

“Ready to Fight: Flying Hours, Flight Safety, and Training the Next Generation of Pilots”

Maj. Gen. Doug Raaberg, USAF (Ret.):

Well, good afternoon to the last panel of the day. My name is Doug Raaberg. I'm the Executive Vice President of your Air & Space Forces Association. Sincerely, thank you for joining us to discuss what I consider a very serious topic of national security importance, about being, quote, "Ready to Fight: Flying Hours, Flying Safety, and Training the Next Generation of Pilots." Let me introduce our guests this afternoon and then let's give them a warm welcome. To my left, Lieutenant General Jim Slife, Air Force's deputy chief of staff for operations. To his left, Lieutenant General Brian "Smokey" Robinson, Commander, Air Education and Training Command. And to the far left and really our blue three on this formation, Major General Jeannie "Tally" Leavitt, Air Force's Chief of Staff. Let's give them a warm welcome, please.

Lt. Gen. Brian S. Robinson:

Chief of Safety.

Maj. Gen. Doug Raaberg, USAF (Ret.):

What did I just say?

Lt. Gen. Jim Slife:

Chief of Staff. But that's okay.

Maj. Gen. Doug Raaberg, USAF (Ret.):

She's now the Chief of Safety.

Lt. Gen. Jim Slife:

For a moment.

Maj. Gen. Doug Raaberg, USAF (Ret.):

And she's now Blue four. Let's go right into this because I think this is important. I was like to have General Slife set the tone. Sir, you've recently spoke with the Mitchell Institute Dean, Lieutenant General Dave Deptula on his Aerospace Nation podcast. And it was really about the need for a well-articulated force presentation construct that really balances mission, resources and risk. You indicated, quote, "The Air Force we have employed the last 20 to 30 years is not the Air Force we need to succeed in the environment we face today. Safe, effective, and timely pilot production and absorption continues to be the greatest challenge if the Air Force must remain dominant to deter, fight and win." So, General, set the scene for us. How would you describe the current air crew production and absorption model, no small answer, compared to a desired throughput pipeline that safely balances high-end training with the complex missions and sensors? Sir, over to you.

Lt. Gen. Jim Slife:

Well, thanks Doug. I appreciate the opportunity to be with you on the panel. I'd like to congratulate General Leavitt on her eight or 10 seconds of being the chief of staff. It's been great serving with you, ma'am.

Maj. Gen. Doug Raaberg, USAF (Ret.):

Any things you'd like to command before he goes and takes over?

Lt. Gen. Jim Slife:

Hey, you asked how I would describe it, and so in two words I would describe it as in transition. And so we have a well-established construct for how we produce and absorb new pilots into our squadron. And of course absorption, for those that don't live in this world every single day, absorption simply deals with the rate at which new pilots can be absorbed into a squadron. And so you can't have a C-17 squadron full of co-pilots with no aircraft commanders. And so there's a limit to how many new co-pilots that can come in. And our ability to absorb is generally governed by a couple of things. It's governed by the flying time that we're able to put on new crews. And so if I'm flying 50 hours a month, I'm going to absorb very quickly because I'm going to experience pilots very quickly.

If I'm flying five hours a month, it's going to take me a long time to be able to absorb. And so the other thing is our definition of experience. If I'm comfortable creating a F-22 four ship flight lead after they have 10 hours in the F-22, I'll be able to absorb very quickly. It'll just be at a very, very high level of risk. And so how we define experience and how much flight time we can put on crews is really the governing factor. And if General Stewart and the AETC 19th Air Force production pipeline could produce more pilots, we would have a hard time absorbing them in the operational squadrons.

And so really it's a system that's in balance, but we're living at an interesting time because of the advent of technologies that are really going to change our historic models for absorption and production. The advent of things like augmented reality, synthetic training environments particularly for some of our high-end platforms are not just nice to have, but they're got to have training modalities that will increase our rate of absorption. And so we're standing at a precipice where there's a lot of new technologies that are going to both increase our production and our absorption. And so I would say we're in transition.

