trying to make that connection tighter. The 350th Spectrum Warfare Wing just came to visit us a couple of weeks ago just to talk about, Hey, these are our systems. This is what we do. We showed them all of our equipment, and I think that helped them realize when you see a picture on a slide and it says, Oh, we put these systems on there, this is what they mean, and it made it more clear to them. I think it's not as tight as it could be. Part of that, I think, is that Air Force has really focused on that self-protection aspect of EW, which is great, and you do need that, and that's a very important part of EW overall. But as an actual, standalone EAES, it's just a different way to look at it. And so we're kind of rebuilding that and seeing how we can make this further because the more things that we can do, the more that we can free up other aircraft, other systems, other joint warfighters to do different parts of the mission.

**Lt. Gen. Burt Field, USAF (Ret.):**

So that brings up an interesting question. So obviously, there's EW and counter-EW, but can you share more on how you look at concentrating on disrupting or severing an enemy's kill chain or protecting or enhancing our kill chains by what you're doing and maybe some of this integration with the Air Force in the future?

**Col. Nicole Petrucci:**

I think that's a lot of that joint targeting process is to make sure that when we're actually looking at targets, there's a way, there's a spectrum of ways that you could affect that target. So depending on where you are in the conflict, you may want to use a non-reversible, you want to use something non-kinetic to give that enemy off ramp so that maybe you don't go kinetic, that you keep it from getting to that place, but it's really about, yeah, that's where you get into there's EW, and counter EW, and counter-counter EW. There are a lot of ways to defeat enemy jamming, and some of that is through the EA, and actually, we do that counter communication systems.

The other way is through that electronic support where you're doing that detect, characterize, geolocate where that interference is coming from, and then that's where you get that information on, okay, how do we pass that forward through the joint targeting process, and then, hey, how do we affect that? Because sometimes it's not always enemy. Sometimes it's us doing it to ourselves unnecessarily or without meaning to. Sometimes your equipment's not tuned quite properly. And so that just helps us keep the spectrum as clean as we can so that we can use it when we need to.

**Lt. Gen. Burt Field, USAF (Ret.):**

Right. Well, you brought up another point that folks are interested in. So counter-EW, counter-counter-EW, all in the EM spectrum. And you mentioned that's all non-kinetic, but on the kinetic side of the house, how involved are you or your organizations in deciding when to employ kinetic capabilities, if ever? Or do you just try to avoid that because of the consequences of that action that will last for hundreds of years?

**Col. Nicole Petrucci:**

I mean, that is one way to take care of jamming from space is to go kinetic. At Delta 3, we focus on terrestrial systems that have effects in space. So we specifically look at that non-kinetic. That's up to the

other Deltas to do more of the kinetic side. But when you think of it, the difference in space is what you do in space can have an effect on everybody else for a really long time. In 2007, when the Chinese shot down the Fengyun-1 Charlie satellite, which was their defunct weather satellite, it was actually pretty high up in orbit.

And so when they broke that up into a lot of pieces, there are pieces that are still up in orbit that we're still having to move satellites for, I know the ISS has had to move on several occasions because there's just more and more pieces floating in space. So it's not responsible, it's not very responsible use of space to be a good steward of space to say, Hey, we're just going to break things up in a lot of pieces that could potentially harm everyone else. You might take out your enemy, but you might take out yourself as well. And so that's the different part about our domain, about the space domain, and how you actually prosecute targets in it. And that's why non-kinetics is very attractive in this space. It's because you don't have those kinetic possibilities.

**Lt. Gen. Burt Field, USAF (Ret.):**

Right. Okay. So after all of that, not the kinetic part, but the other part when you were talking about how you integrate all of these new authorities and ideas that you and your team have, are there any specific material improvement that you'd like to see that's going to enhance your ability to successfully conduct space EW?

**Col. Nicole Petrucci:**

I am very interested in automation for these systems. There are certain tasks in the systems that we have that are very manual, and the operators are very well-trained, and they can do amazing things with our systems. But if I can make the science of space automated, then the art of space can be done by the war fighter, and that allows us to get at some of those unique targets, some of those very specific things, if we take care of some of those lower-level tasks through automation. So I think that's what I'm most excited about. Automation, of course, artificial intelligence, machine learning, I think, is a very big thing for EW.

