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Kathleen Hicks: Hi, I'm Kathleen Hicks, Senior Vice President and Director of the International Security Program at the Center For Strategic and International Studies. And this is Defense 2020, a CSIS podcast examining critical defense issues in the United States' 2020 election cycle. We bring in defense experts from across the political spectrum to survey the debates over the US military strategy, missions and funding. This podcast is made possible by contributions from BAE systems, Lockheed Martin, Northrop Grumman, and the Thales Group.

Kathleen Hicks: In this episode of Defense 2020, I'll be continuing a conversation with three experts about innovation in the national security sector. My colleague Andrew Hunter, Director of the Defense Industrial Initiatives Group and Senior Fellow in the International Security Program at CSIS. Chris Brose, Head of Strategy at Anduril Industries and a Senior Fellow at the Carnegie Endowment for International Peace. And Rachel Hoff, Policy Director at the Ronald Reagan Institute. Chris Brose, Rachel Hoff, and Andrew Hunter, thanks so much for joining me today. So Rachel, on our last episode, we sort of left the conversation having put out I think a lot of the challenges facing the Department Of Defense (DOD) and Congress and others who are looking at innovation. And maybe it's helpful at this point to sort of step back and say, where have those engines of innovation been in the US government, in DOD, and maybe even outside government? And how should we be looking to leverage either those same traditional approaches and where should we be looking for new outcomes?

Rachel Hoff: So I think it's useful to start sort of historically. So certainly during the Cold War, not only was the US the primary driver of R&D (research and development) spending and investment around the world, but within that, that money was coming disproportionately from the US government, and then disproportionately on their end from the DOD. And that paradigm has changed dramatically. So not only is the US now not the primary global investor in R&D and innovation. Obviously the rest of the world, countries in Europe and Israel, and then most recently China, have caught up and surpassed as a whole US spending. But within that US piece of the pie, US government spending and DOD spending has now been eclipsed by private sector spending on R&D. And so that shift is something that clearly the DOD has not adjusted to in terms of how to contract.

Rachel Hoff: I think Chris sort of got into some of this conversation in the last episode in terms of how to do acquisition. And I think the private sector has had some difficulty adjusting to this as well. I mean clearly the success of the private sector in Silicon Valley tech firms shows that they're doing great for private sector means. But when it comes to the ways in which these technologies are dual use and have applicability in the national security sector in addition to their commercial applications, that barrier between the US government and bringing these dual use technologies to bear has proven high though hopefully not insurmountable. I think there's a lot of things that both DOD and some of these innovation and technology firms are doing to help get past this moment and really adjust to the new reality that we're in.

Kathleen Hicks: Chris, where do you think we can pick up and carry forward some of the ways in which innovation in the national security sector has functioned in the past and where is it just going to have to be different?

Chris Brose: Yeah, I think we make a mistake when we think about institutions as innovative. There are innovative institutions, there are those that have that mandate, but organizations are not innovative. Individuals are innovative. And I think in the past we have been at our greatest and most successful when we have actually recognized that there are individuals who are true innovators and we've empowered them to do the very thing that they're capable of doing. You think of Bernard Schriever in the early Cold War, Hyman Rickover, Kelly Johnson at the early Skunkworks. Those are what we would call today founders. And if you look at how venture capital (VC) firms actually make their investments, they bet on people. They bet on the leaders of these organizations. They bet on the founders of these companies. They don't need proof necessarily that they can solve every problem that they have set out for themselves.

Chris Brose: They're betting that that individual is going to be capable of figuring it out. And we've been at our best when we have actually made those kinds of decisions, when we've picked winners and we've said we're going to concentrate a lot of our investment and a lot of our effort in an individual's ability to solve an incredibly complex problem like the nuclear Navy or like the ICBM (intercontinental ballistic missile). And I think we could do a lot of good by going back to that model of really thinking about if you take joint all domain command and control, the new hotness, who is the individual who's going to help the Department (of Defense) solve that problem the way that some of those early innovators solved some of the most transcendent problems we had in the early Cold War? I think that we would be much better off if we thought about it that way rather than expecting a process or an organization or an institution to solve that problem for us.