Maj. Gen. Doug Raaberg, USAF (Ret.):

Being the advanced wing commander, I remember steam jet capability and now you're having to mix that into the operational imperatives capability with the sensors and really get rated management accelerator. So, General Robinson, you're ultimately responsible for replenishing the combat forces, especially with pilots for rotary to fixed wing platforms, really from manned to remotely piloted to now semi-autonomous systems. That gets complicated from there. What are your instructors learning from training students in a complex mix of live, virtual and synthetic training environments? And then the next question is really some early results from the incorporation of cognitive learning and artificial intelligence. Sir?

Lt. Gen. Brian S. Robinson:

Thanks, General Raaberg. I appreciate it. And likewise, I'm honored and privileged to be on stage here with Jim Slife and with General Leavitt as well. I'll just stick with his joke for that. So, we've learned a lot in that regard. So, the beautiful part about being a part of AETC, the first command, is we touch every skillset and training. So, we touch more than just pilot training. It's all the AFCs across the Air Force, a little more than a couple hundred. And what's interesting is we've learned a lot in the last four years of pilot training transformation in terms of the technologies that we've applied to it and how we've designed the learning and action. Being unfair by saying we. It's actually the 19th Air Force that's done a lot of that work, most of that work, and we're pivoting off that now toward tech training transformation.

But to answer your question directly, we've learned that the more often you stimulate the cognitive experience for anybody, either in flying skills or no matter how heavy or light the touch labor aspect is, the more comfortable the students are in training when they actually get into the platform of choice, be it an aircraft or a K loader or a Humvee, whatever that might be. Or air traffic control, radar scope, whatever that might be. Because they've seen it before. Their expectations are shaped. They've heard it before. They've been able to make decisions on the scenarios that we've able to present through immersive training, technological solutions or AR/VR.

So, that's actually done a lot of service there and it's actually helped us manage risk in a lot of ways too. Because those more modern systems can actually capture data for the student's performance and we can instruct them earlier. And one of the things I'll never forget, at least in the flying training side, is I was at Laughlin Air Force base in the flight room early on in my time with the command and we're getting out of one of the immersive training devices and I heard one of the students who just went out to the OR, to the MOA rather, for a contact phase ride. And he's explaining that as he's upside down in the Cuban 8, he looks through the top of the canopy and the ground references are just like he saw them in the immersive training device. So, not as worried about where he's maintaining position in the MOA.

He's focused on flying the aircraft and putting it through the right parameters and flying it safely from that perspective. So, that's very, very important in that space. And so we've learned that we can do that sooner. In the cases of how that's transferred over to maintenance training and even air traffic control training, we know for a fact we can train skill level upgrades in maintenance probably about 33% faster is what the science has shown so far, the studies have shown so far. In the case of air traffic controller training, I have personal testimony of one individual who linked in with the network that the immersive training devices that the pilots are using in the flight rooms and they could upgrade to the five level on their skills in about five months faster than the traditional cathode ray radar scope with a white carded inject from a civilian instructor or a live instructor, a human being. So, we're not done learning what we can in that space, but that's what it's shown so far. A lot of great promise.

Maj. Gen. Doug Raaberg, USAF (Ret.):

So, General Leavitt, in many ways you and your teams have the tougher job, frankly, to ensure safety enables the mission. It's a key point you always make from a session to combat readiness. You also emphasize that safety culture cannot be an afterthought. How do you identify potential hazards and proactively mitigate the risks from your perch?

Maj. Gen. Jeannie M. Leavitt:

Well, thank you. Very happy to be here with my outranking Generals. Thank you both for letting me join. You're absolutely right. We're really trying to get after the idea of ingraining safety in everything we do. Because we know we're often an afterthought and we want to stop doing that. One of the things we did at the Safety Center was to shift our mission and vision. And so we safeguard Airmen and Guardians and protect resources, but the why part, and it's to enable mission success. We're not here to slow the mission down. We're here to speed it up. Because you want to slow things down, you have a mishap, everything comes to a screeching halt. And so we really want it ingrained in everything we do, and we want to get that proactive safety mindset to people to identify risks ahead of time.

We've seen some great examples in the field of when a unit will have a really close call, that near miss, where they didn't have a mishap but they were about a split second away from having one. But rather than just go, "Whew," and go to the bar and have a drink and go, "Wow, that was close," we've had some organizations go, "Let's treat it like an investigation. Let's go find that root cause and let's make

changes." There's nothing stopping us from making changes. And so we have seen some great behavior along those lines and really trying to share that so that we do that more. We want people to share their flying stories. We want them to share their experiences so we can learn from each other's experiences. I had the great fortune last assignment when I was in AETC to check back out in the T-38, and I was blown away by the debrief abilities that come with that.

