Aerospace Nation: Brigadier General Heather R. Pringle

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**SPEAKERS**

Theresa Hitchens, Brig Gen Heather Pringle, Garrett Reim, Frank Wolf, Lt Gen (Ret.) Dave Deptula, Steve Trimble, Rachel Cohen, Valerie Insinna

**Lt Gen (Ret.) Dave Deptula** 00:01

Good morning, ladies and gentlemen, I'm Dave Deptula, Dean of the Mitchell Institute for aerospace studies. And welcome to our aerospace nation series. Today, we're really pleased to have with us Brigadier General Heather Pringle commander of the Air Force Research Lab. as commander of afrl. She leads a team of over 6000 military and civilians across nine technology directorates, and a wing to manage and execute the Air Force's $2.5 billion Science and Technology Program, and an additional 2.3 billion in externally funded research and development. So welcome, gentlemen, Pringle, and thanks very much for taking the time to chat with us today. What I'd like to do is start out by giving you the opportunity to make a few opening remarks about the challenges that afrl is facing, and some of your top priorities as you look into the future. So with that, let me turn the microphone over to you.

**Brig Gen Heather Pringle** 01:35

Well, good morning, and thank you general tip Tula for having me what an honor it is to really be here. And I want to thank your team as well for doing all that behind the scenes work and getting us setup. I know we have an afrl alumna alumnus in your ranks major Chris Olsen, shout out to him as well as to Kamilla Gunzinger. For setting this up. I'm really looking forward to the opportunity to highlight afrl accomplishments and what we're going to be doing and 2021 to sharpen the warfighters edge, technologically speaking, like everyone out there, 2020 was full of challenges. And not withstanding the challenge of COVID. There were a lot of accomplishments that afrl were able to get done. For example, we had about $900 million in contracts awarded through the DPA title three authority that helped the medical and defense industrial base respond to this nation's pandemic. We also set out as you mentioned, our afrl, Commander priorities. I'm very excited to talk to you about those today. The first part, we had three priorities, the first of which was to accelerate our SMT 2030 strategy. The second of which is one afrl for two services. And the third was to lead the best afrl team. I have to say afrl is not the same organization that it was a year ago, we came out of the gates at full speed. And we are driving these three priorities that we set last year into action in 2021. And I'll just take a minute to talk about those for a second if I may.

**Lt Gen (Ret.) Dave Deptula** 03:39

Sure.

**Brig Gen Heather Pringle** 03:40

Okay, good. So on accelerate the 2030 strategy. The whole goal here is to create technological surprise. And what we want to do is to build threatened formed transformational portfolios. And you may have heard about the Vanguard's and that is going to be a prioritized, resourced effort. But we also are supporting technology across the entire Kill Chain, including communications, next generation munitions, and a tradable autonomous platforms for example, we also have a very strong, enduring technological portfolio. And this really helps us create that strategic surprise that warfighters need to get out there. And so this includes things that we'll prioritize such as artificial intelligence, autonomy, hypersonics, micro electronics, quantum directed energy and even biotechnology. As far as the one afrl for two services, this is all about all of afrl all those technology directorates supporting both The United States Air Force, as well as the United States space force. In fact, I like to tell them, we need to be bilingual in the challenges that warfighters face in both of these domains. So in 2021, we've got two primary activities that we'll be looking at. So one is mapping our science and technology to cheap Raymond's priorities. He's laid out about five of those space security, space domain awareness, combat power, projection, information, mobility, and mobility and logistics in space. And so we'll be mapping our science and technology portfolio to his five priorities. And the other thing that we'll be doing under this priority across afrl, is maintaining that great strategic alignment between Air and Space, across domains across portfolios. And as my boss general bench likes to say, this is important because a technology doesn't know its application until we tell it. So if we're talking about micro electronics, we don't know where it's going to end up in a satellite, or an airplane. And it's important to be flexible across the board. And third, finally, but not least of all is, of course, leaving the best air for LTE. There's a couple aspects of this that are really important for 2021. Our mantra is going to be collaborate to innovate. And this will involve building some digital tools and inculcating a digital workforce and bringing in some digital engineering, to our science and technology. It's about having a data informed human capital strategy, as well as strengthening the partnerships that we have. And of course, app works, if you've heard of them. They are the Energizer bunnies of creating partnerships with industry. And we're looking to expand our network with industry non traditional companies out there. So that's just a snapshot general dip Tula. Thank you for letting me elaborate it a little bit. I think 2021 is going to be exciting. And we're already off and running. Well, thanks

**Lt Gen (Ret.) Dave Deptula** 07:30

very much for that overview. General was very informative. So now let's dig a little deeper into some of the topics that you brought up there. You mentioned that your number one priority is to accelerate implementation of the Air Force, science and technology 2030 strategy. For our listeners out there who may not have read the document, can you give us a brief overview of the objectives of s&t 2030, and tell us what you've accomplished today.

