On the Front Lines of Defense Innovation in the Digital World

00:00: Ladies and gentlemen who are with us online, if you stay with us, we're moving directly into our very last session of the Aspen Security Forum, coming home to our core competency, which of course is defense and security, and we have a really wonderful panel here to talk about defense innovation. You just heard Michèle Flournoy say that we need to take some big bets, Congress needs to re-align the resources, the Defense Department isn't using its resources effectively. Of course, Mark Esper, the current Secretary of Defense, said the same thing to us yesterday. So let me now introduce to discuss that topic in more detail, Kathleen Hicks, if you could turn on your camera, Eric Chewning, Ryan Tseng and Mike Brown. Thank you all so much for joining us.

00:55: Hello.

00:57: Great to be here. Great to see you all virtually. That's wonderful.

01:03: Great to see you too.

01:04: I think we're still missing Eric.

01:06: Great to be here.

01:07: Wonderful. Thank you all for joining us. You are last but not least, you're our all star panel on defense innovation because you're all in the trenches actually doing it. So let me just introduce you briefly. Mike Brown, of course, is the current director of the Defense Innovation Unit, that very special unit that is trying to rebuild the bridge between Silicon Valley and DOD. We've talked a lot, Mike and I talk a lot out in Silicon Valley. Silicon Valley was based and built on a good relationship with the Pentagon and with the intelligence community, and somewhere along the line that was broken. When you go from Vannevar Bush to all of the first semiconductor companies, they all were built with lots of support from the Pentagon. Much less of that happening now, so Mike and his crack small but savvy team is trying to revitalize and rebuild that bridge.

02:09: We have Kath Hicks from CSIS, she's the Kissinger Chair and the Director of the International Security Studies program there, and a great thinker on all of these things of defense innovation.

02:22: We have Ryan Tseng. Ryan, you and I met a few weeks ago, and I was just so impressed with you and what your company Shield AI is doing. You'll tell us more about it, but of course, you're working very closely with the Pentagon, so we're really interested in getting your perspective of an innovative company that's trying to work with big defense and with the intel community and how that's going.

02:45: And Eric Chewning was most recently, of course, the Chief of Staff to Secretary of Defense Mark Esper. He's now a partner at McKinsey & Company and has direct experience trying to move the Pentagon into the 21st century, if I could say that.

03:05: So welcome, all of you. Thank you so much for being here. Let me start with, you heard all the remarks that Esper made and that Michèle just made. Everyone is calling for this. The Defense Department needs to be more innovative. Chris Brose said in an earlier session, he's just written a book on this subject, he said most of the defense budget now is going to military systems that don't have anything to do with the wars that we are fighting. Kath, let me turn it to you first, is that an overstatement or is he right?

03:40: I don't think you can understate the challenges in pace and scale of change that's needed inside Defense. I think one of our biggest challenges is that many Americans have become comfortable assuming that the hundreds of thousands of millions of dollars that they're spending on defense is being spent well and productively, and I think as you're hearing in a resounding chorus, that's unfortunately probably not the case. And on the innovation side, I think that's where we see a lot of these challenges. So I might frame it a little differently than Chris. I think the way in which we might use forces in an actual conflict, for example, which we very much hope we won't find ourselves in, but with a competitor at the scale of China, I think there are a lot of capabilities we've built that we would use, but are they the best capabilities? Are they the capabilities we'd want to have? The answer to that is no. There's a lot of legacy systems where it makes sense to move with the right concepts of operation to move to new types of capabilities, and there's no doubt we're coming from way behind. We're slower than we need to be.

04:51: So we're going to dig really hard into this session, everyone has not raised this problem. The question is how? 'Cause this is worse than turning the Titanic. This is a really large, large operation to move. And Mike, let me turn next to you. You've led DIU since 2018. It's been a huge success. You facilitated over 160 contracts, brought in 60 first-time vendors to DOD, you're working... You know all the innovative companies in Silicon Valley. I see you do it. Maybe the numbers are even higher than ones I'm listing, but is it scaling? Is it enough or is this really a drop in the bucket?

05:33: Well... Thanks, Anja. The reason I raised my eyebrows when you talked about our success is I feel like we're just scratching the surface. I feel like we have been successful, this is an experiment that Ash Carter set up in 2015, so we're just this month celebrating our five year anniversary, and we have accomplished a lot. We probably influence about $500 million worth of defense procurement. Big number in absolute terms, but let's think about what defense buys, probably 2 to 400 billion a year, depending on the year. So we're a small drop in that bucket, and if we really want to energize the flow of commercial technology into the Pentagon, which is the purpose of DIU, we need to do a lot of things to make it easier for successful entrepreneurs like Ryan, who have the creativity and the vision and initiative to be successful with DOD, and his company has that, there are others that do, but we've got to increase the scale of this effort because the game-changing technologies that we face in competition with China, where we need to make investments, AI, cyber, autonomous systems, biotechnology, the list goes on.

06:43: Most of those are commercial. There's a few that are military, hypersonics is one of those, directed energy, but many are commercial. And we don't have that scale yet that we're achieving, where we're bringing in many, many companies. We've introduced 60 first-time vendors to DOD. That needs to be 600. We need to be influencing the procurement to a much greater degree than we are today. We're ready to pick up that challenge, but we need to make that happen as a country to

really take advantage of the innovation, the defense strategy calls that the national security innovation base, we've got to really be drawing on that to a much greater extent to be successful in this competition with China.

