

Center for Strategic and International Studies

TRANSCRIPT

Event

Assessing the State of the U.S. Space Industrial Base

DATE

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FEATURING

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Clayton Swope: Hi, everybody. Thanks for joining us this morning. My name is Clayton Swope. I'm the deputy director of the Aerospace Security Project at CSIS. And we're here today to talk about the state of the space industrial base, which is the topic of a recently released report. This is actually an annual report released by NewSpace Nexus. We will take questions from the virtual audience. You can ask a question via the link on the event webpage. And before we really get into the discussion today, I want to introduce the experts who have joined us today to chat.

So, first off, let me introduce you to Dr. Diane Howard. She's been involved in space for her whole career, in academia and at both the U.S. federal – (audio break) – for Space Commerce in the U.S. Department of Commerce, and she's also served in the U.S. and Canadian delegations for the U.N. COPUOS, long-term sustainability work, from 2011 to 2019. Currently, Diane is consulting and teaching. And she's actually joining us from a travel she has to Rwanda now. So thank you, Diane, for dialing in from so far away.

The next person joining us is Casey DeRaad. She is the CEO and founder of NewSpace Nexus, a nonprofit established to grow the commercial space industry from New Mexico for the nation. Casey was a 30-year executive of the Air Force Research Laboratory, leading programs in space technology, strategic business development, investment leveraging, technology engagement, and workforce development.

And then, finally, let me introduce Robert Perez-Aleman. He is a senior program manager in the Space Portfolio at the Defense Innovation Unit, DIU, where he has also served – where he also serves as the liaison with the Space Development Agency. His work spans projects involving technical GEOINT, and advanced nuclear fusion concepts, electrospray propulsion, responsive launch and cislunar logistics, deorbit as a service, space ground stations, and hybrid space architectures. And lot of stuff there that seems really interesting for the discussion today. Before joining DIU, Rob served as an assistant professor in the Department of Physics and Nuclear Engineering at West Point.

So thank you, for the three of you, for joining me today to talk about the state of the space industrial base. So I thought maybe just to start out, since we said – I mentioned, Casey, your organization publishes a report on this topic. It was just released. You just had your annual conference. You know, maybe just take us back, Casey. Tell us, why did you write this report? Why are you focusing on the state of the space industrial base? And tell us maybe how long have you been writing it? And just – you know, what's going on in the last year? What are some of the recaps and the takeaways that someone should have from the report this time?

Casey Anglada
DeRaad:

All right. Well, thank you. And I want to thank CSIS for hosting this, and Clayton for being such a great supporter for our SSIB and NewSpace Nexus.

So this is the seventh annual SSIB, State of the Space Industrial Basem, report, named "Sustaining Space Leadership, Economic Strength, and National Security at Speed and Scale." And a lot of our SSIB framework is always about both that economic strength and the national security. And the last few years have really focused more on this speed and scale. And we'll get into that a little bit today.

But the report is – it's built on a structured collaborative framework that we use in our SSIB conference and workshop series to identify critical barriers that impede the industrial base's progress, year over year, with the voice of industry fully represented. It's the only report that is built from the input from hundreds of industry experts who convene annually through a multiday, and really through the multiyear series of these workshops and presentations. And it's designed to codevelop these solutions across industry, government, and academia.

So our NewSpace Nexus, a key part of it is we work with our key partners – you know, DIU is here today. And what the key partners do is work with us to help develop the topics that need discussion in the workshop, which then, again, feeds into the report. And our key partner has been the U.S. Space Force, specifically the COMSO office, Air Force Research Hub, and then, of course, the Defense Innovation Unit has been with us. It informs administration, senior policymakers across executive departments, Congress, venture capital, the investor community, and also just the broader space ecosystem.

So over time these reports have evolved, but the 2025 report, I would say, has built on the previous year's lineage but more focused on alignment, the degree which U.S. policy, regulation, acquisition, infrastructure, workforce all coherently support the long-term objectives in space. And we'll – I think, we'll be talking a little bit more about that alignment through the webinar. So thank you.