**Brig Gen Heather Pringle** 08:02

The SMT 2030 strategy that was signed by Secretary Wilson in 2019. And the strategy has stood the test of time and is still our guidepost for where we want to take the Science Technology and Innovation enterprise for 2021. She laid out three priorities as part of that, develop and deliver transformational technology, absolutely key to what we need to accomplish. It was the second one was to leave science and technology in new in different ways. And then third was to deepen and expand our science and technology base. And so that's through partnerships, but also through our workforce initiatives. So those are kind of the three elements there. And what we've accomplished in 2020, we did quite a bit. In fact, we really focused on developing and delivering transformational technologies. So we stood up an office called the transformational capabilities office. And they are the ones who are ushering through the vanguard projects, these game changing technologies that bring in all of the acquisition community warfighters, as well as technologists to deliver them. They achieved their initial operating capability. They have a skeleton crew, right now they have additional resources and and we established a governance structure to help them a couple other things that we've done, for example, the space force, they're leading in and managing science and technology differently by having a chief technology and interest Officer currently led by Major General Crider. And then of course, in the workforce effort we've been doing a lot, but that's a major effort that we're looking forward to in 2021. So our next steps are really marching the SOC full operating capability, getting those resources fully instantiated for the transformational office, that'll be 20% of our budget when all is said and done, and measuring our success.

**Lt Gen (Ret.) Dave Deptula** 10:32

Very good. Oh, thanks for that. Perhaps one of the most visible parts of s&p 2030 was, as you've already mentioned, the call to establish the Air Force Vanguard programs. And you know, they're meant to be big bets on Game Changing warfighting technologies. One such Vanguard is a cyborg. That was part of an advanced battle management system demo last December, where it flew information with the F 22. And the F 35. And briefly served as a gateway translator between the two. Can you tell us some of the challenges and successes of the December demo and what's planned for the next guy Borg test later this year?

**Brig Gen Heather Pringle** 11:18

I'm glad you asked about that, because I'm really excited about what Skye Borg has accomplished and what we have in store. And I really want to start by saying this is a collaborative effort. This is not afrl by itself, but we have strong industry partners. My co lead on Cyborg, of course, is the PEO for fighters and advanced weapons Brigadier General Dale white, and, and warfighters, as well. And we're really excited about that December demo, because it was the first ever kind of an opportunity to show in a tradable as a force multiplier, with to fifth Gen aircraft, I just really wanted to ask the two pilots what they were thinking when they were, you know, flying in formation without a tradable autonomous aircraft. So it achieved some objectives. And that went really well. And I love the photo that they got out of it. But as you mentioned, General deptula, there were, there are a couple challenges that we faced. And so with the actual attributable itself, it was a rocket assisted takeoff. And that can be a really stressful, stressful kind of a takeoff is shaking the aircraft and the platform a little bit. And so basically what that did is it caused stress on the communication gateway. And so as you mentioned, we weren't able to establish it in flight with the onboard communication gateway. But we still achieved achieved the objective, because we had a backup on the ground. And so the connections were made. And so so we still got the job done. That's a little bit part and parcel to science and technology is learning through your failures. The next steps that we have, we have more tests this year. We have multiple platforms, that multiple prototypes that we'll be looking at, and we're assessing the military utility and military capabilities with our Warfighter partners. And we're driving toward general White Knight, the whole team toward the initial capability and 2023.

**Lt Gen (Ret.) Dave Deptula** 13:41

That's great to hear. Obviously, there's huge potential there and many folks are excited about that potential and looking forward to you continuing to push it and develop it. Something else also happened in December, the Air Force test center dropped two collaborative small diameter bombs from an F 16 as part of the Golden Horde Vanguard program. Now I understand that test was declared a partial success with the bombs establishing network communications, but failing to hit that target. Can you tell us what was learned during that December test and what's planned for upcoming tests this year?

**Brig Gen Heather Pringle** 14:22

It was another great learning opportunity, as you mentioned. So on the positive side, nine of 13 test objectives are met. Things like the networked radios were were were working well the interest warm communications, and another great demonstration of collaboration with the acquisition community. My partner here is the PEO for weapons Brigadier General Keith Collins, as well as industry, but not everything went according to plan and It was basically, you know, we're still doing the analysis. But we had uploaded and ofp that couldn't accept updated flight profile information from the autonomous onboard processor. And so ultimately, the initial flight profile that was in it is where it ended up. So there was no updates. And the flight never changed. But we have done the forensics on it, we've corrected what needed to happen. We're looking forward to two more flights this month. In fact, with four collaborative small diameter bomb weapons and and looking at time on targets, to try and up are up the game a little bit. So this this program is still progressing. And we're really excited about where it's gone in 2021. Now, that's

**Lt Gen (Ret.) Dave Deptula** 15:56

good to hear. Because obviously, that's an integral part of this whole notion of a BMS jetski to now, with the current Vanguard's that you have up and running, can you give us any insight on the timeline, and processes involved in establishing new Vanguard?