07:25: Thank you. And just for our panelists, I want to spend the first 20 minutes or so with the panel on really digging into in detail what are the problems, like what's stopping this? Then we'll move to solutions, and then in the end, I want to give our audience a chance to ask questions. But Mike, let me press you. Why isn't it 600? What's stopping you?

07:45: Well, one of the things that's stopping us is, it's...

07:48: Don't want to get you in trouble with that gang in Washington.

07:52: We're not moving in government at an agile pace that reflects the nature of the competition, it's about speed. So when we think about when we have successful prototypes that we've done, it's difficult for the budgeting process to catch up and the services to catch up. Congress asked the Pentagon to budget two years in advance for what they're going to need. Many of the technologies that we'd like to be prototyping are not developed yet. So companies like Ryan's develop something, we need to be quick on our feet to be able to prototype that, test it in a military application, and then have a rapid uptick to get those vendors into production. We don't have that today. That service that thinks about an autonomous system like Ryan's and wants to incorporate it would have had to do the planning, get the budget approved by Congress. And that's a two-year process, one year to work in the Pentagon, one year to work it with Congress.

08:50: We have to change that if we want to have the flexibility to incorporate the most innovative technology. So, that can happen with bigger budgets that are focused on innovation, it can happen by trying to speed up that process, giving senior officials more flexibility to be able to replace an existing legacy system program of record with a more innovative, more cost-effective solution. So the speed isn't right, and the incentives frankly aren't right to make that happen, those things we would need to change.

09:18: Thank you. Eric, you were in the thick of this until very recently, until you went back to McKinsey. Let me turn to you, and I know you and Secretary Esper were really dedicated to this. He made a big point about this yesterday, that we're not getting the return on investment on our defense dollars. And I know there is some recent legislation that shifts more oversight decisions to the military departments to make it faster, a more streamlined process. Where do you see the problems, from kind of big, big Pentagon perspective? I think you're still on mute. Eric, I think you're on mute.

10:12: Great, thanks. Sorry, the host had me on mute there, I was chained. Alright, thanks, Anja.

10:17: Sorry.

10:17: No, no worries at all.

10:18: Let me tell you, they've done it to me, too.

10:20: Yeah, it's okay. Listen, I think what everyone's scratching at here is this, the monolithic nature of the problem. And it really... As I think about it, it's because of three things. Defense innovation requires three elements to work in tandem: Technology, warfighting concepts, and then acquisition. Each of those are necessary. And collectively, they're necessary, and individually. What you see often is we may get the warfighting concept, but we don't have the technology in place or working very hard on the acquisition reform, but we can't get the technology sourced. And so I think what you've seen in the past is we've focused on one side of the triangle, but not the other three. And I think we're at a moment now where we recognize that we've got to move all three in tandem for the system to work. And recently, I think we've done a pretty good job, though clearly, much more needs to happen about trying to get each of the sides of the triangle in order.

11:15: If you think of the technology angle, the fiscal year '21 R&D budget was the largest ever requested by the Department. And those investments are being used in part to generate technological spillover effects to the commercial sector, which is something Mike and I have talked a lot about. When you think about the investments the Department made in the '80s and '90s, we created technological spillover effects with the commercial sector. And the Department needs to do that again. I think what we're doing with 5G is a good example of that. In addition, on the technology side, the Department went through the largest reorganization since the Goldwater-Nichols Act, with the restructuring of AT&L, and the creation of the Undersecretary of Defense for Research and Engineering. So we've made concept... Made some progress on the technical side, but obviously more needs to be done on the warfighting concepts. As you mentioned, Secretary Esper tasked the joint staff and the services to come up with a joint warfighting concept for all the main operations by December of this year.

12:11: Each of the services are working on a specific piece of that, and so as they're working the concept and as we're freeing up the technology, then you have to get the acquisition to work, and you know what Ellen Lord and the team have done at A&S about an adaptive acquisition framework is arguably the most dramatic acquisition reform we've seen in 20 years, and so while everyone wants us to move faster, and we certainly need to, and more work needs to be done, progress has been made in the last two or three years that I think we're all hopeful will begin to bear fruit here shortly.

12:42: So, Eric, this is great and exactly where I want to go. Let me press you a little bit for those people in the audience who are laymen and don't know ATL, what Ellen Lord is doing. Just explain a little bit how acquisition works, how long it normally takes and what you're now trying to get to.

13:01: Yeah. So, what the Department has done is looked at how do we think about acquisition as a channel for doing work with the Department. And so, one of the challenges that we typically have would be a company like Ryan's, smart, innovative, really great technology, but an average DOD development cycle was going to take 5 to 10 years. It would require a lot of money and investment on Ryan's end to do work with us because he'd have to have a cost accounting system that was compliant with our systems and for...

[overlapping conversation]

13:32: Being out of business by then.

13:36: They need to show growth right away, right? And so, one of the focuses, and Mike and the DIU team had been in the forefront of this is, is how do we create more nimble contracting mechanisms so that we can create a contracting mechanism to work with somebody like Ryan and, you know what, someone like a Lockheed Martin or a Northrop Grumman can have a different type of contracting mechanism. Now, we may use other agile OTA-type vehicles with their partnerships as well, but this idea that says, listen, you can't treat every problem through the same contracting process. You've got to tailor a contracting process for how you want to go about and create a solution, and that's what the Department's working on right now.

14:14: Thank you. Ryan, let me turn to you because we had this great conversation a few weeks ago where you've actually said it's been great, you've worked really well with DOD [chuckle] which is not something I hear from most entrepreneurs. So, tell me just a little bit about what Shield AI does and then, why it's worked for you. Are the new contract mechanisms working?