Kathleen Hicks: At the same time though, just to push you a little, the institutions or the processes or however you want to put it, the system, it has to be able to reward those people. It has to be able to identify them, and the idea has to have some light. And how do you see DOD or the US government in general helping make sure that happens?

Chris Brose: Yeah, and I think it's more about the senior leaders have to identify those people. They have to empower them, they have to give them resources, they have to give them space and they have to protect them. Many innovators, their own institutions routinely tried to sack them throughout the course of their careers, and that is somewhat explainable or understandable in light of what they were trying to do and how it was contrary to the way the institution had defined its interests. Oftentimes what senior leaders have to do most importantly of all is just recognize who those great individuals are, give them the space to be successful, give them the resources, hold them accountable for results and then protect them when everyone comes after them. That's not a dramatically complex set of things to have to do. It doesn't

necessarily require an entire institution, but it certainly requires the buy in and commitment from senior leaders.

Andrew Hunter: Yeah. Not to take us down a statistical rabbit hole here, but I wonder how much of the great man theory of history, if you will, is survivorship bias. So we had these really great thinkers, and we can name 10 of them that led to dramatic transformation. But maybe the system just managed to eliminate the other 90 who would have also been incredible innovators if the system hadn't killed them first. So I think Chris's point is well taken. This is a human talent enterprise and there are people who just are more innovative in their way of thinking or are bigger risk takers. You have to encourage them. But I also think there's a role for making the system friendlier to change and friendlier to innovation so that not everything takes a genius or not every change in the system takes a secretary of defense personally intervening to get it done.

Andrew Hunter: And I think there are some things that prove out over time as facilitating or being enablers to more innovative approaches. And actually one of them was something that Chris promoted in his time on the Hill, which was cross functional teams, bringing people from requirements community, the budget community, the acquisition community, the operational community together to exchange information in really short intervals of time so that the system was updating much more rapidly. And that has had a big payoff in the rapid acquisition world. I think it's having a big payoff in some of the Army CFT (combat fitness test) processes where they are succeeding, and not all of them are succeeding, but some of them are succeeding. I think there's a real payoff to that. So I do think there's an institutional piece that has to go with finding the right people on protecting them.

Kathleen Hicks: We haven't talked directly about federal R&D dollars and there's so many tools, but I do want to talk about that directly because it's so fundamental to how we have innovated in the past in the public-private interface where DOD in particular, but again, NASA (National Aeronautics and Space Administration), there are some other examples, their ability to reach out and provide dollars to research communities, the academic community and startups has been so fundamental in how we've been able to keep an innovative economy. I think most people who look right now at national security innovation, that is not the first thing on their mind is federal R&D dollars because we have such a vibrant economy in terms of the tech sector and the ability of VCs and others to invest in that. But is it gone? Does it not matter anymore or is there an important role still to play for federal R&D?

Andrew Hunter: I have very strong feelings on this, so I'm happy to go first. So I think there's a really vital role here because the growth of private sector R&D is profound. It is a massive change. And it's a good thing because that's really good for the economy. I think there are still incentive structures in private sector R&D that means that they will pursue technologies that they can see the return on investment in a time horizon that is for national purposes relatively short. Some investors are more patient than others, but patience generally is not a

feature of most modern investors. The government can afford to be a longer term investor and so there's fundamental science and technology work that needs to be done that I think federal R&D remains by far and away the best mechanism to do that. And I would point specifically to things like the explainability for AI (artificial intelligence) or the ability to validate learning algorithms to do high consequence tasks. I think these are things the government R&D is particularly well suited to do that can leverage this massive private sector investment that's out there.

Chris Brose: I think that I... I mean, I totally agree that there's a role for a federal R&D. But I also think the days where federal R&D was sort of king of the realm are just not coming back. And we need to think and do a lot better at creating the incentives to make all of that private research and development, all of that private capital work for us in national defense. And I think we've just really abjectly failed to do that in recent years. The thing that the US government needs to do is create the incentives and create demand. Andrew's right. There are certain things that private R&D, venture capital, if left to its own devices, is not going to create. But if the US government creates a strong demand for the types of capabilities that they would like to see private R&D going toward, if they suggest and show empirically that they're going to buy a lot of those capabilities, you're going to see a lot...