So we'd like to bring more of that into our systems as well as I think in the future, actually quantum computing could have a really big impact in how we actually do EW because you're able to recognize patterns, you're able to break things down. And then, what do you do with it? Because if we have that automation, when it really comes down to it, most weapon systems are about data, having access to data, being able to take data, fuse it, and then make it intelligence that you can use in an operationally relevant timeline. And so that's what I'm really looking forward to with these systems. That's what we're looking forward to in our next block upgrades of these systems is to the more that we can take some of those just manual tasks off the operators, the further we can push EW.

**Lt. Gen. Burt Field, USAF (Ret.):**

Right. Leaves you more time to make decisions as opposed to try to figure out what's going on, right?

**Col. Nicole Petrucci:**

Exactly. So become a more of an operator on the loop instead of operator in the loop.

**Lt. Gen. Burt Field, USAF (Ret.):**

Right. Interesting. Okay. On a different track. At the end of the day, all of our military capabilities always come down to the men and the women that are doing the mission. So I've read a pretty interesting

article recently about some of the initiatives that you all are pursuing to enhance the readiness of Guardians and to take care of them as service members. Can you elaborate on some of those?

**Col. Nicole Petrucci:**

So we have started a program, it's called the Guardian and Airmen Development Program. So we do have Airmen that deploy with us as well as part of the Delta because the Space Force doesn't do all the things we need when we deploy out the door with the system. So we still do depend on Airmen. So what this does is that development program, it's run by our NCO council, so it's a Non-Commissioned Officer Council, and that's made up of NCOs from all over the Delta. They come together and decide what we're going to work on for development for each quarter, and then it's up to the squadrons to prosecute that in a way that they think would be the best for their unit. What we found, a couple of different initiatives have been on, one was on progressive discipline because people didn't really understand how to use that, right?

There are times as a commander, by the time it gets to you, it's kind of too late. We could have fixed it when it was just a small problem. We could have fixed that. We could have turned that around. And so, hey, how do we do this with progressive discipline, which people were very reluctant to give paperwork and things. And it's not that I say, Hey, we always need paperwork because we don't. What it is, is, hey, you can only verbally tell someone to knock it off so many times before, Hey, now you have to document it, and let's go forward with that because it all comes down to good order and discipline. And so that was a way to help not only the NCOs become stronger and realize all the tools that they had but then also the officers as well, because we do have a lot of junior officers in the Delta 2, and if they're not getting guidance from those senior NCOs either, it's hard to figure out what to do.

So, that's been one. Feedback has been another, like how to actually give feedback. As leaders, we're always asked to give feedback, but people don't actually teach you how to do that, or they give you the, oh, you need to do the feedback sandwich. So you say a good thing, a bad thing, and then the good thing at the bottom, which we know doesn't work, right? Because people only remember the good things that you told them and are like, Well, it must not have been so bad because they finished off that conversation with something good. So those are some of the initiatives that we've had. We've had success with it. Delta 2, the SDA, Delta actually started that, and we took that on, gave it our own Delta 3 dark knight slant on it, but to make sure we could develop people.

We actually also did have one with the new, the enlisted performance report, the Air Force. Officer reports too through the Air Force because we have to write both types of performance reports. People didn't know the difference, what was going on. Hey, if I supervise someone, what do I do? And so we've had seminars on that, we've brought people in to speak, and so that's been a good way to get that development. And then also too, to push those NCOs out in the front at SpOC, at Space Operations Command, this is the year of the NCO, and so this was, Hey, we need to make sure they take on more responsibilities, those senior NCO responsibilities, so that they can train the next senior NCOs. And so that's just one of the initiatives. We are always doing something in the Delta. Just last month, we had the Delta 3 liftoff. So that was-

**Lt. Gen. Burt Field, USAF (Ret.):**

I saw that.

**Col. Nicole Petrucci:**

... just people lifting heavy things over and over again to see where they were at. I didn't lift anything just because I don't think I could do a bench press without hurting myself with the kind of weight that

they were doing, but it was great to see. We also have unofficial events to commemorate the Bataan Death March. There was a group that went out at Schriever, they did a two laps around Schriever to commemorate that march, and we just have things going on all the time.

