



## **Panel 2: INVESTING IN AI: FIELDING AND OPERATIONALIZING AUTONOMY IN OUR NATIONAL DEFENSE**

### **Moderator:**

Missy Ryan, The Washington Post

### **Panelists:**

Rep. Mike Gallagher, Chair, House Select Committee on the Chinese Communist Party

Hon. Frank Kendall, Secretary, U.S. Air Force

Brian Schimpf, Co-Founder and CEO, Anduril Industries

Hon. Heidi Shyu, U.S. Under Secretary of Defense for Research and Engineering

Jason Zander, Executive Vice President, Microsoft

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Missy Ryan:

Alright. My name's Missy Ryan. I'm a journalist with the Washington Post. I'm really happy to be here to talk about AI and defense. In an era characterized by rapid technological advancements, our armed forces are increasingly leveraging the power of artificial intelligence to enhance decision-making, optimize resource allocation, and ensure the security of the nation. However, this intersection also raises critical questions about ethical considerations, the balance between autonomy and human control and potential geopolitical implications of AI and defense. I hope you liked that introduction. It was written by ChatGPT when I typed in that I was moderating a panel on AI in defense. So I realize I may be putting myself out of a job for next year, but I thought that would be a good way to set the stage for this conversation that we're going to be having today. And as a human, one of the things that I'm interested in doing during this panel is talk about the opportunities and also the challenges and potential downsides of AI adoption in the National Defense enterprise. I'm going to kick things off for all of our panelists with asking a general question that I hope that each panelist can answer briefly, and then we'll get into some more specific topics over the course of the 55 minutes ahead. So maybe we'll start with you Representative Gallagher, and then we'll go

down the line. How can the United States efficiently adopt AI for defense purposes without getting bogged down in some of the same acquisition challenges that we've had in other areas and while managing the risks associated with the potential dangerous deployment of AI?

Rep. Mike Gallagher:

Well, first I want to begin by addressing the elephant in the room, which is that yes, Secretary Shyu and I are wearing the same shoes. It's very embarrassing when I realize this backstage. R.M. Williams is a great company. Go Australia. I know we have the Ambassador here somewhere. Alright, well first I think I've got to put this in the context of something that's very simple to the point of sounding unsophisticated to this very sophisticated audience, but important to remind ourselves as we consider this competition between the United States and China, which is that if we lose that competition, the Chinese Communist Party will use artificial intelligence for evil, for bad purposes. Xi Jinping has said AI must follow appropriate socialist policy. Secretary Kendall says they're preparing for war. There's no doubt they would use it to turbocharge their war machine, achieve their ambitions with respect to Taiwan, perfect a techno-totalitarian surveillance state, economic coercions on steroids.

I just bring that up because we have to understand that contrary to what Elon Musk says, the CCP when it comes to AI is not on team humanity. They appear to be on team communist genocide, and therefore that should remind us of the stakes. What can the Pentagon do? Well, I think prior to us going down the road of what is the complex set of arms control regulations that we need in AI with our relationship with China, and that seems to be where the discussion is going. I'm concerned that there's an argument right now being made by some in the administration that our interests with China overlap when it comes to regulating AI. What we need to do is recognize that this isn't 1975 where we can embark on a set of these agreements. It's more akin to 1945 and we actually need to build these weapons and these systems rapidly with our allies.

So in the simplest terms, what can the Pentagon do? Pick winners and losers in this space, like put their thumb on the scale, have a multi-billion dollar program in procurement, ACAT I program involving a non-traditional company leveraging AI and autonomous systems, and I don't think we have that right now. So that's where we in Congress need to provide the flexible funding in the form of multi-year appropriation. We need to encourage the Pentagon to take intelligent risk, but we cannot simply admire the ethical and policy dimensions of this problem at the expense of fielding capability right now.

Missy Ryan:

Alright, thanks. Secretary Kendall, how do you answer that big picture question?

Hon. Frank Kendall:

Great stimulation Congressman, because I have a slightly different perspective. We of course can talk about it. Before I do anything else, I want to do a couple of things really quickly. I want to thank all the people on both sides of the aisle who've been working so hard to get the holds of our general officers lifted. It looks like we're going to get there,

cross my fingers on that, so really appreciate that. I live firsthand every day with the implications of those holds. Second thing is I want to thank our partners. A lot of them were here. I don't know if Japan is here today, but Japan is helping us right now to try to do search and recovery operations for eight airmen who went down, one body's been recovered off the coast of Japan, and for all of this, we're are sitting here in this really nice situation going into the holiday season, remember our men and women in uniform are out there putting their lives on the line. This is who we do all this for. So just pause for a moment, think about that, and hopefully in our prayers we will, we won't have the worst possible outcome, but it doesn't look very good right now, quite frankly, for that V-22 that went down.

AI, I think there's an enormous amount of confusion about AI. I loved what Alex Karp said this morning. AI is software that works. I've spent my time with the industry when I was out of government, I spent a fair amount of time back in government looking into, and recently of course, regenerative AI, understanding these technologies and their implications. They cannot be stopped. It is essentially new tools for engineers to create better things. And they are using those tools and they're using them for all sorts of products. There isn't one thing called AI. There are a number of technologies that are labeled under that. And quite frankly, anybody who's doing software for anything right now is calling it AI because that's supposed to be a cool thing. So out there somewhere, there are a lot of PowerPoint slides that now have AI on them that didn't before, but nothing has really changed. But there are also an awful lot of things that are being done with new technologies, processing that's incredibly capable, data storage manipulation that's incredibly capable, that are opening whole ranges of new possibilities.