**Brig Gen Heather Pringle** 16:18

So Sir, it's important to keep the pipeline going. And we've kind of set up a battle, a battle rhythm of about a year long so that it's a continuous process, so that we're constantly collecting ideas from war fighters from industry from our alpha nerds in afrl. And collecting them through our war tech process that's called a Warfighter technologists one and developing those into proposals that are vetted by an executive committee and then teed up to the to Vice chiefs for consideration is Vanguard status. So I can't let the cat out of the bag until we get that final approval. So I guess more to follow on that.

**Lt Gen (Ret.) Dave Deptula** 17:11

Okay, no, that's very good. Now, you mentioned war tech. Could you tell us a little bit more about war tech and what it's doing differently to connect warfighters and technologists?

**Brig Gen Heather Pringle** 17:22

Absolutely. It is an important process to think about, because before when afrl engaged warfighters it was more of an ad hoc serial process, a single match com, a single Technology Directorate, but through war tech, we're really bringing all the parties together. And in particular, we're leveraging Wargaming insights from Air Force futures, as well as the space force to inform what are those big opportunities that we need to get after. And so by bringing together those technologists and the warfighters, across the board, we can better develop some those game changing ideas and develop them into proposals for the two vice chiefs to consider.

**Lt Gen (Ret.) Dave Deptula** 18:19

Oh, that's a that's great to hear Heather as a, as an operator who has a great appreciation for what technology can do to change concepts and operations, it's it's really heartening to hear that you're bringing those folks together, as early and as often as you can. So keep up the great work on that one. You also mentioned in your remarks, one afrl, two services, as the motto for how afrl can support both the Air Force in the space force, can you tell us a bit more about just how afrl is adapting to support both of these services.

**Brig Gen Heather Pringle** 19:05

It's, it was an early priority, when I got to afrl to establish our support to the United States space force, not only in Word, but indeed. And we saw this as an opportunity to expand our aperture and and really get after how we should stand up this new this new service. And so last year, it was all about learning and connecting and just just those initial conversations about what we need to do. We had looked at our processes for example, we clean cheated everything we didn't take for granted that an Air Force process would apply to the space force. And we're taking lessons learned the good practices from one applying it to the other. So we're being very fluid about that. We looked at our portfolio. And I think this year, we're really going to get after aligning our science and technology portfolio to those key priorities that the space force is laying out. I kind of mentioned what the chief Raymond has already laid out. And so we're doing the mapping right now. And we're ensuring that multi domain strategic alignment is continuing. The only other thing that I'll mention at this point is on the people aspect of it. So afrl, you know, we've been in this space business for a long, long time for decades, in fact, but just this week, we had a number of our airmen commissioned as guardians, and we'll have more joining over to the guardian of service in the future, we have ultimately about 700 personnel who are going to be part of the space force. And we want all of our personnel to be bilingual, as I mentioned, in guardian and airman's speak. And so we're really excited about supporting the 700 people who will be wearing that different pouch, but they'll be assigned to me for their day to day duties in science and technology. So a lot coming in 21. And getting those processes fully, fully institutionalized and making sure we're making progress.

**Lt Gen (Ret.) Dave Deptula** 21:39

Now, you talked about advancing afrl digital transformation. Could you talk to us a bit about the major lines of effort underway to make that a reality?

**Brig Gen Heather Pringle** 21:53

digital engineering is critically important to me. And, and frankly, it's critically important to afrl and, and our warfighters. So the first aspect that we're looking at is incorporating digital engineering into everything we do in science and technology, open architectures, government, government owned data, for example. But we're also wanting our alpha nerds to be Uber connected. And so we are supporting our workforce with data tools. And we really want to up their proficiency in this digital culture as well, because we want data to be our, I guess, our third love language, if you will.

**Lt Gen (Ret.) Dave Deptula** 22:47

Okay, that's super. Let's just switch gears a little bit and talk about what's fundamental to everything that you're doing. And that's hiring and retaining talent. We all know that it's a difficult problem across the whole of federal government. But I think it's somewhat amplified. In places like afrl, where you've got to compete with industry for really a limited pool of tech experts in industry, oh, by the way, can often pay more and hire faster. So what's afrl doing to gain an edge when it comes to hiring and retaining stem talent?