It wasn't the T-38A I left. The T-38C was considerably different, but the incredible amount of debrief capability that we can't always take advantage of because of the ops tempo, because of the [inaudible 00:11:29] of the time. And so I think this is one of the places as we go forward, in addition to immersive training devices, that we could potentially have that AI instructor. Because they could watch every single approach I did and know my exact threshold crossing height and my attitude and my speed and all of those things. And so when we're able to get our arms around some of this big data, we can identify trends and be able to really take advantage of all that information.

Lt. Gen. Brian S. Robinson:

Yeah, I think that's pretty powerful. And so we need to build that time in for the debrief and like you mentioned there. Because the students can take that and then go jump in the immersive training device and practice on the very specific particular maneuvers or tasks that they've been debriefed that they need to work on without having to re-fly in the aircraft. So, I think that's pretty powerful.

Maj. Gen. Doug Raaberg, USAF (Ret.):

Yeah. General Slife, you've been a MAJCOM commander. You've been the end user of the product through the pipeline, but I'd like to get both perspectives, both as the A3, but also as an end user MAJCOM commander. That is, there's a dimension of volume and velocity. You can only go so fast with the product to get it out there and then get it to the end user, especially the MAJCOMs that'd have to bring it to a combat status. So, what have you seen both as the A3 in terms of that absorption model and then give a perspective looking back as the [inaudible 00:12:54] commander?

Lt. Gen. Jim Slife:

Well, I'll tell you, as General Robinson's predecessor General Webb used to say, "The clue is in the patch." There is a MAJCOM that has the words education and training in their patch. And these are the professionals at education and training. And so my experience as a MAJCOM commander and certainly as translated as the A3 is that as the operating force tells AETC, "This is what we need you to produce." Whatever standard that is, whatever special qualifications we need them to have, whatever it is, when we tell them what we need them to produce, this is what AETC does for a living. And they can come back and tell us exactly, "Well, this is what it's going to cost. This is how long it's going to take," and so on and so forth.

And that allows the operating force to be able to make trade-offs for, "Okay, how much of an exquisite product do I want the pipeline to produce versus what can I accept in the squadron when it shows up?" And I think every MAJCOM goes through that a little bit. But I will just tell you my own experience was that I wanted to push as much of the formal training enterprise in the AETC as possible because these are the professionals that do this for a living. So, I think as long as the operating forces are clear with AETC what's required, they can deliver the product.

Maj. Gen. Doug Raaberg, USAF (Ret.):

The real question is, you're dealing with the new dynamics. Obviously force modernization. We're talking NGAD. We're talking new bombers, lots of new weapon systems, and again, the continuation of the complexity of training. Sir, go ahead.

Lt. Gen. Brian S. Robinson:

No, it's a great point. We are. So I think we're on the crest of the wave with that with the work we've done already in pilot training transformation. So, we understand now that there are certain standards in the learning management systems that we have to assure that, as the lead MAJCOMs go out and acquire these new weapon systems, that will allow us to capture that data to understand the student's performance from their actual employment of achieving the criteria and the standards for operating the aircraft, but also not only that, but their human performance. Are they adequately rested? Are they ready to perform in the aircraft?

And we can see if the stress level's too high to safely perform. We can see if they're rested or not with wearable technology, things of that nature. And we've got a lot of work going on that space as we designed the fighter bomber fundamentals syllabus going further forward beyond where we were with the air mobility fundamentals. So, a lot of that work is going into place, understanding what's coming down the pike for those systems. We are working to stay and gain the right level of integration into those weapon systems and what the training approaches are going to be as they come forward. Of late in the last couple months, as Secretary Kendall mentioned this morning, when he came to visit us in November, he said, "Hey, what are you thinking about for collaborative combat aircraft training?" And he caught us a little bit flatfooted. We're like, "Uh, we'll get back to you on that."