They are happening. I used to go to -- one of the contractors I worked with, every year they would have a big tech fair basically where all their engineers who were working on interesting projects would come in and brief each other to cross-pollinate across the organization. And several years ago, people were coming in and briefing what they were doing with machine learning. I guarantee you right now they're briefing what they're doing with regenerative AI. It's being embedded into all of our products. It is being used where it provides a competitive advantage, and the government as much as anything else, needs to not get in the way of that and encourage that. I don't think we frankly need an AI program per se, but we do need to find ways to evaluate this technology, become confident in it, have ability to trust it, and to get it into fuel the capabilities as quickly as we can.

There are enormous possibilities here, but it is not anywhere near general human intelligence equivalents. We're not talking about that. We're talking about pattern recognition. We're talking about some enormous efficiency improvements, and the ability to generate things like your opening statement this morning, the pattern recognition in general, deep data analytics to associate things from an intelligence perspective. There are a whole host of applications and I think our job on the government side more than anything else is to thoroughly understand this technology, have the expertise we need to really get into the details of it and appreciate how it really works and what it does for us. Be creative about helping industry find new applications for that technology and then developing the ways to evaluate it and get the confidence we're going to need to ensure that it can be used ethically and reliably when it's in the

hands of our warfighters. So that's the task that's really before us more than anything else. I'll stop there.

Missy Ryan:

Brian.

Brian Schimpf:

Thank you very much. So maybe just doubling down on what the Secretary said, which is I think it's important there's so much talk about what is the existential risk to AI, but I think what gets lost is the huge upside potential from it, and applied to DoD and weapon systems, we can have weapons that are wildly more precise. We can have an incredible understanding of what's happening on the battlefield from hundreds of sensors simultaneously, which will increase the precision and efficacy that the warfighters are able to make decisions. These are all good things. And on top of it, when we start thinking about AI applied to weapon systems, we actually already have a lot of policy frameworks around this. We've had anti-radiation weapons that seek out emitters for a long time, that has existed since the 70's. You give them an area to go, and they find something that matches a pattern and engage it.

That is how torpedoes work. That is how anti-radiation missiles work. That is how, basically, nearly every missile system works in the US inventory. So we actually already have a lot of framework around how to think about responsible use of a smart system that can increase precision and understand what is going on in the environment. And that is fundamentally what a lot of these autonomous and AI technologies can enable you to do. Just huge amounts of understanding at massive scales. I think the part that I do believe is that it is very much a technology that enables you to build better systems. That is how you should think about it, it is a different way of building software, developing systems, it is a different way you can process information, but the key to this is we have to start experimenting with it. We have to start getting it fielded. We have to start learning how best to use it.

That is the only way we're going to actually work through the regulatory problems. How do we actually govern this? How do we evaluate this? And then most importantly, how do we fight with these technologies? Huge credit to Secretary Kendall for the emphasis he's put on the CCA program where you have just an amazing amount of energy and focus on fielding capability at scale. It is, in my opinion, the brightest spot in the Department from how do you actually move out and get next generation technologies fielded, scaled and built. I think it's incredibly powerful, the way we need to be moving on these things. Because the alternative of viewing this purely in sort of a spread out research world is hard. The tens to hundreds of billions that the commercial world is putting into AI research, the department is spending I think 1.8 billion or so in the next year.

So a very small percentage, a very small percentage to what is going on in the commercial world. The much more interesting question is how do we actually adopt this, integrate it, and do this at speed? And that is the really hard question that I think needs to be answered. And then the other part of this is when you look at the history of new

technologies in defense and you look at it and what's happened in say, the self-driving world and automotive, most of the innovation in this area starts small. This has been the history of things in defense worlds where you had small companies, new entrants try to build out new technologies, which were then either those companies scaled up or they acquired into the existing industrial base. That is the pattern that has worked very consistently here. So I think figuring out where are those bright spots that you can start to scale and actually just get this technology out is very, very key to being successful on this.

Missy Ryan:

And just for the audience before we move on, can you explain CCA just for --

Brian Schimpf:

Oh yeah. CCA is a collaborative combat aircraft, so a loyal wingman concept that the Air Force and Secretary Kendall has put forward.

Hon. Frank Kendall:

If we could just get a '24 budget we could get going with it.

Missy Ryan:

And we're going to come back to that and we're also going to come back to AI and lethal systems. Under Secretary Shyu, what's your answer to the big picture question that I posed?

Hon. Heidi Shyu:

Yeah, so in my perspective, first of all, I completely concur -- the fact that AI research has been going on for decades. It's not something that just popped up last year. That's number one. The other things, if you think about the scope of where we can make huge impacts, 70% of the cost of a weapon system is in sustainment. We can leverage the funding that we have today to dramatically reduce that cost. That will give us a huge benefit because then we can utilize the rest of the funding for development of new systems. I will give Air Force credit here that they actually work with a company that ingests in 10 years of B-1 data and maintenance data. So now they have predictive maintenance capability based upon actual data. They know which parts fail at what rate. So predictive maintenance is huge, and they're expanding that across all of the rest of their platforms.