**Brig Gen Heather Pringle** 23:29

Hi, you nailed the big challenges that we have with our workforce. And I think we need to tackle it head on. Before I got to afrl, the team did a workforce study. And they tried to identify what would be the key challenges for this workforce going forward? And what would we need to achieve the workforce of 2030 and that, that provided some really great insights. And from that, we developed a number of initiatives to get after some of those things that you said there's there are a lot of things we can do within our control, as a science and technology laboratory. So for example, we get to use that we can use executive headhunters to find the best talent for some of these niche capability areas that we need micro electronics, hypersonics, artificial intelligence, quantum and so on. So that's, that's been a real boon to improving the depth of our technical expertise. We are accelerating timelines. We are even with the workforce that we have. We're conducting state interviews, that's an industry best practice what will keep you here and we're learning a lot about how How we can change our day to day work environment to better support and encourage the workforce that we have, oh, here's an exciting one for students, we can repay loans now our maximum has increased to $125,000. That's pretty big to get some top talent. My favorite general tip to lift is supporting the junior Junior force of afrl. This is introducing the stem kids to afrl. And getting them excited about STEM opportunities, growing their capabilities and growing their talent through partnering and mentorships at the high school level. And then when they get to college, supporting and hopefully getting them all the way through the pipeline, in hiring. So we've created a pretty, we have an initiative that's created this pipeline from introduction to growth to hiring. And we've had some success in in retention there. So graduating from those three different stages, we've had about 94% retention, and so that should yield some benefits in the long run as well.

**Lt Gen (Ret.) Dave Deptula** 26:21

Well, good luck with all of that. I mean, that's pretty impressive in the context of being able to help pay off student loans, I had not heard that one before. And that certainly has to be a motivating, as well as what you provide. I mean, you know, industries, a great partner, but they tend to be very, very focused on a particular element, whatever they happen to be producing, where the potential opportunities in the Air Force in the space force, particularly in the s&t world, you guys are doing things that you don't find in industry, and you can't do anywhere else. So that's got to be a motivator as well. So good luck. You mentioned hypersonic weapons throughout some of your remarks. In light of the new administration and his desire to pursue Strategic Arms limitations with Russia, which could include both nuclear and conventional hypersonic capabilities. Could you give us any insights on how this might alter or affect afrl? hypersonic portfolio moving forward?

**Brig Gen Heather Pringle** 27:34

Well, sir, I'm not involved in those conversations.

**Lt Gen (Ret.) Dave Deptula** 27:38

I know we stay out of keep the politics out of it, but it may have may have an impact. Just curious if if you've heard anything in that regard, or if you're pressing ahead.

**Brig Gen Heather Pringle** 27:50

So, you know, if the past is any indication, those have not tended to involve science and technology, the New START that is currently in effect does not touch science and technology, it covers deployed operational and strategic weapons, and our portfolio focuses on tactical theater, conventional weapons, and its science and technology. So we've been able to continue with our portfolio and, and frankly, we've invested a lot over the past 25 years, almost about a about $1.7 billion in the past 25 years to developing furthering hypersonics It's a long history. And, you know, you brought up, you know, afrl having some really interesting things that maybe industry does not, and hypersonics is one of those areas. Did you know we have the world's largest hydrocarbon fuel scramjet combustor at afrl. A hypersonics engineer that's got to be Nirvana. Right,

**Lt Gen (Ret.) Dave Deptula** 29:05

right. Okay, well, thanks for those insights. The FYI 21 NDA added over $300 million to the Department of Defense's SMT lines, and it included provisions for the establishment of a directed energy Working Group. further exploration of quantum computing solutions with small and medium sized businesses and continued expansion of the national security innovation base. Have any of the s&t plus ups impacted? afrl directly? And if if so, in what ways?

**Brig Gen Heather Pringle** 29:43

Absolutely, sir. And that was that was above the President's budget. They did come to afrl in a couple key areas. And just for our approximate numbers, there's about 100 million that will benefit To space, science and technology, about 100 million that will impact materials and composites, those basic elements, and about 100 million that will help add advanced manufacturing or mantech, which is a real critical, foundational part of our science and technology portfolio, it kind of puts together those prototypes that we need to play with. There were smaller plus ups for things like basic research, Quantum hypersonics propulsion, and, and that money will be used to either enhance what we have, or start new areas consistent with the guidance that we got from Congress. You mentioned the directed energy working group. So OSD is already stepping out on that and F Morales on their wing. And following right along with them. You mentioned the quantum efforts. And I'll just say that afrl was has a long history in there as well. And we were the first D od entity to join the quantum economic development Consortium. And this helps build out that industrial base. And that's been a really fruitful partnership with ACU etc. And then lastly, you kind of mentioned the national security innovation base. And we continue to leverage Commercial Investments, what's already out there. And we try to complement that with our own funding to seed some new areas. So we're complying with the guidance and grateful for the support.