But we're getting up on step pretty quickly on trying to understand where that's at and how we use that technology and the data that we'll have to transpire there in how a four ship flight lead with X number or any pilot with X number of CCAs attached to him or her and how they're going to be tasked or what they're capable of. So, that's actually been really, really, really exciting, to be honest with you. And so the tech is there. There's no lack of industry willingness and ideas on how to do that. And so we're really embracing that through our detachment 24 that works directly for 19th Air Force to really wrestle those things to the ground.

Lt. Gen. Jim Slife:

Can I-

Maj. Gen. Jeannie M. Leavitt:

I'm sorry.

Lt. Gen. Jim Slife:

Go ahead, Jeannie, and then I want to come back with some-

Maj. Gen. Jeannie M. Leavitt:

Go ahead, sir.

Lt. Gen. Jim Slife:

Okay. So, a great example of the different thinking that AETC is putting into this is when Hurricane Michael struck and really wiped out much of Tyndall, we found ourselves in a very different position with our F-22 FTU, which was located at Tyndall. And of course the airplanes end up over at Eglin, but all

the simulators are still down in Tyndall. And so typically the way our training methodology would work is you would mix in the simulators interspersed with flights in the actual airplane. And the way we would typically use our simulators was, you would set the simulator up at the critical phase of flight. And so in other words, you wouldn't fly a whole flight in the simulator. You'd fly whatever the training objective for that day was in the flight.

And so you'd go back and reset at the merge or whatever and then do it again from the merge. And because we found ourselves, because of this natural disaster, we found ourselves with the airplanes at Eglin and the simulators at Tyndall, we didn't want students having to drive back and forth to Tyndall for a simulator today and then back to Eglin for a flight tomorrow and so on and so forth. And so AETC really innovatively put all the simulator training up front and completely switched the syllabus around where the students were flying full, climbing the jet, do your pre-flight, your start taxi takeoff, your flight out to the training area, whatever training iterations you had to do, all the way back to recovery, all the way to engine shutdown. And every simulator flight was that way. And they did all of that front to back.

And then they came over to Eglin to hop in the live airplane. And what we actually found was that by the time the students get into the airplane, they don't actually require a whole lot in the airplane because of the quality of training they got in the simulators. And there's specific things they need to do in the airplane, but a lot of the mission stuff they've already handled in the simulator. And so I think that's, just by happenstance of this natural disaster, we've stumbled on to something that really may point the way ahead in the way we think about the training.

Maj. Gen. Doug Raaberg, USAF (Ret.):

Tally.

Maj. Gen. Jeannie M. Leavitt:

Yes, sir. So, one of the things I was going to say is that with AETC, we're trying to insert ourselves into processes and things that we may not have traditionally been in, but there's a lot of value to it. So, for example, new aircraft acquisition. We're staying very closely tied with all the entities on that because sometimes there's systems that we've figured out in other platforms that we may want to integrate in. And in the bubble with the initial requirements that were written and things like that might not be part of it. So, example, Auto GCAS, the Auto Ground Collision Avoidance System.

It is now credited with 12 saves and 13 lives that we have saved. And so it is a system that's on the F-16. When a pilot has a G loss of consciousness heading towards the ground, the airplane gives you one chance. Hey, you're going to recover. And if it doesn't, the airplane recovers. And so there's all kinds of different features. And so we're really trying to embed ourselves in, whether it's acquisitions, whether it's in the air crew task force, just different areas where we'd like to be part of the conversation to bring that perspective.

Lt. Gen. Jim Slife:

General Leavitt, the other thing that I would, not to put you on the spot, but one of the things that I have been most impressed with is our MFOQA program and how... This is where we take data recorders that are already on the aircraft. And when you think about flight data recorders and voice recorders, it's typically in the aftermath of a crash. You go find the box. You pull it out and figure out what happened and why the airplane crashed. Well, what we found is we can actually collect data off these things off of each sortie and look for training trends.

And you can say, "Okay, how many unstable approaches do we have inside the final approach fix? How many times do we see a bank angle that exceeds whatever it is?" And so whatever the criteria are you

set, you start to get that data back. And it's washed so that it's not, "Hey, Raaberg was out flying again last night. Let's take a look at his data." It's trends in a fleet over time. And I'll tell you, that really gives you some great insights into the training programs you have in the squadrons.