14:36: Yeah, great. Thank you. So, Shield AI is about a half-decade old and we are focused on operationalizing AI on the edge to get the right information at the right time to the right people to enable the best possible choices. And our experience or our timeline has very much matched up with that of DIU. We started in 2015, the same year the DIU kicked off and the work that that organization has done has been tremendous. They gave us an opportunity to exist and an opportunity to grow, and there have been many positive aspects of our interaction with doing business with government.

15:17: Of course, I think there are many challenges, and I think Mike, Eric both hit it on the head. At the end of the day, I think it comes down to speed and breaking that down, I think what's important to look at is why does innovation happen in the private sector and I think at the end of the day, the following needs to be true. Companies and investors need to believe that if they take risk, they work hard, they get ahead, there will be a return, and that is true in many markets, and that's why we see the cycle of innovation where new entrepreneurs, new companies are created and they take risk, they invest and drive forward innovation, and this is not always true in the defense market. There are characteristics of the Defense Acquisition System that work strongly against the incentives for innovation and the things brought up here start to get at some of those underlying structural challenges.

16:15: So, Ryan, can I ask you honestly? If not for DIU, would you have been able to sell into the Department of Defense?

16:22: No, no, and they have provided us with an amazing opportunity to get our foot in the door, but Mike was just talking about the scale becomes something that's very important. When you think about the best-in-class venture investors, you have to move at the speed and scale of relevance if you want them to participate and you want their portfolio companies to participate. And so, I think that DIU has done an incredible job of energizing Silicon Valley, energizing innovative technology companies in that investor base, but it still remains to be proven whether or not DOD can move

with both the speed and scale and relevance in the acquisition of these critical technologies.

17:01: Yeah... I'm sorry. Did you want to jump in?

17:05: Yeah. Just let me jump just... And I think the pointer on the scale gets back to the warfighting concept angle. So, let's say we solve that. How do we contract with Ryan? Then, for Ryan to really get scale, the services are going to have to have concepts that employ the technology he's describing, So, until you're able to develop the concept that knows how to use the technology, getting the contracting mechanism in place, it's great that we've got that, but you're not going to see these scale until the warfighting concept is clarified.

17:33: Yeah, absolutely.

17:34: I'd like to jump on that piece if that's okay. Because I think that's so easily overlooked, and I'm glad Eric brought it up, and it's so much more complicated, too, because it's not linear. It's not concept innovation or technology and then procurement system. This is about a system of innovation. It's an ecosystem that's in constant communication around those pieces. That includes experimentation, exercises at scale which are expensive, and they take time for the services to do. They take attention to plan. And then, it's about creating space at the strategic level for the trade-offs so that if you want to have concepts that drive technology solutions in new areas away from those legacy platforms that we talked about, you have to actually be able to buy them, and that's not just about the contracting. That's about the system across the US Government, Congress and others, to make space to grow these new capabilities which is at risk to some of the existing defense industrial base. It's a big challenge set that we're facing.

18:39: Right. You're going to actually have to say no to some of the legacy platforms to bring new ones in. Let me just turn back to Kath for one more thing because Kath and I, we're treading our own corn. Just put a piece in Foreign Affairs last week that talks about Chinese signal fusion and then how do we counter that and has some suggestions for doing it. And, Kath, you wrote the really important piece on the Valley of Death. Can you just explain what that is and why that's so important and how DOD is failing at it so far?

19:12: Sure. So, I think there are several people on here who have lived in the Valley of Death and crossed it or helped folks cross it, but what that refers to is that period of time between when a company is being worked with on the R&D side, in a small way, perhaps. And then their goal is, as Ryan said, for their investors is to get picked up and purchased on the procurement side, and that's the risk that they're taking, that they're doing this early work. But the big pay-off for them, and the reason that they're investing in the innovation is that they're going to get a contract for procuring actual capabilities, buying capabilities.

19:52: And right now, that's what we call the Valley of Death, because it's really hard to transition. We've had this problem, by the way, for decades. Really hard to transition programs from that R&D up to that procurement point, for all the reasons that Eric and Mike were pointing to in terms of making sure that the services are going to buy... Or the component is going to buy the capability at the end, that they have room in the budget to buy it, that they can... That the investors can wait the

two years that it now takes typically in the Congressional authorization process to get approval to have a program move up as a new start. So there are a lot of barriers to entry for a new company, for a non-traditional player. It's also a big problem for traditional players, by the way. But they've baked it in. They've learned how to absorb that risk. But it's still very challenging for them.

20:48: Right. And let me just get Ryan or Mike to jump in here because I think... Well, let me just get you both to jump in to see if you want to add anything.

20:56: I just want to say that the Department is, Eric described beautifully, has done a very job on acquisition reform. There have been so many efforts on how to reform the acquisition process. The Department now has the variety of authorities to tailor the contracting instrument to what we're buying. We don't use the same instrument to buy an aircraft carrier that we would to buy the products that Ryan is developing. But the speed is now all about the budgeting process, and that requires to work with Congress and Michèle Flournoy, who was just on, has written about this as well.