Chris Brose: That they're going to buy a lot of those capabilities. You're going to see a lot of that private investment go to solve those problems and it's going not just to solve the problem that the Department of Defense has sort of said in a color by number way that it wants solved, but it's going to solve those problems with new technologies, creative approaches that federal research labs would never have come up with if left to their own devices. We need as the government to create the types of incentives where all of that money, which is many multiples larger than the Department of Defense's entire budget can be brought into alignment to actually start solving these problems. But the only way that's going to happen is if the Department of Defense actually puts its money where its mouth is, is not on the R&D side, but on the procurement side to actually buy the capabilities that are innovators and small companies and emerging technology kind of developers are out there building for the Department of Defense.

Kathleen Hicks: Rachel, this kind of hits right into the core, I think of what you all did with your Reagan Institute study. Can you talk through what some of those incentives might be that Chris is talking about? Do you think everybody around this table is in agreement that gets the private sector capital energized around issues of national security?

Rachel Hoff: Right, so to start over the last year in 2019, the Reagan Institute convened a Task Force to tackle a lot of these issues that we've been talking about. Came out with a report late last year called the Contest for Innovation. It was a bipartisan task force. Our own Chris Brose served as a member, co-chaired by former Deputy Secretary Bob Work and former Senator Jim Talent and with many other great voices around the table, the Task Force was able to

sort of come up with a set of recommendations to get after some of these challenges.

Rachel Hoff: I think to your question about incentives, I would echo first of all what Chris said about demand signal and showing that companies that want to pursue these dual use technologies and pursue the Pentagon as a customer, we'll find a market there. Then more broadly, I guess aligning those funding incentives to where Chris talked earlier about the \$50,000 contracts and aligning those funding incentives to where the investments are significant enough to draw these companies into the mix. I mean, what we're used to with the traditional defense industrial base and the prime contractors that have been doing this work for decades and I've gotten really good at working with the DOD as a partner, unlike the traditional defense industrial base and these primes that have gotten really good at working with the DOD, these new companies that are part of this broader national security innovation base are never going to be in a situation where the DOD is their primary customer or their largest customer or as is the case with their with the primes, their only customer. We've just got to adjust to that new reality and figure out ways to engage these new companies.

Kathleen Hicks: Chris, one of the perceptions I think that's widely held, I still hear it frankly, on Capitol Hill and elsewhere, is that many folks in tech don't want to work with DOD and this is a byproduct presumably of the Project Maven, which is a Google effort where there was a revolt, if you will, of those who didn't want Google to be doing work with DOD. That was several years ago. Fast forward to today, you work in tech, you work on national security programs. Are there elements of the tech sector that really don't want to work on national security defense issues and how do we handle that?

Chris Brose: Yeah, I think there are definitely elements of the technology community that don't want to work on military problems, for reasons of conscience or some other reason, and that's totally fine. I think a lot of the members of the technology community who get the most press, who signed the letters, who petition the leadership of their companies, I think it's a minority and I think it's a vocal minority. I think it's wrong for Washington to paint Silicon Valley with one brush or look at the technology community as somewhat monolithic in the same way that it's wrong for the technology community to look at Washington and think that it is monolithic. In my experience, there are tons of engineers, tons of developers in the United States who would want to work on national defense. They would want to do it because they believe it's the right thing to do.

Chris Brose: They want to do it because they think that there could be an opportunity for them to be successful to build a successful company. Many of them are drawn to these problems because they're engineers and they're drawn to hard problems. One thing you can say for the Department of Defense is it has some of the coolest and hardest problems around. What we have failed to do, and I think the reason you've seen over many decades, so many of these folks opt out of national defense and go do work in the commercial sector, is

because they have not believed that national defense is going to be a path for them to succeed as an individual, to help build a successful company. Unfortunately, there's a lot of empirical evidence to suggest that that's right. You've seen engineers and investors just go elsewhere.