Maj. Gen. Jeannie M. Leavitt:

Yes, sir. And FOQA, we borrowed it from FOQA which the civil aviation uses, but the MFOQA we're working on getting it on more of our platforms. We've got it on a lot more of the mobility platforms. Starting to get it on a few of the other ones. It just got into the F-15E, but it does exactly what you said. So, now we can identify trends like, "Why are there so many slow approaches in this variant of the C-10?" Well, we go back. And again, it's aggregated data, washed data. You don't identify who it is, but it's trends. And so we found that in that case it was a negative transfer from a different model. And so now you can identify an issue and be proactive. And I always say one of the most important metric we want is the one we can never have, which is how many mishaps do we prevent? Well, we don't know. But everything we can do to do a proactive action that could prevent that future mishap is absolutely key. And so MFOQA is a big part of that.

Lt. Gen. Brian S. Robinson:

I agreed. And I think the data point that General Leavitt was talking about was Officer Robinson, a little slow on the air speed negative transfer. But-

Maj. Gen. Jeannie M. Leavitt:

It was aggregated.

Lt. Gen. Brian S. Robinson:

Yeah. Actually-

Maj. Gen. Doug Raaberg, USAF (Ret.):

What does the chief have to say about that?

Lt. Gen. Brian S. Robinson:

Yeah. But I think we also, in AETC, we haven't forgotten the fundamentals. So, again, as enhanced as we can by data, but we're actually going back and taking a refocused look on operations resource risk management rather, both in the flying realm and on the ground realm, and your team's being incredibly helpful with our safety office on that, to standardize where we can, not take away enough, allow wing commanders in their mission sets enough maneuver space and decision space, but also to simplify and make that more effective. But that's still, as the Airmen are going out the door, thinking about the environment they're going into. "Am I ready? What environment am I going into?" All the things we evaluate in that space, we're just doubling down on that. And so your team's been very, very helpful in that.

Maj. Gen. Jeannie M. Leavitt:

Yes, sir. And that ties into one of the things that we're standing up a new division within the Safety Center called Human Performance. Because if there's one common thread with mishaps, there's often a human in some way, shape or form involved. And in the past we've always focused on human factors, which usually says, "Who did what wrong? Did you have channelized attention? Did you have test

saturation?" Whereas human factors are just a part of it. We want to look at it more holistically as human performance. What can we do proactively to optimize human performance to negate some potential human factors from happening?

Maj. Gen. Doug Raaberg, USAF (Ret.):

Smokey, you caught my ear when we did our panel prep. You talked about a C-17 incident where the data after the fact proved that we could have caught it a lot earlier.

Lt. Gen. Brian S. Robinson:

Yeah, that's true. And so this goes way back several years now, but the only C-17 we've actually totally lost to a Class A, by virtue of the use we really came to appreciate MFOQA, as General Leavitt talked about. Because unfortunately we weren't looking at it as aggressively as we do now, but it turns out the particular aircraft commander that had the Class A, we went back and looked at a pattern for stall warnings is what we were looking for. And as you looked at the trend in the data and the fleet, there was one data point that stood out quite a bit on the graph. And you can drill down into it when you need to, tail number orders and crew member. And unfortunately, what we missed was that aircraft commander was involved in the eight previous events where those star warnings had happened. So, had we had this culture and understanding what the data can tell us proactively, we might have been able to intercede and not had that crew in that aircraft lose their lives and lose that aircraft.

Maj. Gen. Doug Raaberg, USAF (Ret.):

Yeah, absolutely. Tally, go ahead.

Maj. Gen. Jeannie M. Leavitt:

I was just going to say, another MFOQA good news story was with a C-17 and they were doing low altitude threat reactions and they had briefed it, the non-flying pilot would call the threat reaction. Well, they had just done a crew swap and the IP was up front and poor timing type of thing on a threat reaction. And so it came very near a stall. The IP took it and ended up overspeeding something and so recovered it. Got home, it was a Friday, and the IP had the chance to think about it and it was like, "Holy cow, that was so close to being really bad. And if that could happen to me, that could happen to anyone." So, he went back and they pulled the MFOQA data and they recreated it so he could share that with the squadron so that others can learn. And that's the exact kind of culture we're trying to encourage. Not cover up like, "Oh my gosh, we almost crashed that airplane." No. "Oh my gosh, this happened to me. It could happen to any of us," and sharing that information so others can learn.