So this will be huge in terms of compressing, we're leveraging AI to figure out how we can optimize our, let's say supply chain, our maintenance facilities, our logistics. So this is just one aspect of what we're doing. The other thing, going back to what Brian talked about is target recognition. This is what we've been doing for decades, but now with the speed or the processing that's available and the software capability, you can optimize that much, much better. And cost of sensors is reducing. So we can now leverage multimodality, multiple modalities, to be able to optimize target recognition much, much quicker. And I'll say the other thing that we're working on is multi-domain. What I mean by multi-domain operation is we have to operate from undersea to space. It isn't just one

segment, but how do we operate and optimize our capabilities from undersea all the way to space in a highly contested fight.

So this is exactly what we're doing as a part of the Rapid Defense Experimentation Reserve, greater activities, we're working with companies that have defined prototypes that can close the joint warfighting capability gaps that we think we will have. Therefore, we tapped into the prototypes that was available and we leveraged the National Guard in Indiana to conduct the joint experimentations. From that pipeline of system that proved to have military utility, we then go up, we'll work very closely with the services in all the CoCOMs and all the Under Secretaries to figure out how do we rapidly push it into procurement, into accelerating capability to the hands of the warfighter. Ultimately, that's our focus, right? Otherwise, it's just cool technology sitting on the shelf someplace. We've got to get into the hands of the warfighter as quickly as possible. So that's what we're focused on.

Missy Ryan:

Great. Thank you. And Jason?

Jason Zander:

Yeah, no, thank you for having me. And I would say as somebody who has been on this journey for three decades myself, we have been moving along very rapidly. But the honest truth is, 20 years ago we thought that machine learning was going to be cool, and it gave us -- if you like this movie, you'll like this one. And 10 years ago, we thought that virtual assistants were going to change everything, and then all of a sudden we hit generative AI. So multiple winters of AI through there and now you see it, and the easy question is you ask a hard question to ChatGPT or you ask a hard question to your Alexa or Cortana or pick your favorite, you're going to get a very different answer. So it just shows that capability. What's super interesting about this particular era is just how fast it's moving.

I'm a software engineer by trade. Two years ago, we got tools, they were probably interesting, they helped me write some code. A year ago, it actually started writing half my code. Now it's writing like three quarters, and it's actually pretty damn good. And that's just in one particular domain. So I think one of the things we have to also recognize, this is not a one and done, it's here. And when you adopt it, you have to figure out how to make that enduring. And you have to understand the pace is picking up at a very, very rapid momentum. We went from something that was kind of interesting to something that could pass the bar exam, right? And that's very interesting. So that's the pace that it's coming at and we have to be ready for that. I would echo some of the things that I heard.

Experimentation is incredibly important because we have this innovation and the great news is the bulk of that level of investment, those tens of billions of dollars are actually in America, and they're tech companies. We have this technology, we've been building it out for years. ChatGPT didn't just show up. We started building the supercomputers five years ago, and now we're getting the benefits of that. And that's the old models. There's new ones coming through after that. The big thing I would say is there is no shortcut for

experience, right? So we can't sit back and just write papers about how it should look. We do want to responsibly adopt. We want to think about what that looks like. But you have to get in and do the experimentation. And I think the industry, we would very much encourage co-development as well. We don't want to go running around with scissors.

What we want to understand is where can it work, where can it not today? And then don't leave that as a static point because stuff that didn't work two years ago is working very well right now and stuff that doesn't work today, guess what? Six months from now you're going to see even more stuff that'll blow your mind and it continues to grow. And so, I think to me experimentation is important, picking where you start is important. I think Task Force Lima has got nearly 200 examples of potential use cases, and it can be things like acquisition and contracting upfront, but then it gets out into mission planning, and it also can go into command and control, and some more advanced stuff that we will get to. You don't have to do that on day one, but we do have to be on a path to be able to do that, get the friction out of the way.

Missy Ryan:

Alright, I'm going to ask a couple questions about DoD's attempt to adopt and deploy AI, for you Under Secretary Shyu and Secretary Kendall. And then we're going to move on to China and use of force. So I guess the first question is regarding budget. The DoD's latest budget proposal would invest \$1.8 billion in AI and machine learning capabilities. As we were saying in the green room, one thing is a budget proposal, another thing is having that money in hand. For either of you, how can DoD do what it wants to do in an environment where continuing resolutions may be the norm and there's uncertainty about the future funding paths. And then also for either of you, can you tell us a little bit about the Replicator Initiative that DoD has been talking about? Can you demystify this for us? What is it? How is this going to be different than other attempts to accelerate innovation and acquisition in the past? I think we'll start there.

Hon. Frank Kendall:

Oh --

Missy Ryan:

So either of you. Yeah, whoever wants to take whichever questions.

Hon. Heidi Shyu:

Go ahead, Frank. You go, and I'll jump in.

Hon. Frank Kendall:

Let me talk a little bit about the CCA program, and I think it's a good example of what can be done, and I'll mention a couple of things about Replicator maybe, and let Heidi talk about that. The tendency, the trend in warfare has been in the direction of greater autonomy for quite some time. In the late eighties, I was one of the people in the Pentagon really pushing for more autonomous systems. We feel a lot of them -- in the course of the counter-insurgency campaigns, they supported us very well, but they were very much human in the loop -- kind of operations we were doing. As the technology moves forward, the ability to do things autonomously keeps increasing.