Chris Brose: I think that happened not by accident but because of incentives that we created, some conscious, some unconscious. It would also suggest that if we created different incentives, those people can be absolutely brought back into the national defense world, that there can be problems that are attractive to them and if we make it worth their while on the form of actually buying the capabilities that they develop and buying them at scale so that they can see a real path to individual success and corporate success, that is absolutely something that you'll see a lot more of. The bottom line answer is most American engineers, I think, are perfectly happy working on national defense. We just have to make it a lot easier for them to do so and be successful at it.

Kathleen Hicks: How would you rate the utility to date of the approach DOD's taken with what I would call a constellation of hubs, outposts, DIU-type (Defense Innovation Unit) organizations, the (U.S. Army's) Futures Command, these efforts to get beyond the beltway and take off the uniform and try to talk to tech outside of traditional bounds? Are those bearing fruit? Is there more we should be doing there?

Chris Brose: I think we should do it. I think it always has the risk of becoming innovation theater. At the same time, I think the problem, if you go back and look, and I think Andrew and your CSIS colleagues have done great work on this here. The problem in recent decades is not necessarily been a failure of new entrance to try to enter the federal market. Many, tens of thousands of these companies have sought to enter the federal market. The problem is after a few years, they're all gone. The challenge is how do you retain them? How do you identify the ones that are truly successful and enable them to scale the contracts they have, the programs they're building, the companies that they have that if you look at it through the eyes of a venture capital firm, a small SIBR (Small Business Innovative Research) phase one contract of \$700,000 is literally discounted to zero.

Chris Brose: They do not look at it as real revenue. They do not look at it as a positive symbol of success for that company because the historical experiences that it's going to be one time, it's going to be a science project and it's never going to lead to anything meaningful. Again, unfortunately, all too often that's been the case. In terms of whether these things are worth doing, the AF (Army Futures) works, the DIUs, yeah, I think they're worth doing. I think it's great for the Department to kind of get beyond its walls and try to bring new people in new companies, international defense work. The far more important challenge is going to be whether they can keep them there and whether they can actually reward the ones that do good work with larger contracts that enable them to become more successful in larger companies.

Kathleen Hicks: Yeah. Andrew, I'd love to get your take on that and then also just to make your life more complicated. Throw in the allied and partner piece because tech is diffusing internationally, so now particularly in places like Europe and some of our key allies in Asia, they are hubs of innovation and potential solutions. How do we bring them in at the same time we're trying to bring US industry in?

Andrew Hunter: Yeah, I there's so much irony in this particular part of this discussion because I think there's so much good intention that goes into all of this and we just can't seem to get out of our way. The SBIR, SBIR system, Small Business Innovative Research system is one of the few places where there is on allocated R&D money that can be had and the process requirements are relatively light. What you see is the Air Force leveraging SBIR to do these pitch days where they get people on contract in a very small, in an hour or less. In many ways you say, "Great, here's this process. It seems to do what we want. It gets nontraditional companies involved in defense acquisition, does it really fast, very low level of administrative burden."

Andrew Hunter: As Chris says, so little of it over the time has actually gotten through that Valley of Death that we've talked about in the first episode. To some extent that Valley of Death needs to be there because if you believe in a fail fast model of innovation, there needs to be failure. There needs to be a fair amount of failure. I think that Valley of Death can be looked at in some ways as the failure point where we figure out what needs to go forward and what doesn't. The problem is I think is there's too much fails and out of the SBIR system, and so not enough gets through the "Valley" to the other side. That's very a very real problem, and one that we've got to figure out. On the allied and partner piece, I think there's a similar dynamic in play. Traditionally, the US just believed that all the best technology was here. Anything we did with allies and partners was just a thing that we did to be nice. This is in some ways, a sort of Trumpian view of the world, right? It's just us doing favors for other people, and there wasn't much in it for us. That is I think, profoundly not true in today's world. Not to say that the US is still a leader and a lot of places because it is, but there is very good stuff out there around the world and very smart people developing technology elsewhere. We actually have a tremendous amount to gain by leveraging technology develops in our allied and partner nations and in their civilian economies that they may not even using for defense purposes, but that we can use for defense purposes. The question is, how do we change our mindset, which has been that the purpose of all our technology controls is to keep as much in the US as possible and allow as little out and as little in as we can to a true exchange situation.