Maj. Gen. Doug Raaberg, USAF (Ret.):

Yeah. Let me start with you, Jim, because I think this is important. We've been talking about culture, structural changes to adapt to the new 21st century training environment. Let's talk about the business model. It takes cash to fly. So, can you talk about the Flying Hour program, the funding for the program? And I'd like all three of you to address it from your perspectives.

Lt. Gen. Jim Slife:

Well, so there are a couple of funding issues really that go into our ability to fly more hours, absorb more pilots, all those things that we started talking about. And really at the top level, I'd say the three variables, the three funding variables that affect that are number one, you mentioned it, the Flying Hour program. And so our Flying Hour program pays for things like fuel and consumables. It's the washer that

when it comes off, you throw it away and you put a new washer on when you do maintenance on the airplane. All those consumable items that go into generating a sortie. And so that's our Flying Hour program. And I think that's important. The longer term funding issue is what we call our Weapon System Sustainment Funding. And so this is money that funds a lot of our depot and backend repairables capability. And so if you don't fund your WSS program, you'll have airplanes stacking up at the depot because you don't have the throughput at the depot that you need to put the airplanes back out on the flight line. Then you'll have a shortage of flight hours.

And then the third thing that is directly impacted by funding is frankly, in my view, the most important thing, and it is where we really have some work to do. And frankly that's in our maintenance manpower. We have assumed a lot of risk in our flight line maintenance manpower. We have taken manpower cuts over the years for reasons that all made sense at the time, but it has left us in a position where we have a shortage of qualified flight line mechanics. And as it turns out, it takes about seven years to create a crew chief with seven years worth of experience. And so this is not a problem that you can apply money to and fix it today.

It's a long term problem. And so those three things are really the variables that we have to work with. I would say that we are trending upwards in that. And because of things like this maintenance issue that I said, there are limits to what you're going to be able to produce, even given more fly. I mean if you gave more Flying Hour program funding, we wouldn't be able to generate the sorties because we don't have the flight line maintainers to generate them. And so these things are all interconnected. But at the end of the day, I think we're trending upward across the board on this, and I'm optimistic about the future. We just can't really get there fast enough for my comfort.

Lt. Gen. Brian S. Robinson:

Yeah, And General Slife, one of the things I take away from your comment there is that's a great way to state the system of systems approach to what you're talking about. So, where data can help us again is as we're entertaining a decision or anyone in senior leadership in the Air Force has to go, "I think this is the right answer," how useful would it be to say, "If we do this, the likely outcomes will be the following effects"?

So, we can make that decision with our eyes wide open and go, "Is that really what we want to do? Because we know sometime down the road this is what's going to happen or likely to happen," and then make that fully informed as opposed to where we tend to find ourselves today is we make the call for valid reasons with what we know, and then we go years on, to your point, and then we find ourselves in a position and the staff unfortunately has to waste time going back looking at, how did we get here? So, I think there's a lot of activities going on right now that are helping us get back in that more proactive space.

Lt. Gen. Jim Slife:

Yeah. We've got a fairly involved project going on right now for the chief and the secretary. We just showed a first demonstration of this to the secretary a couple of weeks ago. But all of these variables are knowable things. I mean, it's not a mystery. This is how it works. It gets complicated in the details. And what we need is we need to take advantage of all the data that we have collected over the years about how these variables interact and affect what's the end result. And to me, as the A3, the end result is air crew flying hours per month. So, right now, if I'm not satisfied with the number of hours that our air crew are flying every month, what I need to be able to tell the secretary of the Air Force is, "Mr. Secretary, we need to get that number from here to there, and here's where you need to lay the money in that's going to get us from here to there."

If you add a Flying Hour dollar today, you'll get an immediate reaction to that, assuming you've got the maintenance to generate. If you add a WSS dollar, you'll see that impact for several years in a row. If you add a dollar into maintenance, you're probably not going to see it this year or next year, but three years from now you'll see an increase. And so this very complicated model for how these variables ultimately affect our air crew flying hours per month is really what we're after, so that we can answer questions for the secretary like, "If I had one more dollar to spend on readiness, where would I put it?"