21:30: We have to develop a relationship that involves the trust, so that there is more budget flexibility. That speed in the budget flexibility helps you move across that Valley of Death, so you're not stuck there for two years. We have to categorically reject that two years is required to agree on the warfighting concept and get Congress to approve it. That's too slow in a competition with China. So we have to allow more flexibility in the budgeting. Congress can delegate that. There's a variety of mechanisms we could look at, managing programs by portfolio, instead of individual program of record. Without getting the specific methods, we need to be able to move faster so that when DIU minimizes the risk through the prototyping process... We're buying down that risk, we're ready to go to scale that, 'cause this really is all about how do we scale what we already know to work. I had a conversation with General Hyten recently when he said, "Enough prototyping already. We know this works. How do we buy this at scale and production volume?"

22:32: And Mike, I think what ends up happening is... I see this with young companies in Silicon Valley all the time, what happens is they end up selling small bits and pieces to the combatant commands, especially the special ops command that has some discretionary budget to do innovative things. But boy, the programs of record are really hard. Does anyone want to comment on that?

22:51: Well, I think that the speed and the scale... We talked about investors having some amount of limited patience, but I think also looking at the innovation incentive. If you have a two-year capability lead or a three-year capability lead as a company, that didn't come without significant investment and significant risk. And then if it takes three years for the Department to move out on that, you're... That lead that was hard fought, that took a lot of risk, that wasn't guaranteed by any stretch, can go out the window, because now everybody can look at what's been done. They can invest, they can catch up, and it disincentives the innovation and risk-taking by the commercial sector. So I think that there are so many reasons to go faster, from getting the capability out to competing with China, to incentivizing innovation, to incentivizing investment, it really does come down to speed and scale across the board, because it really does compromise us on all of those fronts, and we don't move quickly.

23:54: Eric, do you want to jump in?

23:57: Yeah, the thing... I noticed that too, is when we talk about technological advantage for the Department, it's very easy for us to immediately talk in terms of commercial, and that's an important element of this. But I think we also need to recognize that DOD is going to have to have a multiple track technological strategy. There are some technologies where the Department is going to have to play its traditional role where we are investing in driving the state-of the-art. Hypersonics are a good example of that. That there are other technologies where we're going to have to be a fast follower; we're going to have to identify technologies. Some of it's in here in the United States, if... Some of them may come from our allies. We need to be able to identify it, and then decide how does it get tailored. I think part of the question we have now is, who actually does the tailoring of the commercial ... Some of it could be straight commercial. Some of it's going to require some militarization. Is that something that companies like Ryan's does? Is that something that the Department will do? Or is that something that the traditional industrial base will do?

24:47: Yeah. Good point. That's a really good point. Just a reminder to our participants. If you'd like to ask questions, that we'll go to in about 15 minutes, please use the raise hand function in Zoom. Let's move to Congress for a second. Mike started us off there. But. Kath, maybe I can turn to you on this. Senator McCain used to joke that there was a military industrial congressional complex, and in spite of efforts by lots of people on Senate Armed Services, you just can't get movement out of this... Almost a bog of people preferring the legacy programs, the impressive lobbying that is done, each district that has some of those legacy programs has jobs at stake, how do you move that part of the behemoth?

25:42: Well, first, I want to give Congress credit for putting a lot of time and effort into acquisition reform. I think there is still a lot of debate about whether all the changes that Congress has pushed through have been beneficial to the Department. But there's no doubt that both on the House and Senate sides under both parties, they have been focused on acquisition reform. So at that level, they get that there's a big challenge here and that there's change needed.

26:11: But what's going better? Tell me what improvements have already been made.

26:15: Well, so they've... Again, back to the points that Mike was making in terms of creating greater flexibility. Other Transactional Authority is the most obvious example of that allowing a much looser use of ways of procuring needed items in order to allow experimentation. So we've seen this explosion in increasing use of Other Transactional Authority in lieu of traditional procurement processes. And that's one of the examples of ways in which Congress has helped facilitate some of this innovation cycle.

26:49: But the point you're asking about really is about the congressional incentives to make sure that they're taking care of their constituencies and their constituencies at times, of course, involve companies. Now, some of those companies are ones who are trying to get into the sector. So they're getting some congressional look as well. But there obviously has been for years an ability of the existing traditional defense companies to be able to think ahead on their congressional strategies. And so that's going to pay off for them, as it does for any sector where you're investing time and attention in how you think about making sure that you've built that congressional support. And so it has been paying off in many areas, and it is difficult to cut capabilities.

27:34: The other challenge is many capabilities are good, they're useful. There are capabilities that if we had an endless amount of money would be great to have. So the question of how to prioritize capabilities, what do we really need, this gets back to the issue of the concepts and the strategy above them. What do you want the capabilities for? And this is where I think the Defense Department has been particularly weak since the late 1990s, which is making sure that it has invested itself fully in understanding its theory of war, what it is we want to achieve, what are the capabilities we need to do that, and having chiefs and combatant commands up on Capitol Hill saying, "No, no, no, I know, this is a really great capability. I have nothing against this or that system. But I really need this system."

28:21: And just the culture even inside the Defense Department to get that, to have them, for instance, move to unmanned systems, as we've already seen, very difficult to move the internal culture there. And I think a piece of that is because they don't really have buy-in on what that theory of victory instead of needed capability should be.

28:40: Eric, you're nodding.

28:41: Yeah, I think we're entering a very interesting budgetary period where I think you've got bipartisan consensus on the need to modernize the military in line with the national defense strategy. I think you're going to see the convergence of a theory of victory, as Kath said, by the Department. You're going to see a flattening budget environment, which is going to force trades. And it's going to force trades around modernization versus preservation of legacy equipment. And then it'll come down to political will, and are we more concerned with the need to modernize the force? Or more concerned with the need to preserve legacy constituencies?