Rachel Hoff: Just to pick up on that, I think one of the more interesting recommendations that came out of our Reagan Institute Task Force is actually kind of picks up on exactly what Andrew's talking about, to create new mechanisms to allow our allies and partners to contribute more to this sort of innovation base that we've been talking about. We work so closely with many of our allies on very sensitive things like intelligence and share a lot of sensitive information

in that realm, but to not offer pathways to coordinate when it comes to innovation is to our own detriment. What made me think of it was, when you sort of referenced like a Trumpian element ...

Rachel Hoff: What made me think of it was when you sort of referenced a Trumpian element here, actually giving our allies and partners ways to contribute more, picks up on what that segment of this Administration has been talking about in terms of our allies and partners need to contribute more, and so the task force came up with this recommendation to create sort of a follow-on to the NTIB (National Technology and Industrial Base), a partnership for a secure innovation base that can actually offer these opportunities for the innovation bases of our allies and partners around the world to coordinate and contribute to our own and collectively.

Kathleen Hicks: Rachel, let me stay with you for a moment, going beyond politics, this Administration and its National Security Strategy, which is from late 2017 talked about having a national security innovation base and your work kind of builds on this. The fact that it was there really helped kind of create a little bit of impetus around these issues of innovation and national security. The Administration hasn't really built on that as a term, if you will, but presumably there are some things underway. I would invite you to comment on that, what you see already underway. But also I just want to pull back to this idea of a national security industrial base is suggestive of industrial policy, which has in the past been a bit of a third-rail issue. Whether we're an unfettered free market to are we controlling ourselves in something like a socialist manner and industrial policy tends to get caught in that. Do you still see that kind of tension or dynamic underway, or do you think that the specter of competition with China has shifted the viewpoint politically away from concern about the federal government getting involved on national security matters and industrial policy?

Rachel Hoff: I think I lean a little bit more toward the latter, that the competition and the nature they're in has changed that conversation a bit. But look, whether you want to lean into the concept of industrial policy, or you've got concerns over it, I think there are lots of reasons to pursue this concept of a national security innovation base and really building out what it would mean to have a DOD and a US government that knows how to leverage these technologies into the service of our national security. There are lots of arguments for how to do it and why to do it, I should say, and I'm sort of a all-are-welcome-here approach on the topic.

Rachel Hoff: I think in terms of what the Administration can do, you're right that this concept of the national security innovation base was born out of the National Security Strategy, National Defense Strategy. What we tried to do with our Task Force was take up the ball and kind of run with it. Say this is a helpful concept as sort of a successor to the traditional defense industrial base, to broaden the aperture and think about all these things we've been talking about over the course of this conversation.

Rachel Hoff: I think the number one thing that they could do, maybe the most interesting recommendation in the task force report, is to create an inter-agency coordination body assigned with getting after this problem. Maybe a national security innovation committee or something that sort of, not a new layer of bureaucracy but an inter-agency coordinating body that owns the problem. We've talked about how it's not exclusively resident in DOD anymore. We've talked about the way that the private sector has shifted in ways that the government is not accustomed to, having acquisition and contract relationships with. In order to get after a holistic approach to this, something like this coordinating committee would really, I think, allow the various representative stakeholders, certainly from the DOD, from commerce, from trade (United States Trade Representative), from OSTP (Office of Science and Technology Policy) to get around a table and, and actually own the problem.

Kathleen Hicks: Chris, what about on Capitol Hill? What is it that you think ought to be the locus of focus for those authorizers and appropriators who are thinking about how they spur innovation inside the national security sector?