Well, it may not be in the readily apparent thing. Or maybe the question is, "If I have to take one more dollar out, where should I take it in order to have the least impact on our air crew flying hours per month?" Those are the kind of questions that we need to answer for our secretary. We have the data to do it. We just haven't built the algorithms that allow us to sort that out, and that's the work that we're doing right now.

Maj. Gen. Doug Raaberg, USAF (Ret.):

Yeah, I'm glad we're tackling that. So, General Leavitt, really, let's zoom to 50 here. Looking down, it's a dynamic ecosystem to be able to do the pipeline, especially all the variables we talked about. So, what are your biggest concerns now from your vantage point?

Maj. Gen. Jeannie M. Leavitt:

What I would say is when it comes to flight hours, everyone would like to see a direct correlation because that makes it really easy. You just, "Okay, more flying hours, less mishaps." It's not that easy. So, there's a couple variables I would highlight, and one of them is the fact that there are all these immersive training devices. Back when I went to pilot training, I did have the little poster on my wall and I had the traffic pattern taped to the floor in my crew room to practice making the calls. It's obviously dramatically different where they can have the VR headset and they can look down and see the VFR entry point. They can practice making those calls. And so it is different. And so by the time they get in the airplane, they've had a lot more reps at that in a more realistic type of training.

And so part of it is the fact that it's not a direct correlation. The other problem is, and I'm working with General Slife's team on this, is all of my data tends to be mishap. So, I don't have data for the folks who don't have mishaps. So, I can tell you 30, 60, 90 day look back on anyone who's had a mishap. And then an added complication is the thresholds. Okay, so Class A threshold, it's now 2.5 million dollars. It was 2 million dollars. Back when I started flying, if it was a Class A mishap, it was a crashed airplane. Now we can have an engine or two and have a Class A mishap just because of those price thresholds. So, again, trying to make sure we are able to pull the appropriate information out when we're looking at statistics. We have a lot of data and we are trying to get more analysts.

We're cleaning up our data and standardizing a lot of things. And so that will be helpful because the more we can do the analysis, the more we can identify trends and try to identify areas of concern. But I think one of the challenges will be articulating how many hours do you need? Because yes, you can do immersive training devices and yes, we can do simulators, but at the end of the day, we also need to get up in the air. And where is that balance? I don't think any of us know, but that is definitely one of the areas that I think that we all need to take a look at.

Maj. Gen. Doug Raaberg, USAF (Ret.):

Let me tap a different one for you, General Robinson, and I'd love all three of you to answer this question, but let's talk about one other variable that's added into the pipeline and that's our international partners. We're all of a sudden seeing the news lines about the Ukrainians looking at F-16,

some basic training. Less about that, but more about all the international folks that come into the pipeline, your perspectives on working that. What have you seen from your vantage point?

Lt. Gen. Brian S. Robinson:

The bottom line there, what we've seen is it's actually incredibly important. It goes right to the National Defense strategy, integrated by design, as General Brown refers to it quite often. And so particularly for us at the Euro-NATO Jet Pilot Training Program at Wichita Falls, Texas is where we have the greatest concentration of international pilot training. The experiences that they get, for any of those countries that is their sole source of fighter pilot training is through ENJJPT. So, the throughput capacity there is incredibly important to they can get their crew members back to their home nations to serve in their combat units. But we also train international allies and partners across all of our EPT bases. So, we don't just limit it to that.

And so the challenges that come with that are sometimes language barriers and understanding cultural barriers, but ultimately to train them to their best ability to go back and train. But if we step into a conflict or even in competition by with and through our allies and partners, the fact that they've had the experience of training together with US Airmen is a huge advantage, a significant advantage. And that's incredibly important, and we take that very, very seriously. And by the way, again, that's not just limited to pilot training. We have the same with all of our ground forces, many of our ground forces in the different specialties that we train Airmen for.

Maj. Gen. Doug Raaberg, USAF (Ret.):

General Slife?

Lt. Gen. Jim Slife:

Yeah, I think it says something about the enterprise that General Robinson leads for us that we are where the international community wants to come to train. I think that more than anything else says that we have by definition a world-class training enterprise. We can always be better. We're always seeking to improve it around the margins. I think we ought to leverage some of our partners and allies. I mean, we're not the sole repository of good ideas here in the United States. I think we can rely on our partners and allies for that. But the fact that they entrust their national defense to the United States to teach their aviators how to fly says something pretty powerful about the enterprise General Robinson leads.