**Lt Gen (Ret.) Dave Deptula** 31:48

Well, super, job Wrangler. Before we hand it over to the audience. I wanted to ask one more question. You've talked about all of the leading edge kind of work that you're doing. But at the same time, one of the fundamental elements, that is the baseline, as we move forward to try to implement not implement, but develop and then implement a BMS and Jad c two is the need for assured reliable, robust connectivity. Are you working on things as mundane as this but that are so fundamental to moving forward with some of these great ideas?

**Brig Gen Heather Pringle** 32:36

I'm glad you asked that Gerald up to load because sometimes we take that for granted, don't wait. And that is a major part of our portfolio, just the nug work of making it secure, and looking at the micro electronics and that kind of activity. And, you know, you might think this is located only in one of our technology director, it's, you know, one location, Take, for example, either Rome, New York or Wright Patterson, but frankly, we're all looking at all of that. And absolutely, we have a lot of different efforts going on. And each are converging to help strengthen, what would be the final solution, you got to test it all, you got to know all the possibilities. What's best for these qualities, what's worse for the others, and then kind of pick the best of breed to get to that final solution, as you mentioned? Yes, we are.

**Lt Gen (Ret.) Dave Deptula** 33:40

I'm glad to hear that. And I hope, you know, people tend to particularly from industry, they Okay, we got this, the next best idea on a new data link. Well, you know, that assured connectivity is not necessarily something we ought to put all our eggs in the basket of radio frequency, we ought to be integrating optical communications, we ought to be looking at innovative ways that routing communications up to space around the world back up from a different direction. So not that I have any interest in that subject area, but I think it's really important that all this other stuff, ink and work if you can assure connectivity. So

**Brig Gen Heather Pringle** 34:22

I'm with you, General Deptula, and I was, I was talking--I'm sorry--but I was talking with a scientist just last week, and he got a patent in photonics and optical, you know, communication. So we're all in for all of it, sir. So I'm glad you brought it up.

**Lt Gen (Ret.) Dave Deptula** 34:46

Good. Because look, the easiest thing for not to dwell on this, but I mean, the easiest thing for the bad guys to jam is a direct link based on RF between, you know, one error spacecraft and another So we've got to come up with innovative ways to get around it. Okay? Enough, but thank you general Pringle for your comments on these critical issues. And on behalf of the Mitchell Institute and all of a FAA, we wish you the very best as you continue to develop the crucial technologies that are going to empower our warfighters in the future and keep our nation safe. into it a reminder to our listeners, February 16, we're going to be hosting Lieutenant General Jim slife, the commander of Air Force Special Operations Command in our next edition of aerospace nation. Right now, Heather, what we're going to do is turn it over to the audience for q&a. And for those out there in the audience, please either submit your question in writing using the q&a tool or tap on the raise hand icon. And please announce yourself when I when I call on you. So the first person that I will give an opportunity to ask a general some questions is Steve tremble. Go ahead, Steve.

**Steve Trimble** 36:06

Oh, God, thank you very much. And thank you, General Pringle for the opportunity this morning. I have a question. It is a budget question. And I know the budget hasn't come out yet. But just in sort of general terms, you know, over the last four or five years, the r&d portfolio for the Air Force has dramatically increased. It's gone up to x, I think since 2016. And, you know, we're hearing a lot of talk at senior levels of God really, for months now saying, you know, expect clack toeing budgets, and, or declining budgets over the next several years. How do you think that might affect the rd T account? Over the next few years? Do you think it's possible to maintain this growth trajectory that you've been on? Or do you expect? You know, that to naturally plateau at some point in moving some of those rd t and e assets into the procurement realm? So

**Brig Gen Heather Pringle** 37:08

good question, Steve. I wish I had a crystal ball. And, and I would love for it to continue to grow. And, you know, let let all the scientists and technologists and just continue to, you know, have at it and you know, may have a technological playground, so to speak in SMT. But the reality is what you're saying that, you know, we had a big year, last year with COVID, we had a lot of bills, and I would expect to be part of the solution. So I don't know what that would mean, or what that would entail. And you don't want to lose the seed corn of ideas, you there has to be some level of investment to continue that pipeline of new ideas and innovation going forward. So science and technology has always been a core part of this department's mission set. And it's always been contributing to warfighters success, and I expect that to continue. I just don't know exactly where it would fall in. Sure. Thank you.