**Lt. Gen. Burt Field, USAF (Ret.):**

Oh, fantastic. Well, thank you. Thanks for that. All right, now we're going to open this up for audience questions. A reminder is please unmute yourself before you ask a question. You may also type your question into the chat box, and I'll do the best I can to get to it. We're going to start with Chris Gordon from Aaron Space Forces Magazine. Chris?

**Chris Gordon:**

Thanks, sir, and thank you, ma'am, for doing this. In Ukraine, we've seen a lot of electronic warfare and a cat-and-mouse game between the Russians and the Ukrainians, but at least in the public discourse that has largely revolved around drones and more tactical aspects. So how is the Space Force preparing for a future high-end fight in which space-related electronic warfare could be used on a massive scale? What real-world lessons has the electronic warfare fight in Ukraine taught you, and how does that inform how you prepare for a fight and which electronic warfare could be used on a larger scale than that? Thank you.

**Col. Nicole Petrucci:**

Well, thank you for your question, Chris. So I'd like to start off with say, yes, actually, what we have seen in the Ukraine-Russian conflict is more EW than we have ever seen before. And so we've actually been studying this very carefully to see what's going on, to see how we can help or not help. And that is unofficially just because we're trying to say, what was the environment like? So how do we get to, Hey, if we get into a fight like this, what is it going to look like? And so what I can say is we've really just, we're working on advanced training, and what we do is, we like to say, our advanced training will eventually become our baseline training. So we get people up to a certain level of operations, and then that becomes the baseline, and then we work again to move that advanced training even higher, make it even harder.

Part of that is we really are trying to get what that threat environment looks like and what an advanced threat environment would look like in the spectrum. And so we're doing even more exercises, and that is as part of the IMD, but also as part of the Space Force generation model that we're doing where we're doing more and more exercises between the Delta, so EA and ES actually working together to do some of, Hey, we're going to prosecute this target in training. Hey, now what does it look like on the other side? Working together closely, not only between the Deltas, within the Delta, but then with other Deltas as well to say if they're having in their exercise, Hey, we are seeing jamming, what does that look like? And so we're tipping and queuing, we're working more with other Deltas as well to solidify those processes.

And then, also with other partners, the biggest thing is getting people the right training, which means you need the right simulators, you need those right ranges to do that, to be able to adequately look like a high-end threat. That's really where we're trying to push that, and it means that you have to have instructors that are good enough and understand the environment, and hey, this is what it looks like now. This is what it could look like to be able to replicate those environments. That also means we have to have a closer tie with Del 11. Delta 11 does the ranges, and they have the space aggressors. We're working with them so that they can help to get their equipment where it needs to go so that we can actually see these environments.



And then also just working together with everybody to make sure we do this in a timely manner. And so it's kind of a long answer to say, Hey, what are we seeing? What we're seeing is we're studying what they're doing and then saying, Hey, maybe we need to exercise some different tactics, some different techniques, to get after what the environment looks like now.

**Lt. Gen. Burt Field, USAF (Ret.):**

Great. That's a great answer. Troy Orwin has something to piggyback on that, and his question is: How are you approaching the rapid reprogramming of the EW, EA, or ES systems to counter changes in adversary capabilities or operations? So is there something that we've said, holy cow, we need to go work in that direction, and is what you described at the beginning helpful on this rapid reprogramming?

**Col. Nicole Petrucci:**

So we do have partners, so we have the rapid reaction branch, and that's part of Space Systems command. They do see, Hey, what does the data look like now? They say, Hey, these are some threats we're seeing, and then they're able to rapidly develop tactics that we can use on our systems to help counter some of those new enemy threats. We're always looking to the future. What does EW look like in the future? We've been doing it in the, well, the Space Force four years now, but through the Air Force for at least the last 20 years in space. And so really what we're looking for is how can we push this in the future? What does it look like? And so that is some of those software-defined radios, software-defined antennas. Just as you get better equipment, you're going to have to have a better system. You're going to have to have better tactics and techniques, and you need to have those operators trained well enough to be able to recognize it and then make changes while they're in that conflict.

**Lt. Gen. Burt Field, USAF (Ret.):**

Right. Okay. I think, Ellis Kinzer, I think we've answered this question about training, and sustaining, and deploying EW forces. I think Colonel Petrucci just talked about that, so if you want to ask a more or something more specific on that, please retype a question. In the meantime, Les Parsons has one. Does the US Space Force routinely interface with other partners like NRO, NGA?