Maj. Gen. Doug Raaberg, USAF (Ret.):

That's great. General Leavitt?

Maj. Gen. Jeannie M. Leavitt:

I concur 100%. And we have a program at the Safety Center called the International Flight Safety Officer Course. Super popular with our allies and partners. And we are able to host them because they very much look to us for setting up their safety programs, both the proactive side as well as the investigative side. Because the investigative side is very important, that root cause analysis, what went wrong, what changes can we make to prevent future mishaps? And so those engagements are very, very valuable.

And we have folks come through all the time. I know PACAF's going to bring a team through in May. We've hosted people from many different countries coming through on that safety side of things. And we are the Safety Center for the Air Force and the Space Force. And we are standing up a space mishap

investigation course, SMIC, coming soon, next month. And the funny thing is we already have international partners going, "Hey, we want to come." And I'm like, "Okay, let's us first do our initial class and we'll see." Because again, the power of that message that our partners and allies look to us for things that are critically important to them.

Maj. Gen. Doug Raaberg, USAF (Ret.):

Believe it or not, we actually only have about two minutes remaining. So, I'm going to start off with the chief of staff and get your perspective on really, what is your message to industry?

Maj. Gen. Jeannie M. Leavitt:

We really need to partner with industry every step of the way as we're going through things. I mean, we've learned this on the acquisition side, not part of my area of expertise, but I realize the importance of us staying embedded with them to make sure we're clearly understanding requirements and what the war fighter needs as we go through the acquisition process.

Maj. Gen. Doug Raaberg, USAF (Ret.):

General Robinson?

Lt. Gen. Brian S. Robinson:

I echo what General Leavitt said, but I think we need to partner with industry as well in the AETC lens of, how do we transition? Help us transition to a digital age learning environment that is student-centered. It's no longer lowest common denominator or the center of the bell curve. So, people can learn on command, on demand in the way they're going to learn and they move through the pathway or the pipeline and get out to their combat mission. We don't need to be holding them up in the training pipeline for an inordinate amount of time in that way. And it comes down to helping us design our learning spaces.

We went out to visit Apple Incorporated some time ago, and the work they do and a lot of work in the education space, believe it or not. And one of the things they did for learning space design, the number one quality attribute they look for in effective learning space is how the sound carries. They've demonstrated through science and studies that if it's clean, crisp, clear sound, the learning is at its maximum value. If it's awkward reverberations or other things, it just starts to degrade where you are in the room. So, we need assistance in those ways and all the ways that we train Airmen across the board.

Maj. Gen. Doug Raaberg, USAF (Ret.):

General Slife?

Lt. Gen. Jim Slife:

Yeah. I think a couple of things I would say to industry. One is I think, as we think about the future of augmented reality and how it can transform much of our air crew training, I think there is a shotgun blast of use cases out there. Well, you could use it in General Robinson's T-38s in order to provide a flight lead so that your student can practice being a wing man on a flight lead that's an augmented reality platform. And so you only need to generate one jet instead of flying two jets to get a formation out of that. In our combat air forces, you might be able to replicate threats that there is no way that an aggressor flying an F-16, for example, is going to replicate a threat that is a high end from one of our pacing adversaries.

So, I mean, we see all these use cases for what we can use augmented reality for, but I feel like we're a little bit stuck in neutral on this. We're overwhelmed by the cornucopia of opportunity in front of us and we need to find someplace where we can get a early success, demonstrate value, and then scale out from there. And so helping us figure out what is not in the 10-year time horizon. What can we do today to get a success and build out from it? So, I think that's probably the key thing that I'd be looking for from industry.

Maj. Gen. Doug Raaberg, USAF (Ret.):

Well, thank you. So, here's my ME debrief. First of all, I owe each and every one of you a beer. Thank you for covering me down on this formation. General Leavitt, General Robinson, General Slife, I know our audience really appreciates the insights. And for everyone, let's go meet at the bar at the Rock the Rockies, and let's have a wonderful Air Force Fly Safe Day. Thank you.