29:14: Yeah. And can I ask you guys the really hard follow-up? Which legacy systems do you think should be on the scrapheap? [chuckle] No one ever wants to answer that one.

29:28: I think the Department in the '21 budget that we submitted to Congress began to indicate where we thought some of those trades needed to be, though until you've got, as Kath had said, and as I said earlier, sort of a warfighting concept, you can't make that full set of trades. And so once you've got that warfighting concept in place, then you can begin to make trades, frankly, between platforms and between services, as you think about who needs what to play their role in the joint fight.

29:56: And sometimes the trades are in the quantities, so it's also in terms of exactly the mix that you're trying to go for, where do you make space for new kinds of capabilities? And where might there be room for some legacy capabilities? I'll give you an example sort of domain control, where even fourth-generation aircraft or aircraft carriers that are less survivable in, for instance, East Asia. You might have missions you want to use those for, you're not throwing... You're not scrapheaping, if you will, to use your term, some of that capability, you actually could use it, but you might not need it in the same quantities that you had planned previously.

30:40: I'd just like to add, building on what Eric and Kath are saying, we need to be bolder in terms

of our experimentation. So the conventional wisdom is we plan, we come up with very detailed requirements, then we go buy. The world is moving way too fast in the technologies that are commercial. It may be a little different when we're calling the shots on a technology like hypersonic. But in the commercial world, we really can't wait for that or we're going to be behind in terms of what we're delivering to warfighters. So what we need to do is give the Department more flexibility to experiment, and then use the commercial sector where we can inspire much more competition, and let the taxpayer dollars stretch further. This is going to be a bright spot in an environment where the defense budgets are flattening, to take advantage of commercial technology, have much more competitive bake-offs of who are the best providers of that and deliver that faster. We're not making it clear what the downsides are of not doing that experimentation and the cost of moving slow.

31:42: Ryan, would that help you?

31:45: I think so. One of the things that we hear often is, this is great but we don't have a requirement for that so we can't buy it. And I think one of the important things to remember is that nobody asked for the Model T, nobody asked for the iPhone. But when people saw it and said, "Wow, this is going to change my life, I should buy it." Nobody said you can't buy it because you didn't write a requirement for that. And so I think that in terms of the warfighting concepts, they're super important. We need to know what we're building and why. But there has to be an aperture that allows for the acquisition of extremely innovative technologies and capabilities that people didn't plan for. And that's allowed in most markets. It's much harder to do in the defense market. So I would just add that we need to find a way to accommodate those things.

32:34: And that really underscores the point Mike was just making on experimentation. You have to be ecumenical, if you will, about how innovation comes about in any sector, but certainly in defense, right? It could be coming about because you have a new concept that you've surmised from intelligence and information and operational art, and then you say, here's the kind of technology that would enable that; that's one way, another way, I should way, the other way. Another way is bear with what Ryan said, which is, here are some tools. What do you think of these tools? What could you do with them? How do you find out what you could do with them? You go try them and you use them, and that's experimentation.

33:14: And the traditional way of defense is that deliberative path of first one, then the other, some time passes, there's a four-star meeting and then the idea doesn't make it. Whereas what you really need, again, is this pretty innovative ecosystem that's funded and has forces available for doing these kinds of interactions where the intelligence folks, the technology folks and your operators are able to interact and try things out and come up with new ideas.

33:46: I think you're so right. This is so key. I may be getting the anecdote slightly wrong, but I think Bill Perry, who's no slouch in terms of technology, was asked in a congressional hearing in the very late '70s, like 1979, will there ever be a role for the personal computer? And he said no. [laughter] So, just to underscore Ryan's point, exactly. Let me move to another issue that Kath, you've written about and others, and that's how do you train the workforce in the Pentagon to take greater risk. Right now, they are completely disincentivized from that, and I don't know who wants to answer first.

34:27: Well, I'll say first. I could not say that I think they're completely disincentivized because that wouldn't give a fairer cut at the great efforts on acquisition and workforce reform, which again, Capitol Hill's been supportive of over the years. So, I defer to Eric and others who've been in the building more recently than I have. But I will say in general, the challenge, of course, as it is anywhere, is who gets promoted and what are the incentives for that, what are the bonus structures or incentive structures? Step, quality step increases, if you will, in government speak. How are you thinking about how innovation is rewarded or heard, and this again goes outside the contract workforce itself to Capitol Hill and other areas, where what it is, is there always a hammer on you if you try something and it fails, and is that considered a failure, if you will, in a career sense, or is that considered a necessary part of how one innovates.

35:26: So there's the workforce sure how it's trained, what it understands, who comprises the workforce? Do they understand the technology community, are they drawn from the technology community, are there avenues of exchange between the two? But that is very much about the incentive structure that is put upon that workforce. That's true of program managers as well, not just, if you will, the contracting officers, but those who are running major programs. Typically in the services, the reality is, you want to get in and out of that program manager position with nothing happening on your watch. That runs highly counter to an innovation culture. That's about a no mistake culture, and that's not a culture that's going to advance big new concepts and capabilities.

36:09: Yeah, I think that's exactly right. I think I'd add to it too, it's a different relationship with industry. I think all too often you get into this adversarial relationship where it's industry versus the government, and this is not helpful. I think you need to look at it as a partnership, you need to look at it as everyone's got their Team America hat on, what can we do on behalf of the warfighter and for the country. That type of freer exchange allows for the type of risk-taking as well as some of the solutions that Ryan and Mike are describing.

36:36: No, I'd like to quote...