**Col. Nicole Petrucci:**

Yes. That's a very short answer to that question, but it seems a bit flippant. But the answer is yes, because, as I said, the space domain, everyone's in it, and so we need to be able, but not everybody has the money to do everything that they want to do. So we do need to work closely together to make sure that we are using our resources in the best way possible so that everybody can get that data that they need to be able to do their part of the mission.

**Lt. Gen. Burt Field, USAF (Ret.):**

Are we doing better in the handling "you're not the boss of me" problems that occur between agencies and who really gets all the data first, or last, or on the right timeline?

**Col. Nicole Petrucci:**

I think as we're getting better operating systems and as we're handling data better, we're getting that faster because, really, it's just making the data available and making it available at a classification that people can use. So as long as it's available and then you can build your own GUI on top of it so that you can get what you need out of it to do that data fusion, that part's very easy. Sometimes, depending on, as I said, we have 10 teams deployed around the world right now. Not every location is at the same

classification, and some of that has to do with where they are, and it also has to do with what partners that they're around as well. And so that's something that's a little bit of a problem with us sometimes is just classification level, just having that access to it. It's not that they couldn't see, it's they can't see it where they are, and how do we deploy out the door?

So some of those lessons that we've learned are what is a standard CCS or bounty hunter look like? What kind of kit do they roll out the door with? What kind of backup comm do we need? What kind of resources do we need to request downrange to make sure that we can do those capabilities that we're presented to do as soon as we get there? And how do we do that better? One of the things that the teams do before they go out the door is they actually have to unpack all the equipment, set it up, operate for 24 hours, and put it away, which sounds like, oh, that's not a big deal. Well, we're a transportable system. You have to be able to set it up and take it down. Some of these systems have been in Delta a while, but they have to be able to do it because that's our mission, because if we need to move somewhere else, we're going to be able to pack it up, palletize it, get it on airlift, get it to the next place it needs to go, and then put it out the door.

And so we're getting better at that every place we go, every relationship we make, because you get different support if you're on an air base, if you're on a camp with army, you might get different levels of support. And some of that just has to do with some of our equipment because it's more DAF equipment. As I said, we do have Airmen on our team, so we do have age equipment, so we do have aerospace ground equipment as part of our package that goes out the door with generators and things. And so if we're on Air Force base, it's a little bit easier to get some of that support, and if we need additional things, whereas if we're with someone else, maybe we don't, but that's okay. It doesn't mean we can't, it just means, hey, we might need learn some lessons on the, hey, we might need to ship them some things a little bit earlier that we wouldn't need to if they were on an air base.

And so we learned a lot about that. And then just normal housing people, that's always a challenge, depending on where you go. Some places are a little bit nicer than others, so there's some where, sometimes, when they get ready to go to the deployment, they're like, Well, we know how it's going to be. One of the other things that we do is I do, if I'm able, I take a team and we go to visit the team usually about halfway during their deployment if we're able to, if it's safe, et cetera, and we're not in the way, what we do is we usually take the next deployment commander with us, and they get to see what's going on, see what the system looks like, see what the team looks like so that they can better prepare and adjust their training for that team that's going to commit next.

**Lt. Gen. Burt Field, USAF (Ret.):**

Awesome. Leland Parker has a pretty interesting one. It says, so Colonel Petrucci, you mentioned electromagnetic applications for CCS. What degree are laser systems part of CCS currently, and what future laser applications do you anticipate the Space Force using in the near and distant future?

**Col. Nicole Petrucci:**

So there are, as I said, the spectrum is very big. There's a lot of ways to affect it. Yes, lasers are directed energy, which could be one of them. That is not one of the ones that we are concerned with here in Delta 3, that is for other people to develop and employ.

**Lt. Gen. Burt Field, USAF (Ret.):**

Okay. All right. Jeff Huggins has a question. Is Delta 3 addressing free space optical communications, this laser one again, for both satellite to satellite and satellite to ground data flows?

**Col. Nicole Petrucci:**

Yeah, I think that's-

**Lt. Gen. Burt Field, USAF (Ret.):**

Same answer.