**Lt Gen (Ret.) Dave Deptula** 38:30

Okay, Heather, let me give you one from a text in question from retired Major General Larry Stutzriem. He asks, in recent years, the Air Force has juggled how it derives and prioritizes research efforts. Some suggested priorities for research dollars are not defined with enough granularity. To understand what has the most impact on Warfighter requirements. What efforts are underway to better guide r&d dollars to support the most critical warfighting requirements.

**Brig Gen Heather Pringle** 39:03

So in terms of the most impact on what war fighters need, that is exactly the purpose of the 20% of our transformational portfolio. And so if you think that me as a referral has all the ideas about what needs to happen in this area, I would say truly, we are relying on Air Force futures and the designers in this space force who have been brought up in those communities have been more gaming for years and gleaning insights. And we're partnering with them and with the warfighters to get at what are those most impactful technology areas so we can tell you all about the future. hypersonics micro electronics quantum, But to your point, how does that impact the battlefield? And how do we put that into a technology that is most meaningful for our Warfighter? So, that partnership through war tech Warfighter technologists is so critical and it's continuous. So we have multiple meetings at the action officer level multiple meetings at the executive level, to really mature the concepts into proposals and develop them into what would be prototype technologies. So I would say ultimately, it's a partnership.

**Lt Gen (Ret.) Dave Deptula** 40:49

Okay, let's, uh, hand the mic over to Rachel Cohen.

**Rachel Cohen** 40:54

Morning, thanks for doing this. Um, I have a question about SMP 2030. You know, one of the points of that strategy was that afrl was going to have a new Chief Technology Officer, which I see that you have now I think he came in last year. So yeah, I'm curious now that he's in his position, you know, what has? What has creating that done for you, you know, what, what difference has it made? You know, what, what has he done? What does he want to do? You know, just give us an update on that, and where you see that going for afrl.

**Brig Gen Heather Pringle** 41:30

So the changing the way that science and technology is LED and managed is the second pillar of the 2030 strategy. As you mentioned, there are a couple different ways to get after this. So I want to start by pointing out the Chief Technology and Innovation Officer is how the space force is implementing that part of the recommendation. And so, Major General Crider is overseeing the portfolio of science and technology that contribute to the Space Forces way ahead. So afrl is one piece of it. But you're probably familiar with that Naval Research Lab Army Research Lab. And they're partnering with NASA and others to really kind of get a hold of community effort toward the space force. I do have a Chief Technology Officer, Dr. Bunting within afrl. And he's helping me collect and take a broad base understanding and enterprise view of the afrl portfolio. And he's helping us refine and mature processes so that we can be as effective as possible as an enterprise. And he's really facilitating how we are building up the transformational capabilities office as well. So it's really maturing from, we're continuing to have our nine technology directorates as well as the 711 human performance wing, but adding in that element of multi disciplinary, cross technical Technology Directorate efforts to get at those bigger big bets and game changing technologies and ensure that we can get them across the valley of death.

**Lt Gen (Ret.) Dave Deptula** 43:39

All right, john Pringle, here's one from the Dayton Daily News. This is in Tom, I hope I pronounced your name right. But Tom Gnau. And he'd like to ask if you can look into your crystal ball about where do you see afrl employment, specifically at Wright Patterson Air Force Base heading in the next couple of years, particularly with the prospect of flatter budgeting in years to come?

**Brig Gen Heather Pringle** 44:09

Well, Tom, that's a that's a good question. As far as employment, we are. What we're primarily trying to do in the employment area is make the most of the authorities that we have, maximize our hiring practices, be as efficient and as agile and as quick as possible. We don't see changes in terms of more or less but just kind of shifting the emphasis. So we are increasing our focus on space, science and technology and that's an important part of being one afrl for two services. Were working on supporting technologies for our vantage guards and our technologies in support of the entire Kill Chain or kill web. And then all those also enduring areas. Ai quantum, just to name a few.

**Lt Gen (Ret.) Dave Deptula** 45:15

All right, let's hear the mic over to Teresa Hitchens.

**Theresa Hitchens** 45:18

Hi, nice to see you. Again. This is Teresa at breaking defense. I have a clarifying question and then a question question a clarifying question is about the Vanguard's I'm, I'm curious whether or not those are going to be split between space force and Air Force this time since in the past they've been focused mostly on air related tech and the timing. My other question is is about gray wolf and if you can give us any kind of update on that program since it was recently linked with this digital twin effort and kind of just what's up with gray wolf not not necessarily the weapon, one digital twin side of it, but the actual missile Thanks.