In the nineties, I was the Chief Engineer at Raytheon, and we were working on a radar we were going to put on cars to do collision avoidance, and it was this big clunky thing that we were experimenting with. We never did it of course, but if you'd get a car today, you're going to have all sorts of collision avoidance sensors on it and it's going to be automated to try to protect you from having an accident. The technology on aircraft -- General Brown, who was Chief of Staff of the Air Force and now Chairman is here, has talked to me about getting checkout rides essentially or getting a chance to fly some newer aircraft. He's an F-16 driver originally, and the degree of automation that has gotten into those systems, the judgment that I made was that we were ready to make a major commitment to a war fighting autonomous system, and that the Air Force had a couple of problems. One was that we were not doing as well in terms of cost of change ratios as we would like to against the pacing challenge.

Another was that the cost, the unit cost of our aircraft, particularly our tactical aircraft, was much too high. F-35 is on the order of a hundred million dollars. F-15EX is on the order of a hundred million dollars. The NGAD platform, which I started when I was in the OSD, is going to be multiples of that. You can't afford an Air Force of any reasonable size if that's what you're paying for individual airplanes. So we need to introduce something into the force structure that is cost effective and that is affordable and will give us a much more affordable force. And so we made a decision to launch the CCA program two years ago now, actually a little bit over two years ago, part of the operational imperative initiatives that we started. And the concept was that we're going to have an aircraft which is on the order of a third, say, of the cost of a fighter. It's going to be more than one, up to maybe five, wingmen if you will, that are controlled as part of a formation by the crewed aircraft. And they fight as a team. They fight together and you manage that team, you call the plays if you will, from the crewed aircraft, and the other aircraft in the formation do whatever they're told to do in order to have the best tactical outcome.

This was at the time, two years ago, to some degree I was gambling a little bit, but I was gambling based on what I'd seen with the DARPA ACES program, the Air Force Skyborg program, the Loyal Wingman program that Boeing was doing with Australia. And I was confident that we were close enough that we could make a commitment. And the commitment is several billion dollars in the fit up, and we've already found some ways to get some of this work started. It's underway, but we desperately need the '24 funding to keep it going, keep it on pace. We are in a race for technological superiority with an adversary who is doing a very good job of competing with us and we cannot waste time.

The loss of time just from when we started this concept, when we came up with the idea, to today is two years and we may lose -- if we don't get a '24 budget, we may lose another year. That is an enormous head start to give somebody else, and don't think the other guys aren't paying attention and aren't well aware of this. One of the things that impresses me about China in particular is their willingness to innovate and their willingness to do things that are non-traditional. So everything that has happened since the decision to go in this direction two years ago reinforces my perception that it was the right choice. We just need to get the resources and get on with it. And I've asked the Scientific Advisory Board for the Air Force, which I've also asked to form an AI

subcommittee, to help keep track of where that technology is going because as was said, it's moving very quickly.

We want to be fast adopters of that technology. In some cases, we want to help contribute to it. But as I think Brian alluded to, the commercial investments in AI for a variety of reasons are vastly greater than what the government's going to put into it. And that's okay. It just means it's available to everybody though. The US does have a huge lead, but we don't have a monopoly on it. It's not all necessarily protected. So in any event, we have about \$5 billion in the fit up right now to move forward with this. The overall Uncrewed Collaborative Combat Aircraft program actually has three components. It has one component, which is the aircraft itself, and we're doing that in increments of capability in order to get capability out and learn from it as quickly as possible. It also is a companion program which will buy some existing uncrewed aircraft to work with our operators to develop operational concepts, maintenance concepts, look at ways in which we would organize force structure around the combination of crewed and uncrewed tactical aircraft basically. And then there's another component which is more technology maturation where we're taking F-16s, which can be optionally -- you put a pilot in them, but he doesn't have to fly the airplane, it's also automated. And we're going out and developing the technology for tactics and for control of the aircraft and so on as a third leg, if you will, of the overall program.

And there's another piece of this, of course, which is the continuing investment and basic technology that we have that can feed into the program. So we're trying to do all this as an integrated whole. We will be fielding aircraft by the end of the fit up. This is a program that is moving as quickly as we can, get that first level of capability out there. It's going to be transformative, and it is a very serious commitment of the Air Force. So we're not wasting any time on this.

Military systems have to have certain unique features that have to be designed into them to be effective. They have to be cyber secure, they can't be vulnerable to electronic attack. They have to be able to work in different environments. These aircraft will be able to carry weapons. So we have to do weapon separation and safety things associated with that. So there's significant developmental activities that will have to occur, but those are laid into the program. We're going to keep it as competitive as we can to generate ideas. We're looking at non-traditional as well as traditional defense contractors. And I'm bullish about the program. I am anxious to get it moving at pace and at scale. We just need the money, and I lose sleep frankly that '24 won't pass, and we won't get the funds we requested in '24. It is my single biggest worry right now. I think we've done our homework, we've identified the things we need to do. We've laid out sound programs, we just have to get the resources. I've talked probably too long about CCA. That's my favorite thing to talk about.

Missy Ryan:

Great answer. I'll stop maybe before you weigh in Under Secretary Shyu. I'm going to ask if we could put up the slide, the survey about -- just shows that there is public support for greater military spending on AI. And then to you Under Secretary Shyu, what's your take on the budget question and then also if you could mention Replicator.