36:41: I don't know, would you change the incentives in terms of how people are trying to train people in a different culture.

36:53: I think it's a combination of first time something goes really wrong, they're not brought up on the Hill and made a political pariah over it, right? So you've got to to accept the limits of and accept the amount of risk-taking is going to result in some failures, and that's okay, and we're okay with that and it's not going to affect your career. Second thing is too is, I think, more fluidity in the workforce I think is important, to understand what the state of the art is, and then also understanding the different experimentation that's occurring across the services. We have a very federated model. An MDA may be experimenting with different acquisition concepts or technology concepts that are applicable to what's going on in the Navy or space force or somewhere else. Sharing those cross-learnings is important, and I think the ability to migrate talent across these different areas is important because you've got to to give folks the right career path in acquisition to retain the kind of talent that you want to have.

37:49: And what's preventing us from migrating the talent, and do you mean in and out of the private sector, like a tech or a VC or even...

37:56: I think both. I think you want people in and out of the tech sector, I think you want to move people in and out of government, I think you want to move them within government, just so they could begin to get a 360 degree view of the problem set.

38:09: So not to be a little bit flip, but I asked a senior DOD official about exactly this, rotating people in and out of Silicon Valley, maybe on six month stints, and he said to me, "You know, the problem is they all smoke pot."

[laughter]

38:28: No barriers here.

38:28: Israeli military. It's interesting, right? So the Israeli military, obviously, you've got a very innovative culture, you also have a culture where everyone has to serve. So when I spent some time with the Israeli military, what struck me was a lot of their entrepreneurs had just rotated out of the military, had a good idea and then thought how they could then use technology to apply those problems. I think that's the type of virtuous cycle that if we had a little more of, I think it would help everybody.

38:58: Mike, you were the CEO of a tech company and now you're serving us in the US Government. How do you see it?

39:06: I was going to add to the last point. We need more than six months, you've got to dedicate a couple of years. It took me at least nine months to figure out what some of the acronyms were, the congressional budgeting process, etcetera. So it's a very complex organization we're talking about changing, so we need a commitment of a couple of years for folks, but I do agree with Eric, more fluidity would be a very good thing.

39:29: I also see a tremendous amount of innovative spirit in our armed forces, the airmen, sailors, marines. They have instinctual views of what could be changed to make their capability enhanced. The fact that the processes in the Pentagon are aimed at driving for predictability, which is kind of a false sense of security. And making sure that we don't experiment, we are hyper-focused on fraud prevention, which is a good thing, making every cent of the taxpayers' dollar go to what we have allocated that for. So again, very little flexibility. But if we were to free up and say we want more experimentation, we need to be moving faster, we want to have implementation of new ideas, some of which are going to fail, all of the right things would start to happen. It's really, from my standpoint, much more an incentive issue, than it is a training issue.

40:33: So Mike or others...

40:34: I think...

40:34: Do you advocate a system where you have some part of the defense procurement budget put aside for this kind of experimentation, more like a venture capital fund where you know that 9 out of 10 are going to fail, 1 out of 100 is going to be the big thing that saves DOD a huge amount of money and makes us that much more competitive and better. And how would you implement that if you're advocating that?

41:00: Well, it's not quite as a venture capital firm would see, you just need some amount of the budget. Ten percent would be a huge amount compared to what we're doing there, where the Department has flexibility to make some other choices rather than what they thought two years ago. And then you can use the commercial market to say what's been successful? So the Department, unlike when it's developing hypersonics and you have to make these big bets, and you may not have as much to go on, we can look at the commercial market and say, "There's already a proving ground, there's a very competitive market in place. Let's do a bake-off and see who's got the right capability." So I think you could do it with a lot less risk than is implied in this conversation, because you can leverage what commercial competition is doing. And we're going to get capabilities to the warfighters faster and it's going to be much more cost-effective. And we're going to need that both to compete with China and in an era of flattening defense budgets.

41:55: Right. Ryan?

41:58: I was going to say that I think what people would find if they went between the two sectors, and Mike has probably already seen this, in a technology company you have to opt out of taking risk. Kind of the default expectation is that you're going to push forward, you're going to take chances, you're going to innovate. When we work, you know, with our counterparties in the national security sector, people have to opt into taking risk. You know, I have to fill out a full source justification to do this, I have to explain why I'm going to do this differently. And it's that opting out versus opting in of risk, that I think drives a lot of the behavior and decision-making. And so if we could find a way to encourage an incentive structure or a culture where you actually have to opt out of taking a risk. And that could be done through experiments and different components or different commands. I think the results could be pretty profound and interesting.

42:52: Yeah, thank you. We've got a bunch of questions lined up, let me maybe start with Murray Purvis, who had a question. It will just take a couple of seconds for Murray to come online.

43:17: Hi, I think I am here.

43:19: Hello.

43:20: Hi, guys, that was an incredibly interesting conversation. And I apologize for my darkness, it's night-time where I am in the UK. But I just wanted to ask... I mean, I have a million questions, but I'll pick one. In terms of... You kind of briefly touched upon this in the conversation, but I've worked... I've had the privilege of working with a number of different agencies and departments within DOD and also other places like the Department of Energy. And how do you think you can kind of solve the challenge or approach the challenge of... You know, if you know about things that are going on in one department or one agency that would be very innovative and new for another

one, you know, how do you get that sharing within the DOD or elsewhere to kind of work more efficiently and work better?

44:10: That's a good question. I mean, this happens all the time. You see it with one combatant command has something that's working amazingly, but it doesn't transfer over very quickly, not to mention between intel and defense and other agencies.