**Brig Gen Heather Pringle** 46:02

Okay, so as far as the Vanguard's and the air and space, parts of it, we have Golden Horde, Cyborg and navigation technology satellite three. So those are the three Vanguards that are approved right now, you could say that two are strongly air focused and one is strongly space focused. I would see in the future that we would continue to have a balance across both services, we would probably see at times where we would partner across services for maybe a true multi domain type approach the you know, the possibilities are out there for any and all of the above. So it's a matter of bringing together the best of breed ideas and what makes the most sense given the maturity of the technology and the needs of the warfighter prioritize. As far as gray wolf, the teams down at Eglin is doing a great job of incorporating this and adapting it to part of the digital one or digital weapon community weapon one, I guess, is the better term. And they continue to make advancements. So I'll have to I'll have to give you a more specific update offline, Theresa, that's okay.

**Theresa Hitchens** 47:39

That'd be great. Thanks. Okay.

**Lt Gen (Ret.) Dave Deptula** 47:42

Heather, here's a one from Mr. Doug Birkey. One of the great accomplishments of Dr. Roper and others in recent years, was reintroducing the notion of allowing successful failure, which is key to learning and advancement. tight budgets, historically speaking, have often seen the opposite reaction with folks desperate to show no weakness for fear. If they do, it invites cancellation. How do we avoid that culture from reemerging?

**Brig Gen Heather Pringle** 48:17

He's highlighting a real human tendency, right? to retreat to the safety when you are a little bit under threat and to reduce the risk that you would face. But frankly, as an afrl, science and technology and innovation ecosystem, we have to be the ones that are taking the risks. And frankly, what do we know we learn from our failures, we learn more from our failures and knowing what went wrong than we do from what went right. Because we take it for granted, we assume that things were going according to plan in our perfect design. But even as we're learning from artificial intelligence, it may end up with some of the right outcomes and consistent with what we had hoped. But we truly don't know what how the artificial intelligence got to that endpoint. It's making its own decisions and its own trajectory. So afrl will continue to lead in terms of taking risks and learning from it. You know, we highlighted you know, not everything was perfect in our earlier experiments, but we still move the needle and we moved the ball down the court. What both was Skyborg and Vanguard are and

**Lt Gen (Ret.) Dave Deptula** 49:48

well, I applaud you for that attitude. I often wondered when, you know, Congress would put pressure on all the services, not just the Air Force, and weather when there happened to be a test failures that were sort of Why do you think you have testing evaluation in the first place? So, you know, keep up the good work and encourage people that and I think it's quite frankly, it's easier to do in your line of business. And some of the concept developers and others who just have this fear of failure and risk avoidance is a disease in the Pentagon. But enough on that, let's turn to Frank Wolf. Frank, what do you got?

**Frank Wolf** 50:28

Yeah. Good morning, General Pringle. I just wondered on the afrl. effort on the dilutable. Effects munition. Which I which would presumably give air crews more flexibility during dynamic targeting, and just wondered if you could discuss that, because that's been a joint concept technology demonstration, I think and since way back in 2018, with the Navy and he could sort of discuss what's going on with that. And, and I think during Inherent Resolve, you've had some instances where there were sort of limited numbers of low collateral damage munitions that they could employ, like the gbu, 38 and the 54. And presumably, again, this would give you more flexibility for air crews and lead to less sort of civilian casualties. So I wondered if you could discuss that. And, as just a follow up short, if you could give us sort of just your general thoughts on the new Vanguard's just in terms of general areas where you think you're really looking into and just again, if it's any timeline, where war tech would end, the process would be resolved, where you'd have a new Vanguards actually coming out.

**Brig Gen Heather Pringle** 51:40

Okay, thanks, Frank, a lot, a lot of meat to unpack that one. So the dilutable munitions is one that the folks at Eglin have been working hand in hand with the acquisition professionals. They're they're working on. You know, as you mentioned, the GB 38 and the 54, how that was supported in Inherent Resolve, they continue to look at how they can have it be more facilitated for the warfighters so that they can, you know, right now they have to pre program those die level effects. And it's not as moderated on the fly. So making that more agile for the warfighters and that they can adapt while they're in flight. I think that's an important area that they are looking at. And rather than just, you know, pre programming, even though they have the body out there, you know, it has to has to be started before they load it up. What was the other question, Frank, that you had? Yeah, I was just start.

**Frank Wolf** 52:58

Yeah, right. Right, just in terms of as much as you can just in terms of sort of general areas and how they would differ from the three the NTS three Cyborg and Golden Horde that you have now, you've sort of indicated that, that you think it would be sort of against sort of a balance between air and space. But just in terms of, you know, general areas you think are, are most needed or are for these new Vanguard's and just sort of a general sort of timeline on where the war tech process would find the resolve. And when when you'd have actually new Vanguards actually proposed?