**Col. Nicole Petrucci:**

It's kind of the same answer. This is a little bit different because you're specifically talking about in space as you're going, that's always a possibility rate. As I said, where does EW go next? What does that roadmap look like? It can encompass a lot more systems, a lot more ways to affect everything. That is not on our horizon here for Delta 3 currently, but we really do need those kind of communications in our systems. We do need to be able to protect that so we could easily get that information from space to the ground so that warfighters can make use of that data.

**Lt. Gen. Burt Field, USAF (Ret.):**

Okay. From John Knowles: can you just expand a little bit more on working with allies and international partners and some of the coalition operations? You answered that earlier, but is there anything else you'd like to expand either on the security aspect of it or the planning for deployment or any of that?

**Col. Nicole Petrucci:**

I think that security is always an issue when you work with allies and partners, not that we're concerned. It's always a little bit different with space. I know previously I had sat on a CAOC floor in previous operations was a named operation. We would get intelligence, strip maybe some of the information off. We can give it to people to go plan and go prosecute targets. But in space, sometimes it's not seen that same way. And so that's where you really get into that authorities, those ROE, those rules of engagement that you have with space, and where does it cross that line? Sometimes it's a little bit different when you think about that just, from a policy standpoint, on what the US will and will not do or what we have said is our official policy because there are a lot of rules in space.

For instance, when you talk about admiralty law and you're talking about the law of the sea, where if something happens to your boat and you see people in the water, you pick them up. Well, what does that look like in space? We try to make sure there is no actual acknowledged rules in space. There are things that we try to, rules that the US tries to follow and others have modeled, but there is no actual standards in space. And so what we're looking at is just how do we make the best use of it, but we still do want to deny the enemy of their use for any conflict. So how do we do that? And EW is definitely one of those ways to do that so we can help move to victory.

**Lt. Gen. Burt Field, USAF (Ret.):**

Awesome. Okay. This is a great question from Kim. So we have in AFA, we have a mission to help younger folks in America and abroad in STEM, and we have a couple programs to do that. So Kim Zocco asks, can you give some points of advice or insight into computer science high school students on the importance of understanding the integration of their studies in either the internet of things, I guess, or electronic warfare and touching on applications for space operations, a career track, and how to become a Guardian in your Delta?

**Col. Nicole Petrucci:**

So, as I said, we do have cyber Guardians throughout our Delta. One of the things that IMD actually let us do, and this is in progress right now, is what we're going to do is take all of those people that are spread across the different squadrons. We're going to pull them together, and they'll either be their own, I'm not sure if they're going to be part of X-Six, they'll be a detachment or they'll be their very own squadron. And what they'll do is they'll still deploy out the door with the systems as part of that force package that we had before. But instead of doing more of that system admin that in the Space Force, we have decided that that's going to be more of a contract, a contractor thing to do kind of that BOS IT, some of that. But we need it done on our systems when we're deployed, and we can't rely on contractors to do that.

So that's part of their job. But then the other part is, hey, how do we get you the training you need so you can actually do some defensive counter-cyber operations so you can help protect our systems when we're out and we're deployed in an austere location, and what does that look like? And so we are partnered with Delta Six, which is the cyber squadron, because they have a whole list of things that they need to do and they need to protect and they don't have enough people, quite enough people right now. So what we've done is we've partnered with them, say, Hey, we have this because we have this requirement, how can we put these together so people can not only do the kind of sysadmin that we need when we're deployed because if you can't log onto the system, you're kind of host there with actually being able to do warfare, but then how do we actually defend it as well?

And so we're working with Delta 6 right now to say, Hey, how do we get them that training that they need so they can still deploy? So that's part of it. There's lots of great missions in cyber and it's growing every day. It's very interesting. Cyber was one of the career fields when the Space Force stood up, where you could stay in the Air Force or come in the Space Force. As I always say, coming in the Space Force is probably the best part of it, but we specifically deploy other cyber squadrons, do support other systems in their DCO missions as well.

**Lt. Gen. Burt Field, USAF (Ret.):**

Great. So deep but broad and we want you to be a Guardian because she wants you to come work with her.

**Col. Nicole Petrucci:**

Yeah.