Hon. Heidi Shyu:

Okay, on the budget, \$1.8 billion. Actually, I would mention one thing on part of all small business innovative programs that we have, SBIRs. If you look at all the funding we provided last year in terms of contracts, one-third of all the contracts awarded to small businesses was in the area of AI and autonomy. This is exactly where non-traditional players can come in to provide their insight and innovation. So that piece provides the seedling funding for the innovation to start to appear. By the way, I want to emphasize the seed contracts. Even though there isn't a whole lot of money, but it spawns a lot of major, major companies subsequently like Qualcomm received SBIR STTR funding once upon a time. They're pretty big now. Okay, just one example.

So SBIR STTR is providing the seed. The other thing that's important is every commercial company and defense company that I'm talking to is investing in AI. So they're leveraging AI technology and that's not covered within the 1.8 million. That's their private investment that's in there. So the AI technology that they're investing, they're actually testing it out, rapid prototyping capabilities and some of the stuff that you just showed. Roadrunner came out, which is pretty awesome, right? A lot of our loitering munitions have the same capability, embedding AI to improve targeting. So AI is actually in a lot more things than is shown within the sliver of the budget that we're providing. So I want to emphasize that point.

Replicator, I think -- I know you want me to talk about it. I'm going to talk about it now. One way to think about it is the DoD invests in many, many things. Within my organization, we have a rapid prototyping fund to rapidly develop capability as quickly as possible. We have an experimentation fund that's called the RDER I just talked about, that brings the rapid prototypes into a joint war fighting environment to test out these prototypes. You see, do these prototypes have military utility, or did it work really great inside a lab that falls apart the first time you drop it? So we're providing feedback to small companies to refine their systems. At the same time, as a part of RDER experimentation, small companies are seeing what other companies are developing, and saying, "oh, this is really cool, let's team together to develop the next iteration," and they can come back six months later to another set of experimentation. So it isn't just one set of tests and they're out, but it's a sequence of tests.

If you think about the Replicator, it comes after that. Okay, so I talked about the RDER experimentation. The next piece that's important for you guys to understand is we work very closely with A&S, Acquisition and Sustainment office by Dr. Bill LaPlante. They look at all the ways we can rapidly pull acquisition through to shorten the timeframe. We take the set of prototypes that's demonstrated military utility to the DMAG for procurement decisions. Replicator is not a pot of money to develop new stuff. Basically, they're trying to ease the processing to accelerate capabilities, the stuff that's already proven. So they're not funding folks to do the design and development, but rather if you have already designed and demonstrated capability, you're ready to go into rapid procurement and fielding. They're working with the services, what do you already have within your pipeline? They'll be ready for procurement in the next 18 to 24 months.

Missy Ryan:

Representative Gallagher, is there something that you wanted to say about Replicator before we move on?

Rep. Mike Gallagher:

Well, so first of all, I should say the idea of Replicator is very exciting to me. Like, thousands of attritable autonomous systems creating dilemmas for the PLA in an effort led by the DepSecDef that's going to field capability in 18 to 24 months, that is a cool idea. In a just world, we wouldn't need a special DepSecDef-led process, it would just be part of our deterrence by denial posture. But such as the Pentagon bureaucracy, right? And I want to make it work. I think the concerns about Replicator when it was announced, beyond some of the acronyms involved, were that it was -- the initial speech didn't have a plan behind it. But we've admittedly gotten some of the details of the planning since then, we've had a hearing on my subcommittee on Armed Services, and then the insistence upon those running Replicator that there won't be any money, new money needed for the project, which is fine, except if you then start to cannibalize money for things like critical munitions or Long Range Precision Fires. And that was my initial sort of hesitation.

The first thing we should do is replicate a bunch of the things we know we need in INDOPACOM now and surge them west of the International Date Line, right? Like long range anti-ship missiles, SM-6, Naval Strike Missile, JASSM, JDAM, et cetera, et cetera, et cetera. All the things Bill LaPlante talked about here last year, let's replicate those, get those to maximum production rates, and we can also layer this on top of it. But I think the conversations I've had since my initial concerns with the DepSecDef and with Doug Beck, who I think is doing a great job at DIU, have given me hope. And if Admiral Aquilino and Admiral Paparo tell me that they can use these things and fight with them, okay, that's exciting. And I think we can all get on the same page, but it's going to require Congress and the Pentagon working together to actually meet that very ambitious Replicator timeline.

Missy Ryan:

Alright, I'm going to turn back to our private sector colleagues and ask you to put your constructive criticism hat on. And both of you got a few things in your opening remarks, but what do you believe is missing from DoDs vision or implementation to date on the goal of wider adoption, faster adoption.

Brian Schimpf:

Probably the biggest area is the sort of -- there's very few programs that are going to mobilize the industrial base, mobilize -- and probably even more importantly, mobilize the Department to think about how they're going to really utilize AI. So when you look at things like Replicator, a lot of the focus has been on the aspects of, okay, we've got to acquire aircraft, we acquire boats, and that is right, that needs to happen. But then once push comes to shove, okay, well how are you going to actually command and control a thousand aircraft? There's a very hard problem. How are you going to have these multi-domain effects be able to be coordinated and effective? And the reality is there's sort of -- it's nobody's problem in the department. It touches so many different parts of the department. You end up having this sort of aspect of this really kind of scattered across

all the different PEOs which are focused on just buying the capabilities that they need to buy.