Chris Brose: Yeah, the one big thing that I wish Congress would do is also the thing that I'm very skeptical that they will do in the near future, if ever, is give the Department greater flexibility about spending in year of execution money. The Department, or rather the Congress is very eager to see exactly how the Department is going to program all of its dollars well into the out years and that's a totally reasonable thing to want. I am concerned, however, that we simply have not given the Department enough money to use flexibly in the current year of execution. What ends up happening is as the budgets are planned a year to two years in advance, the Department has to program for what it knows then; and as it gets into the year of execution, it's then stuck trying to reprogram small bits of money through very cumbersome processes that just take a long time.

Chris Brose: The one thing that I think could really help is just giving the Department larger amounts of money, still requiring oversight, still requiring reporting as to how they use them, but to really take advantage of opportunities, emerging technologies, new innovations that occurred after they actually built their budget and put it in concrete and sent it to the Congress. I think it would create a lot more ability for the Department to get after buying some of these things at scale, right when they need them.

Kathleen Hicks: How much has the Administration's use of DOD funds to reprogram to the border wall hurt the prospects for that happening?

Chris Brose: Almost completely.

Kathleen Hicks: Andrew, I'll let you kind of speak to either the Hill or the Administration. What are first the blind alleys you suggest they not pursue, maybe just to add a little color to the conversation, and then where would you really like to see some change concretely?

- Andrew Hunter: Well, let me just say amen to what Chris said about financial flexibility. I think that's an absolutely critical component. It was referenced in the conversation I had earlier today, we have reformed and reformed and reformed on the acquisition side, not to say there isn't more work to be done, but we've been working on that for a long time.
- Andrew Hunter: When you look at the rules for how we handle money, those rules have been unchanged essentially for quite a long time. There was an interesting thing of this year's FY21 budget, they created a new budget activity within R&D for a software and Cloud-type applications. I like that approach to that problem, and I'm hopeful there'll be some legislation they propose to go with that to address exactly this concern.
- Andrew Hunter: As far as blind alleys go, I am a little concerned that we can put too much of the priorities within acquisition that that trade off against one another, which is sort of speed, cost and performance. I think it was appropriate that we've put a bigger priority on speed, especially compared to where we were 10 years ago, as we were starting a big budget draw down. But I think there is a real danger at prioritizing one thing, speed, without clear rationale for why that is actually important.
- Andrew Hunter: Why does speed on that particular development process matter? I think when you know why it matters and you've got a compelling case for why it matters, then you can construct ways to get there that work and that also address the other priorities you can't completely ignore. Cost. You can't completely ignore performance. I'm not saying anyone is, but I think there is this tendency to say, "The world is going fast. We must go fast, fast is all that matters." I think that's a road we've traveled before and usually with not great outcomes. That's one concern is that we can get too much tunnel vision on one aspect of the complex sets of priorities that the Department just has to deal with.
- Kathleen Hicks: I'm going to throw this open to anyone who has a good one to nominate. If you're listening to this podcast, if anyone's made it this far and they're not a defense wonk, congratulations, you already are. But if there's a way to talk to the rest of the world about what we're talking about here in terms of military innovation and prospects for change and how the competition with China plays into it, is there a pop culture reference that jumps to your mind that can help translate easily where we are?
- Chris Brose: The first one that came to mind for me was the old Animaniacs show, Pinky and the Brain, where genius and insanity together try to take over the world and they never seem to do it, so they have to come back and go the next episode. But honestly, my day-to-day life at a small non-traditional defense company feels much more like the Bridge of Death from the Monty Python and the Holy Grail, where it shouldn't be that hard to get across, right? It's like, what is your name? What is your quest? What is your favorite color? All too often it feels like, what is the airspeed velocity of an unladen swallow? It

just feels so difficult to get from here to there. I think that's been our problem all along, and I think it still is.

Kathleen Hicks: That's pretty perfect. Chris Brose, Rachel Hoff and Andrew Hunter. Thanks so much for joining me today.

Kathleen Hicks: On behalf of CSIS, I'd like to thank our sponsors, BAE systems, Lockheed Martin, Northrop Grumman, and the Thales Group for contributing to Defense 2020.

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