**Lt. Gen. Burt Field, USAF (Ret.):**

Okay. Charles Galbraith, what will the adoption of the Space Force Generation model mean to Delta 3 in terms of personnel requirements and readiness?

**Col. Nicole Petrucci:**

So what that SPAFORGEN model, so that's Space Force Generation model, means is that you have repeatable, you know when you're going to prepare, you know when you're going to get ready, and then you know when you're going to commit. So for a normal employee-in-place Squadron, I'll say normal, but nobody's normal. In an employee-in-place mission, you actually do about 105 days out commit, and then you start the cycle over. So you do some of your PME, you do some of your advanced training, and then you come in again and you go through that cycle. There's eight crews that go through, and they rotate through, and that's how you fill out your 24/7 ops. For what we do at Del 3 for our deployed units is our prep and ready phases actually have to be longer than an employee-in-place mission. And that comes back to we have a two to one dwell.

So we have to be at home twice as long as we're out the door. If a commit is six months, that means we need to be home a year. And so our prep and ready phases are a little bit different in length, so a lot longer than we do, but it's predictable. So you know when you prep, you know when you're ready, and that's when they do all of their training as a crew, that's when they do their crew readiness verification. So that's when they have to unpack the system and show that they can do it. And they've done it a couple of times. When of the crews that just went out the door a few weeks ago actually when they were doing that part of their CRV, the flight line part of their CRV where they have to pack everything up, palletize it, and get it on the aircraft, that's when we had some of the worst snow in Colorado that we had had in a really long time.

And it collapsed the tent that the equipment was under, and they had to figure it out. They had to figure out security and how to get on there. So it was just some extra training for them. But then you commit and you do that six months, and so we get ready and we just rinse and repeat. What it means is just it's predictable. And not to say that we weren't predictable before, but what it does is it allows us to project crews a lot farther out because I know this is when you'll finish your initial qualification training. Here's when you finish your mission qualification training, you'll be qualified. This is when you go in with your crew, here's who's on your crew. It allows that predictability, and it just allows people to work together for a lot longer so they can just be a better crew.

**Lt. Gen. Burt Field, USAF (Ret.):**

Okay, good. So what do you think about this one? Somebody wants to partner with you. Who do they talk to to partner with Delta 3 or another Delta and take advantage of technology and terrestrial EW using innovation funds?

**Col. Nicole Petrucci:**

So at the Space Operations Command, they actually do have an innovation office, and that's where you talk with them, and then they connect you with us. We have done a couple of innovation systems at the Delta. We have one called MACE, and that's like our little ES system. It's a little bounty hunter that the squadron built with innovation funds to say, Hey, we can make something smaller. And we were able to use it for training. We actually have a system right now that we were testing out right now based on a joint urgent operational need called Bounty Hunter Light. Once we built this system called MACE, the program office went, "Oh, that's a great idea." And they took that and made that the Bounty Hunter Light.

We have a version of an EA system called Tusk that the fourth EWS has, they made with innovation fund money as well. And what that one does is it's a little baby EA systems. It's got a little antenna, it's a much smaller form factor than putting things on a pallet and putting them on an airlift, and getting them out there. So what we did with that system is, they said, well, what do we do with this system now? So now we partnered with some testers in STARCOM, and we're actually taking that to a couple of tests to see how effective is it? Is this something that we do need to pursue? Is this something we can offer as a capability forward? Is this where we need to go, or is it just something cool that we use for training? So those were both created with innovation money.

We also do have Supra coders in our unit, and some of them were involved in some of the Guardian One and some of the other initiatives that the Space Force had with General Saltzman. We had a couple members on that team to develop applications for the Space Force. They also have developed applications in the Delta. There's a different way that we use to, they made an application so we can do our situation reporting in ways that people need it so they can adjust that data and then use it for lessons learned to consolidate data. So we've done that as well.

And then the other one that we've also sent our Intel personnel to the Data and Intelligence Analysis course, and it's called DIA, but not that DIA. What that one does is that one, instead of going to the Supra coder's route, where that teaches more apps and web pages, that one does a lot of Python coding. And what we do in that is we are specifically using that in Intel so that they can data mine and they can use big data to actually use that data to actually make an intelligence.

**Lt. Gen. Burt Field, USAF (Ret.):**

Good.

**Col. Nicole Petrucci:**

So that's all been through with innovation.