44:23: I'm happy to sort of take a first cut at it. You know, listen, I think part of it is there's... To the extent, you've got a common set of challenges, right? There is discussion at the inter-agency level, and then obviously with your peers and other groups around how are you approaching certain problems or what have you done, and you'll exchange information that way. I think the other is the... You know, those who bring solutions to government, right? And so you know, we're always talking to various industry partners and you know, if someone comes and says, "Listen, we saw a similar problem or issue at Department X or Facility Y, and it's similar to an issue that you have," that's another way for the cross-exchange of ideas. Well, I think, Murray, it comes in a couple of different ways, but your ability to learn is definitely part of the job description.

45:14: Eric, is there a formal process for that, or is that all informal?

45:18: It depends on the type of problem we're talking about, you know, at the sort of highest level, right? The National Security Council run certain inter-agencies' actions around distinct problem sets, but a lot of the good stuff is informal, right? And it occurs at a working level. And you know, this is the benefit of... A UK colleague of mine, we're talking about the differences between the US system and the UK system. And one of them is, you know, when there's a change in political leadership in the United States, there's a change in political leadership relatively far down in the organizational structure of the various government agencies. Whereas in the UK when there's a change over, it's something that's effective only to... You know, two folks at the MOD switch jobs. And so I think it's part of that refreshing that can occur, that also enables that type of learning.

46:08: Does anyone else want to jump in?

46:10: I'll just add, we had the fortune of hosting an embedded person from UK Ministry of Defence, and so what a great opportunity to exchange ideas. And in fact UK has its own Defense Innovation Unit, as China does as well. We're not collaborating with them, but it was great to see what is the UK doing and exchange some ideas there to share best practices.

46:36: Kath?

46:39: I mean, I will just take on the... Exactly what Eric said on the interagency and then inside DOD, this is all about governance structures and processes and trust. And it's usually set by the tone from the chairman and the secretary. And that goes a huge way in terms of the degree to which you see sharing of information on issues like this. So I know one example from this administration is the service secretaries have gotten together on hypersonic approaches. Obviously, we have the JAIC for AI. There have been... In previous administrations, there are examples like this where there are particular areas. It's been ISR... Excuse me, intelligence, surveillance and reconnaissance before,

lots of different areas where there's a decision at the top that the area is so important, the capability set is so important that there will be a concerted effort to make sure there's information sharing and prioritization so that you do get best practices across them rather than in this... In the case of the services, three different or four different investment streams.

47:40: You could imagine, for example, the CIOs of various US government departments getting together and saying in a much more pedestrian way, "Hey, this platform is working. This isn't." And I don't think a whole lot of that happens. Correct me if I'm wrong.

47:53: There is a meeting of the CIOs that does happen, Anja, across the federal government, yeah. So some of that is happening.

48:00: Yeah, it does. It's true.

48:01: That's great. Let me go to one more question, which is Steven Keenan.

[pause]

48:11: Hi, Steven. We'll just wait for him to unmute.

48:16: Yes, hi, thank you. Fantastic conversation. Along with keeping the world safe and I hope everyone... I want to wish everyone staying safe and healthy with your family and friends. The Pentagon started the ARPANET, working on the... What became the internet in 1969. Secretary of Defense Mark Esper mentioned briefly in his talk yesterday our directed energy weapons. Do you feel... Yeah, one of the nice things when the ARPANET invented the internet, the whole architecture was distributed. So there was no big issues as to who was going to own the internet when it went into the commercial marketplace. If in our inventions of our directed energy projects, we've come across a technology... Similar to when we invented the nuclear bomb, we brought in nuclear fission to our energy portfolio. If with our directed energy projects that we're working on and have been working on we've come across a technology that could be fantastic to use in peaceful basis but it's going to make oil gas and coal obsolete quickly, and who owns it? How do you see that coming from the DARPA lab into the commercial marketplace, if I'm correct that we already have this technology? And thank you for a fantastic security forum.

49:50: Thank you.

49:50: Well, if I could start on this one. So, I think you're raising a much broader point than directed energy. So Eric and I just co-authored a paper, are we ready for the super power marathon we're in with China? Our answer was no, with a lot of work we need to do to better prepare. But one of the key recommendations is we've got to get back to the era that created the internet in the sense of government, business, academia, working together and making investments that are in these game-changing technologies that have the spillover effects into the economy. Eric already mentioned that word spillover effects, because that's what happened with the internet. So it's much broader than DARPA. We've got to reclaim the preeminence in science that Xi is going after in China, make those game-changing investments so that we don't lag in the US behind any other

power in terms of having that capability within the US.

50:47: The military can use that, but a key benefit here is those are the foundational benefits of technology improvement that fuel economic prosperity, which is the ultimate guarantor of our national security. We need to be making those now, we're not making them at the same rate we did in the '60s as a percentage of GDP. We need to get back to that so we're creating that prosperity for ourselves, giving those advantages to our private industry and making ourselves more secure in the coming decades.

51:19: Let's stay on that topic for a minute because... All of us are nodding. [chuckle] We've all written on this. Mark Warner said it today, you've got the Endless Frontiers Act out there that's actually trying to do it, but as... Sounds like it doesn't stand much of a chance of passing. If there is such bipartisan consensus on this, we need to get back in the basic sciences and R&D game. It gets away from all of the issues we discussed earlier about ... winners and losers, and where do you go. Why is this so hard to do? And then actually, let me toss one quick question to Ryan too. Have you been at all helped by federal R&D funds? Have you gotten any government help? Or have you done it all on your own?