There's been some initial attempts. So Secretary Kendall has organized a PEO that essentially is going across all of these, which I think is exactly the right construct. R&E is doing a lot of work with RDER and other areas to try to do this, but it is a very hard thing to mobilize. But this is, in our opinion, one of the critical technology areas that has to exist to enable these sort of large scale warfighting constructs to be effective. There's just no way that you can operate these like you do remote piloted aircraft or anything like that. There's not going to be enough people, enough communications bandwidth. It is just not going to work. So you have to enable this to work, but actually organizing around that is very, very hard and conceptualizing the scale and type of program is very hard.

Project Maven was an initial attempt to try to do this. They did a lot of the right things. They thought about how do you manage data, label it, do test and evaluation, how would you actually employ this, drive-through experimentation. I haven't seen yet the same scale of efforts and same organization of efforts since that, or it's been very fractured. What gives me some optimism around this is in the last six months I think people have started to recognize, or even in the last year, that this is a problem that needs to be solved. Now it takes time to mobilize against this, time to mobilize resources and organize and figure out the right way to go about it. But this is the critical thing that has to magically time out with the availability of thousands of systems showing up. And that is a very hard thing to hope is going to work. It has to be intentional.

Jason Zander:

Yeah, maybe if I can just add on top of that. Look, I just want to foot stomp what was said before. Our nation-state competitors have unconstrained AI ambitions. They're able to move very quickly, they're going to continue to leverage commercial technology. They're going to put it into use in all sorts of ways, frankly, some ways that we may decide that we don't really want to do. And so that's going to be the pace at which your competition is going to be running. So I'd say when we come in with commercial technology, one of the things that we want to do, especially as an American company, how can we take this technology and make it relevant and get it out there for mission?

And I think one of the challenges that we run into -- it's a little bit of things are spread out quite a bit, so we talk to a lot of different folks with different ideas, and also just trying to get it to the point where we can get the forward traction, where even if somebody is forward leaning and wants to make that move, they're a little bit worried about the West of -- maybe control's coming in. Or somebody's going to be asking me about what's the policy on this and what does that look like, which can then slow down the adoption that can be there. And I think being able to figure out ways in which to take that kind of experimentation and make that something that we're actually encouraging as opposed to folks being worried about making that traction, it's going to be super important. And we can do that in a controlled way because there's rational reasons why people want to move slow. We want to look around security, we want to look around good use cases, make sure that those work.

We've just got to get the traction, because again, the competition is not moving slow. They don't have a bureaucracy that's going to hit them in a particular way. So how do we get that up and running? And I can tell you from a commercial perspective, man, we've got industry out there. It's not a question of if we're ever going to do this, it's a when. And more of the conversations are revolving around, frankly, Microsoft, you guys aren't moving fast enough. I need your help on how I adopt. What do the programs look like? How should I shape my workforce? What training do they need to be able to get this up and running? That's the conversation we're having in commercial. I'd say we're not necessarily there yet. In some cases we are, we've got folks that are very forward-leaning. But boy, it would truly be nice if we could get to that point, because again, from a competitive perspective, I think we just have to get there. We've just got to start moving.

Missy Ryan:

Alright.

Hon. Frank Kendall:

Can I pick up on what Brian said?

Missy Ryan:

Sure. And then Under Secretary, I think you wanted to add something as well? Yeah, go ahead Secretary.

Hon. Frank Kendall:

Yeah, I want to pick up on what Brian said. Talk a little bit more about what he alluded to that we're doing in the Air and Space Forces. My observation from -- initially on the outside when the JADC2 concept came out was that it was an interesting and probably correct but aspirational goal. And what I watched for a few years and then discovered to be in fact true, and we saw from industry, was that we were doing experimentation, which is fine, and we were developing some of the piece parts that were necessary to create an operational capability, but nobody had defined what it was we were actually going to do, and nobody had figured out how to actually get there. And we had two really big problems that I thought we had to solve. One was the one that Brian alluded to. Traditionally, if you take a system like AWACS or JSTARS for example, you have a bunch of human beings looking at screens, and they're, it's often with voice or maybe data communications, telling pilots out there with aircraft you go here and engage this target.

In the operational context that we have to worry about now we're going to be faced with hundreds of targets and we're going to have to manage hundreds of aircraft and the weapons associated with them and we have to do that as efficiently as possible. That is something that with emerging technologies, and you call it AI, but it's automation basically still with human oversight, you can aspire to actually manage those fights. Now there's one in the air and there's another one in space. Space has some very interesting military characteristics. Both sides can watch what the other side is doing in peacetime and have a very good idea of what the threat looks like. You can build a lot of weapons and have them ready. You may be able to even station some of them in space. And when you start the war, if you get to be the person who started it, you have an enormous advantage.

You can very quickly engage the other guy's targets before they can effectively respond. So we are not going to be the people who do that. So what we need is a battle management system for space, which keeps track of all those objects, keeps track of what the other side is doing, that helps our operators, decide with a huge degree of automation, how to respond when an attack occurs, both from the point of view of protecting our own assets and going after the other side's. This is a very tough job. The other thing that makes it even more tough is that the threat is reaching out and attacking some of our traditional sensors. So we're being forced to operate from further away. Part of that functionality, the sensing technology and getting the targeting data and so on to people that make -- to whatever's making the decisions, is moving into space.