**Lt. Gen. Burt Field, USAF (Ret.):**

So you guys are receptive to innovation. Start with Space Command Innovation office. That's the way to go. Okay. Joseph Muhlberger, having acquisitions as a Delta member is significant as the far is kind of clunky, to put it mildly. On the acquisition side, how much more rapid is the acquired to arrive in the field timeframe? And on the sustainment side, how much more expected time are you now enjoying with assets? Can you give any insight into that, or are we still too early?

**Col. Nicole Petrucci:**

Well, so the issue is with the systems that we have and the systems that will come into the Delta, we have a few ways that, so there's acquisitions through that normal JCIDS process. We have that going on right now. We also have middle-tier acquisition, where we have that rapid acquisition or going through that rapid prototyping, rapid acquisition with some of our systems right now. And then we also have Agile, where you're working to software upgrades and things. So you have a gamut of acquisition pathways going on at the same time. So it does get-

**Lt. Gen. Burt Field, USAF (Ret.):**

And you have that innovation part that you just discussed.

**Col. Nicole Petrucci:**

And we have innovations, we have everything together. And that's why it's important to have that senior material leader to help with, Hey, how do we actually do this in the correct way? How do we actually spend money correctly? How are we actually making sure that we're spending money in a way that is responsible but will also help the system move forward? So yeah, I mean, acquisition, people always complain about it. They always say it's too slow, but the reason that there are so many laws in place with acquisitions is because there was problems in the past with it. And so that's why there are certain roles and regulations in line, and that's part of the reason that we make sure that we have an acquisition person and an operator as part of the integration mission Deltas to make sure that we get the best of both worlds to get our systems where they need to go so we can offer those capabilities.

The PNT Delta is actually the opposite. So their SML, their senior material leader, is actually the commander of the Delta, and the vice commander is an operator. So we were trying to see how we had a different paradigm with these two systems, and we're trying to see which one worked out for us. As I said, we have a lot of systems, but we only got sustainment of one right now. We'll bring more in as we take them online. But with PNT, they got some of that development as well. So a little bit different

paradigm how they're doing. So they've had some wins. We've had some wins with what we're doing. Which way is better? Not quite sure yet.

**Lt. Gen. Burt Field, USAF (Ret.):**

The jury is still out.

**Col. Nicole Petrucci:**

To be determined.

**Lt. Gen. Burt Field, USAF (Ret.):**

Awesome.

**Col. Nicole Petrucci:**

But what we're seeing is a lot of wins in just the integration and just being able to move faster because you don't have to go through quite as many people to get some of these things done all within the bounds of the law and regulations.

**Lt. Gen. Burt Field, USAF (Ret.):**

So when you talk about your teams that are deployed, and we talked briefly about how you want to automate things, what are your priorities as it applies to decision support and command and control initiatives from an AQ standpoint, is there something that you can pinpoint that this is something that would really help us in specific?

**Col. Nicole Petrucci:**

I think everybody likes to talk about command and control. And what does that mean? Oh, we need a command-and-control system. Well, what level of command and control are we talking about? Are we talking about operational command and control where, hey, they can see some of this, I get some information, you get that machine-to-machine tasking, or are we talking tactical command and control? And this is how I actually interact with other systems doing that same thing. One of the systems that we are bringing online, we're actually in the acquisition process for it right now, is called, it's RMT's, remote modular terminals. And those are antennas that'll be set up all over the world, but they will be operated remotely, as the name suggests, through a piece of software called the Space Electromagnetic Warfare Operating Location. It's actually the software that ties it all together.

So you could do that tactical C2 control across all of those antennas, even though you're not physically at them, which is the way that we are deployed now with the team where you're sitting with the antennas, I mean, a safe distance away, but you're with those antennas all the time. So that is very important because that's some of that tactical C2, and if we can prove that out, how can I expand that to some of these other systems? And that's where it becomes real important and exciting because you're like, okay, I can make this data available. And you might not be able to do some. You have to have, right, there's some authorities, there's some rules of engagement, and things to actually be able to use it, but it's making that data available to everybody who's doing that EW mission. So it could be expanded in many ways, and that would really help everyone.

**Lt. Gen. Burt Field, USAF (Ret.):**

I agree. Okay. Here's an interesting question. How will Space Force and the Air Force deal with an unknown signal or unknown platform?