**Brig Gen Heather Pringle** 53:33

Well, so we're we work on an annual basis, just kind of continuously feeding this cycle of proposals to concepts to demos for the two vices to consider. And I don't want to get ahead of the leadership in when they might be ready to release these kinds of things. But you know, it's a continuous basis that we're, we're feeding. So, for example, next week, we are meeting we as at a lower level, our meeting with magic cons and Air Force future leadership, just to discuss what the next round of ideas will be, while the previous round continues to make its way in terms of what are the major areas that we're looking at. This is defined and co co defined with our partners that Air Force futures, the space force and the warfighters. And what are some of the areas that they've been looking at is you know, projecting, power is logistics under attack is all domain command and control some of Those traditional areas that the Air Force futures has been highlighting as necessary to get after. Thanks.

**Lt Gen (Ret.) Dave Deptula** 55:11

Okay, Valerie Insinna,

**Valerie Insinna** 55:15

either Valerie and center with defense news. Um, I know that you spoke about Cyborg a little bit earlier, but my internet connection has been a little bit rough. And I hope I don't ask the same questions. But I was I was wondering, you know, last December, you guys chose the three designs. That would be, you know, the actual Cyborg prototypes. And I was wondering, you know, if you could give any context about why, why those three why the Boeing credos and General Atomics air vehicles like and what perhaps unique attributes they might bring to the table? how mature they might be? And as you guys move into initial tests for this summer, what are you in general white going to be looking to prove out first? Thanks, Valerie. Um, so, you know, as you mentioned, this is a partnership with PEO for fighters and advanced weapons. And, uh, you know, as far as the attributes that were successful, I think, I think there's a couple different things that, you know, we're trying to keep things as open as possible, I would say one of the attributes that we are really interested in is open architecture, and as much government data rights as we can get. And then from there, we're trying to allow the flexibility to adapt what Cyborg will be for the warfighters. And I think that will be an important part of the experiment, experimentation campaign, the operational experimentation campaign. So you're familiar that we have three parts of the program, the tradable vehicle, the autonomous core system, and the experimentation campaign. And so, you know, creating prototypes that could be adapted to various things that the warfighters need calm relays, weapons delivery, or any number of things that they would want to use that a tradable system, that's, that's a primary thing that we're looking for. As far as that beyond that, then I would, I would pull in general white to help elaborate on more of the Act strategy that they have there.

**Lt Gen (Ret.) Dave Deptula** 58:03

Okay, Heather, here's one from Colonel Bertil van Geel from the Netherlands. He's the Netherlands air attache. Last year, I visited afrl with my deputy chief of the Netherlands Air Force, I see good opportunities for collaboration. Are you looking to expand s and t collaboration with partner air forces?

**Brig Gen Heather Pringle** 58:26

Yes, we are. And we have long standing relationships both with your country as well as others. And it's a real opportunity to leverage the strengths of what each country brings to bear and we find that each relationship has to be addressed based on the specific capabilities and needs or mutual needs. I guess we always look for the win win solution. We're finding that there are increased interest in science and technology partnerships for artificial intelligence or communications and space is just an example.

**Lt Gen (Ret.) Dave Deptula** 59:15

Thanks very much. A quick one in our last one from Garrett Reim, Garrett.

**Garrett Reim** 59:23

Yeah, I had a question about Golden Horn. in I think it was September during the Air Force Association Conference. It was said that you guys were reassessing the way you were going to put together Golden Horde, whether it was going to be a capability on a single weapon that was network or you were going to network, multiple different types of weapons. Where are you guys with that debate? And where do you see going forward?

**Brig Gen Heather Pringle** 59:51

I'm glad you asked that on Golden Horde, so we had your right we have been conducting our tests on small diameter bonds. And those have continued to progress. And we have two more this month. But in terms of the long term way ahead, General Collins and I together have been reassessing what the overall long term scope is of this program and what the end deliverable will be. And so a major component of that is building a digital architecture that will allow more testing various kinds of collaborative technologies and building in some containerized solutions that could be more plug and play across weapons. And I think ultimately, that will allow a lot more flexibility. But I don't really want to let too much out of the bag until general Collins and I have another meeting and about a week. And together we'll we'll do the formal rollout and see what the final solution ends up being.

**Lt Gen (Ret.) Dave Deptula** 1:01:13

Alright, folks, unfortunately, we've come to the end of this very insightful aerospace nation event. And thanks again to general Pringle to you and our audience and from all of us at the Mitchell Institute. Have a great aerospace power kind of day. Out here. Good luck, Heather.

**Brig Gen Heather Pringle** 1:01:35

Thanks, sir. Take care.

**Lt Gen (Ret.) Dave Deptula** 1:01:37

Keep up the great work.