So we've got, as Heidi was talking about earlier, it's a multi-domain problem. It's a cyberspace problem, it's a space problem, it's an air problem. It's also going to be a surface problem. And that has to all be integrated together. And if you try to do all of that, you're never going to get there. You have to define a reasonable technical goal that's achievable, that's quantifiable, and then set out to build that. The Integrating Program Executive Officer for C3 Battle Management for the Department of the Air Force, for the Air Force and the Space Force, is General Luke Cropsey. And he's had the job about a year now. I tell him repeatedly that he has the hardest job I've ever given anybody. His counterpart in the operational side -- He has two counterparts, one for space and one for air, on the operational side -- Luke is making great progress.

I'm going to come back to a theme now. His budget doubles in '24. He will not make that progress if we don't get that money. So if we're going to take advantage of AI, if we're going to take advantage of the automation that we can get out of AI technologies, we've got to put the resources against it and invest in real products that are going to give us real operational capability. That's the path we're on. I think we've got a good solid path to do that similar to the CCAs, but again, we've got to get the resources. Okay. That's my --

Missy Ryan:

Yes. Under Secretary Shyu, do you want to briefly just weigh in as well?

Hon. Heidi Shyu:

Yeah, I just want to add one thing I haven't touched upon, which is allies and partners. I think it's extraordinarily important for us to leverage our allies and partners. And that's another big focus area that we have worked on in the area of AI because we have great partners who have the same interests. So we are collaborating with them to literally create experimentations. We can bring ideas from both sides and prototype from both sides to get the best overall capability. So part of the thing we're doing in this area is working very collaboratively with our allies and partners. And believe me, every single one of our allies, I've probably talked to 20 different countries, they all consider US as their number one most important partner. So we have the opportunity to leverage that capability as well. So --

Missy Ryan:

Alright, thank you. Well, I'm realizing that we only have 10 minutes left and we definitely need to get to AI and lethal systems and also get back to China hopefully. And perhaps maybe a few questions. I'd like to talk about AI's employment in the use of force. Deputy Secretary Hicks has said that humans will always be responsible for the use of force, that they'll be in the loop. What does this mean exactly? How far does that go in terms of what decisions or actions can be taken without human authorization, and how far should it go? And maybe if someone could talk a little bit about nuclear weapons, and then from the private sector perspective, Brian and Jason, how are you all seeing this? And as you guys are developing systems that are going to actually be in that moment, what are the guardrails that you're thinking about? So maybe we can just talk about where that line lies. Humans are in the loop. What does that actually mean? Under Secretary Shyu, you want to --

Rep. Mike Gallagher:

I don't have to follow the Secretary's guidelines.

Hon. Frank Kendall:

I'll take a crack. I was hoping we get to this. I think it's an important topic. Yeah, I'm about, I don't know, 75% engineer, 10%, 15% soldier, and the rest is human rights lawyer. And I care a lot about civil society and the rule of law, including laws of armed conflict. Our policies are written around compliance with those laws. You don't enforce laws against machines, you enforce them against people. And I think our challenge is not to somehow limit what we can do with AI, but it's to find a way to hold people accountable for what the AI does. And there are two types of mistake your AI is going to make in the lethal area. One is it's going to not engage something that should have engaged, which is unfortunate from a military perspective. If you get too much of that, you're going to lose. And the other thing is to engage something -- civilian targets that you didn't want to engage, or commit fratricide, either one, that to some degree under the way the rules are applied today, that's acceptable as an inevitable consequence of armed conflict. And we're seeing that play out in real time right now in the Middle East.

The way I think we're going to have to approach this -- it's a personal opinion, I don't think it's DoD policy or anything -- is we're have to figure out how to apply the laws of armed conflict to the applications of AI. And who do we hold responsible for the performance of that AI, and what do we require institutions to do before they field these kinds of capabilities and use them operationally. So I think that's the place we should be focused. As I think Brian said earlier, we've had autonomous capabilities for a very long time, and it shows up primarily in munitions, which are sent out, search an area, pick out a target, and then engage it. We've been able to do that for quite some time.

In the 1970s, I was the operator -- I was a Lieutenant and I was operating a HAWK air defense unit in Europe on the inter-German border at the time. I had a switch on my console that said "automatic," and I could have put the switch in that position and just sat there and watched it shoot down airplanes. And the data inputs that were necessary to enable that were pretty straightforward. Which direction is the airplane that your radar's tracking going in? How fast is it going? What altitude is it at? And is it sending any IFF, Identification Friend or Foe signal? If it's doing those sort of things, and hostilities have commenced, it's a pretty safe bet given the rules of engagement and

hopefully our commercial aircraft are not up there anymore. And if they were, they would be giving an IFF signal. Military aircraft are complying with our rules about where they should fly and how they should fly. And so, you can automate that function of engagements. That was 1973. We are infinitely better than that now.

So automation and lethal automation has been around for a long time. It's going to be here, it's going to get more and more sophisticated. I don't see any time soon the "Terminator 2" or the idea of the rogue robot that goes out there and runs around and shoots everything in sight indiscriminately. I think we can prevent that, but we are still going to have to find ways to manage this technology, manage its application, and hold human beings accountable for when it doesn't comply with the rules that we already have. I think that's the approach that we need to take.