52:06: We have done R&D programs for DOD. And I think the DOD investment in R&D is important, because capabilities that the Department needs sometimes step pretty far outside the boundaries of what the commercial sector would pay for, both in terms of what you're creating, and also the level of risk involved in creating the technology. So I think that the R&D investments the Department makes are incredibly important.

52:36: Does anyone want to...

52:36: There's a lot of competing priorities, Anja, as we know, and so it's very difficult to free up the Endless Frontiers Act, $100-$110 billion. Now we've got to fit that in with what we're doing for COVID relief, etcetera. So it's big dollars that we're talking about. If we wanted to get back to the same level of federal spending as a percentage of GDP that we had during the Space Race, it would be an additional $200 billion for federally funded R&D. We need something probably...

53:05: Pretty big.

53:06: Yeah, we need something probably on that order, plus doubling R&D tax credits for private companies if they're investing in these game-changing technologies. If we really want to recognize what we're up against in the competition with China, it's on that scale that we need to rethink our investments of the future.

53:23: That's right. And maybe on the flip side, our friends in Silicon Valley never like to hear this, but you and I have talked about this a lot, Mike, the R&D tax credits now are so broad that you literally can get the same tax credit for a craft beer, not that I don't... I love craft beer, like the rest of them, but as you get for some of the cutting edge stuff that Shield AI or others are doing, and that just doesn't make a whole lot of sense. So maybe give more on one side and a little bit less on the other. Kath, do you want to jump in on this?

53:53: Yeah, I think I would only add, 'cause I agree completely with what's already been put out here, as you say, there's a lot of consensus, but I think the other piece is there are still some pockets where there's a principled dislike of industrial-based policy of the federal government having a hand, if you will, or a heavy hand to some, in setting... Investing heavily on the R&D side. Now, that's not about the STEM education piece, again, I think that's strictly on the spending side, but when it comes to what role should the federal government have in trying to set us on a course with specific sectoral investments, one can argue we've been doing that for many, many years in many areas, but they're presenting it as the national security industrial base, for example, as the Trump administration had in the national security strategy. I think there are some sectors that are standoffish to a policy like that, either because on the right, they're afraid it's socialism, or on the left, they're afraid it's just the defense industrial complex.

55:01: I think the only other thing I'd add would be, I agree there what everything, everyone said, our capital market system's the best in the world, right. Very efficient at allocating capital. I think the other thing Mike and I talked about in our paper was do we need to think about perhaps maybe a longer term capital framework, where rather than trying to evaluate some of these long-term R&D decisions on a quarterly basis, we're putting in place incentives to evaluate them more on a five-year type of return. You wouldn't want to throw the baby out with the bath water, obviously, the system we currently have, but this idea about a longer term capitalism, I think it would be part of the solution, 'cause the government just in and of itself isn't going to work, right. The government can make the basic investments, but unless you've got the private sector with the right set of incentives to take that and then generate the Bell Labs equivalent of 30 years ago, then you're missing a very important reading.

56:01: It's an important point, and I've got to tell you, maybe we'll get Ryan in on this too, but the incentives right now are all wrong, if I see most of the venture capitalists in Silicon Valley, the incentive is to do social media, e-commerce things, things that are easy tech, not hard tech at all, because there's technology risk, there's product risk and it's just much easier to have four guys out of Stanford starting Snapchat or any of these other services, which are great, and they're ubiquitous, but they're certainly not helping our national defense.

56:35: Venture capital is...

56:36: Innovation needs to...

56:38: When you're leading a public company, so my experience, when you're a CEO of a public company, it's all about short-term incentives, that's how your compensation is determined, that's what your shareholders care about, you get activists or private equity coming in, they're even less patient. So there's no view that it's much better to think about 10-year capabilities you're building in the company, nobody has the patience for that. That's a mentality, as Eric's saying, we have to change, because that's not how China is thinking, so we're competing with another society with a completely different system. We don't want their system, but we need to think about what are the benefits of long-term thinking when it comes to making investments.

57:18: Companies are great at driving innovation forward, there just needs to be a market that generates a return when there is innovation, and so I think that when we think about government participation in R&D, there is a stage of R&D that the commercial markets really won't touch, it's just... It's too speculative, it's too uncertain, and the federal government has a huge role in laying the foundations, but once it gets to a certain stage, companies are extremely well-positioned, we can see that's a cross-market to picking up those basic technologies and doing a huge amount of work to make those commercially viable and sometimes change the world with them. And I just... You see that in markets where the incentives are right, where innovation generates returns, and I think that the DOD and the national security sector needs to find a way to allow companies to generate returns for their investments in innovation.

58:12: Thank you. Kath, I'm going to give you the last word on this and then we'll close out.

58:16: I think I've had my last word, but if you're going to give me one more, I'm going to go back to the ecosystem piece. It's not just about the tech and the hardware and software, as important as that is, you have got to look inside the building and create actual funding positions, authority and high level interest in developing concepts and experimenting with them to spin out innovation.

58:43: Thank you guys so much. Well, there is heated agreement, there is bipartisan agreement, there is agreement inside the Defense Department and Congress, and there is a crisis right now, [chuckle] and maybe that will create the opportunity to finally make these hard things happen, so thank you all so much for being at the forefront of this and for talking to us in our very last Aspen Security Forum panel, it's been wonderful to have you. Kath, Mike, Eric, Ryan, thank you very much.