**Col. Nicole Petrucci:**

Oh, we see them all the time. So it's whatever we're tasked with. And so this is where that electronic surveillance really comes, oh, see, I said it too. Electromagnetic surveillance comes into play. Old habits die hard, I guess.

**Lt. Gen. Burt Field, USAF (Ret.):**

They do.

**Col. Nicole Petrucci:**

Because what they're doing is they're monitoring those spectrum and by being able to detect, characterize, geolocate, and report on these signals, we're able to do something about them. Now sometimes it's just, hey, everybody's going to tune to a different signal because there's not really anything we can do about it depending on where it's coming from, depending on that type of interference you may be getting. But it's just better knowledge of what's going on in the spectrum. As I said, sometimes it's blue on blue, sometimes it's red on red. Hey, what can we do about this? Hey, are other people involved? Are we getting this through proxies?

Are we getting it through third parties? Is it somebody just not knowing what they're doing? Is it the same time of day? So there's a lot of information you can get from these unknown signals, and then we put that forward and then try to move forward from there. So that's how we deal with unknown signals. A lot of times, it comes from reports. So people will report and say, Hey, I had some jamming. Here's some information on it. And then that's when we go back and do that investigation and see if we can figure out what it is. So that's where part of that is important with that automation, whereas if somebody reports it, I should just be able to ingest it, see that information, and then start working that problem.

**Lt. Gen. Burt Field, USAF (Ret.):**

Right. Start deciding. Okay. Another question for the youth, do you offer outreach to youth like civil air patrol, similar to a week-long orientation course at Vandenberg or some other Space Force space?

**Col. Nicole Petrucci:**

So actually, STEM outreach is a really big part of the Space Force, and every December, as part of the Space Force birthday celebration, we actually reach out to a lot of people. I have, last December, I think I talked to four classrooms about space and about STEM, and it was great. But we do this on a continual basis, and this has been something every year, so not a week-long course. This is just kind of a little taste. So it's maybe just an hour or two talking to people, sometimes talking to classrooms, sometimes doing projects with them to explain space or different concepts in space. Some of them have been in person, and some of them have been virtually. The way that educators do that is they actually just sign up through the Space Force website, and they can request their classroom. And I've talked to, over the years I've talked to many different types of classrooms at many different age levels.

**Lt. Gen. Burt Field, USAF (Ret.):**



That's awesome. Thank you for doing that. Leland has a follow-up question about lasers and what Space Force departments are charged with evaluating technologies such as laser or directed energy capability.

**Col. Nicole Petrucci:**

Right. I think that-

**Lt. Gen. Burt Field, USAF (Ret.):**

I think you might've answered that already.

**Col. Nicole Petrucci:**

Yeah. That's more the research and development on how we can move forward. Once you do that research, once you do that development, or just kind of that S&T, that science and technology, and say, Hey, this is a technology that's out there. This is what we're exploring, and then how do you actually make that something? How do you put those things all together and actually become a weapon system or not? Or maybe it's just something that you protect against as you decide how you're going to move forward.

**Lt. Gen. Burt Field, USAF (Ret.):**

Well, thank you. Anything you want to say to wrap up, a message you want to deliver that we haven't kind of tapped into?

**Col. Nicole Petrucci:**

So I'll just say thank you to everybody that's here today. I'm always happy to talk about Delta 3. I think that I have the best Delta, but I'm probably a little bit biased. We have over 600 Guardians and Airmen in the Delta, and that also includes our civilian members as well. And then we also have our total force partners. So being part of DEL 3 and any other Delta is a team sport, and so by doing that, we're able to present capabilities downrange to the warfighters.

**Lt. Gen. Burt Field, USAF (Ret.):**

Well, thank you, and thank you so much for spending time with us today. Unfortunately, though, we're out of time, so thank you and thank everybody who joined us today. For our virtual attendees, we hope to see you back here in June for our next two Air & Space Warfighter in Action events. The first one's with the Chief of Staff of the Air Force, General David Allvin, and then Lieutenant General Adrian Spain will join us. He's the Air Force's Deputy Chief of Staff for Operations. You can scan that QR code on your screen to register, or just search the events tab on AFA.org. Have a great day.