Rep. Mike Gallagher:

I think this is a very thoughtful analysis, and I hope you're right that the killer robots are far away. But, I mean if you read DeepMind's latest paper on AGI, it makes me think that it might -- and Jason's probably the best to comment on it -- be coming here sooner than we think. And therefore we need to have a plan for whether and how we are going to quickly adopt it across multiple battlefield domains and warfighting capabilities. And I'm not sure we've thought through that. I certainly haven't. But I mean, Jason, you can tell me if I'm off base on where we are with respect to AGI.

Hon. Frank Kendall:

You could clearly build a system today that could kill indiscriminately. It would waste an enormous amount of ammunition from the military perspective, and that would be a clear violation of the rules of armed conflict to do that. And then again, it's how do you hold that -- whoever put that weapon system out there accountable? Excuse me --

Jason Zander:

No, I'm sorry. I'm very much in alignment with Secretary Kendall. I mean in particular, the way we're bringing -- we've chose to bring AI to market, we call it co-pilot. We did that on purpose. We debated calling it autopilot. The problem is autopilot implies perfection. And we know it's not perfect. In fact, there's no world in which I want a doctor operating on me because an AI told it to. I wouldn't do that. I don't think anyone in this room would do that. I mean, because a doctor's a highly trained professional, and they understand what that looks like. We have the best trained military on the planet, the most capable commanders in the field. And so what we want is that co-pilot notion, that concept where AI is allowing them to make decisions quicker. Anyways, the data that I get in the field may not always be perfect anyway.

And so when I look at AI, what we're looking for is how do I get that acceleration? How do I get you more information that's more relevant to your mission and what you're doing, but you are the one that needs to be able to make that call. And then with Congressman Gallagher, I do agree with you around the framework. I don't believe we're that close to having an AGI that would jump into that. But I also think we should be very intentional about which systems we use it in, even in that co-pilot sense, and put the safeguards in place. And that's another thing that we've been investing in, not just us, but

other companies like ours. We've been investing heavily in those safeguards, doing testing, doing simulation, testing everything out. There were some embarrassing things you could probably make it do 18 months ago that you can't today.

And by the way, we're talking about defense here today, but there are amazing new work that's being done in advanced AI around biology, around computational chemistry. We've even got products around these things today. You are at a point where AI can actually create new molecules that didn't exist before. You're at a point where you can actually go back with biology and create new things that you didn't have before. Those are amazing tools. So we're talking about the defense space. I think this also applies when we talk about life sciences, we talk about chemistry, we talk about other sort of areas like that. We need to get the frameworks in place so we do avoid the worst sci-fi movie you've ever seen. The good news is I do have a lot of trust, Secretary Kendall and the rest of our military base, that you folks are really thinking this through and we just want to partner –

Rep. Mike Gallagher:

And Congress, of course.

Jason Zander:

And Congress. Of course. That goes without saying.

Missy Ryan:

Brian, did you want to wait? I'm going to add on an additional question for you: How should we be thinking about this given that some of the competitors may have different ethical analyses or different guardrails when approaching the use of AI being optimized?

Brian Schimpf:

Yeah, something Jason said kind of struck me of like, I wouldn't trust an AI to diagnose me today. I'd actually go the other way. I think medicine is actually one of these examples that's actually pretty similar to a lot of the context in DoD where it's like, anyone who's gone through anything with their family or anything like that, you get seven opinions from seven different doctors. It's hard. It's genuinely hard. And I think it showcases a lot of the limitations of human decision making and understanding and complex environments. So I actually think within two years I'd probably take the AI to be honest. So I think that's actually a really good analog to think about in a lot of the defense context where there will come a point where we believe exactly, as Congressman Gallagher said, that the system is probably going to be better at making certain decisions than humans. And it comes down to that accountability and those accountability frameworks of when a commander in the field fires a weapon, they're accountable for the results of that weapon system. That is how it works. And so, I think there's going to be a very similar construct, it is, but being prepared for the idea that the computers are actually going to be better than humans at an increasing array of tasks is a hard concept to wrap your head around and being prepared for that is challenging.

Hon. Frank Kendall:

I want to piggyback on that because the critical parameter on the battlefield is time and the AI will be able to do much more complicated things, much more accurately and much faster than human beings can. If the human being is in the loop, you will lose. You can have human supervision, you can watch over what the AI is doing. If you try to intervene, you're going to lose. I just got briefed by DARPA on some work that they're doing on manned versus unmanned combat, basically on aircraft fighters. The difference between -- the AI wins routinely with the way they structure the task, which is a little artificial, but the difference in how long it takes the person to do something and how long it takes the AI to do something is the key difference in the outcome. And we're talking about second tier. Just to give you a sense of parameters here, the best pilot you're ever going to find is going to take a few tenths of a second to do something. The idea the AI is going to do it in a microsecond, it's going to be orders of magnitude better performance. And those times actually matter, and you can't get around that. That's the reality that we're going to have to face.

Missy Ryan:

Alright, there are so many questions that I would like to sit here and ask the panelists, and unfortunately we didn't get to any of the audience questions, so my apologies. But I'm really happy that we got to take advantage of the expertise up here on this stage. Thank you very much, and look forward to continuing the discussion for the rest of the day.

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