Mr. Swope:

Yeah, Casey, so is it a report that says what is good that is going on? Is that a report that says what bad is going on, and has recommendations? Or is it a little bit of both?

Ms. DeRaad:

Well, it's always been about – you know, we first bring up sort of what's the current state, what's the background in these topic areas, and then we go through what are the challenges, and then what are recommendations. So it always – it always balances what are the challenges and then what are the solutions.

Mr. Swope: Yeah. It's a sandwich.

Ms. DeRaad: Right.

Mr. Swope: The good, things that we could do better, and then at the end, hey, it's great. Let's all work together.

Ms. DeRaad: And then, yes, let's do it. Yeah. (Laughs.)

Mr. Swope: Well I know Rob – oh, yeah. Go ahead.

Diane Howard: I want to interject one thing, because I think what's really key here is that it's really a collaboration. So the report is really not the viewpoint or the point of view of any one entity or any one person. But instead, it really reflects an overview, like a landscape view, if you will, of multiple perspectives. And so there's also another piece in there that's the inflection point, so those triggering events that we think can really make a difference. And so over to you.

Mr. Swope: Well, I was able to participate in some of the workshopping last year with you, Diane.

Dr. Howard: Yes. That's correct.

Mr. Swope: And I could tell it was very iterative and wasn't something that you already had in your head where you're going to go with the report. So I thought that was an interesting way to approach it, with so many different voices who certainly – I'm sure it's not unique to the space community – but we don't often agree on some of these issues. So I know that's really hard. And I could tell that you're working to weave those together.

And I know, Rob, you were really involved in that process too last year. What do you think, looking back on the report for 2025? What are some of the trends and the positive things that you saw in the State of the Space Industrial Base? Observations about the industrial base? And then what's really – is it growing? I was about to just say, what's behind its growth. But tell us if it's growing or not first.

Robert Perez-Alemany: OK. All right. So I think one of the – I think the most positive trend that I'm seeing right now in the U.S. space industrial base, right, is we're no longer handling just a few primes building on these exquisite systems for these exquisite missions. I mean, that's still definitely part of it. And we still need it. But it's not the whole story anymore, right? We now have commercial companies building real capability, like, launch propulsion, remote sensing, SAR, space domain awareness. I mean, you name it, right? I can go through the list – maneuver, logistics, resilient communications, yada, yada, yada.

That's a huge deal. What's powering that growth though is a mix of private capital – like the operational demand – and a much more serious understanding that space isn't just, like, a support function anymore. It's part of the kill chain. It's part of deterrence. It's part of the economic security. And it's part of a whole, like, how we operate globally. So I mean, look, look, the best companies I see aren't waiting for the government to write that perfect requirement. No, they're past that point. Like, they're building. They're testing. They're iterating. They're finding ways to create value at both commercial and national security markets.

And actually, that matters. It reduces the cost burden for the government. We don't have to pay every dollar R&E anymore. If we're smart enough to meet industry where it is – (coughs) – sorry. I get excited, right? So, like, another positive trend that I'm actually seeing is that the government is actually getting better at recognizing commercial capability earlier. We're not perfect. I mean, that's the truth. We're not perfect. But we are seeing more mission partners that understand that prototype doesn't need to look like a 20-year program of record on a day one. Sometimes the right move, if it's fly, learns, iterate, and then scale.

The other thing that I want to highlight – and I keep throwing ideas out, right – is that companies are starting to build around operational problems. And that's huge, because it's not just any one of the cool technologies that I can build. That's the difference between a science project and a capability. If a company can tell you how its systems helps with custody, maneuver, going down the list, warning, targeting, logistics, resilience, or even survivability, right, then we can have that serious conversation. And I have to emphasize that part, right? Then we can have that serious conversation.

So I'm optimistic, as you can see. Casey knows me very well. The innovation is there. The companies are there. The capital is there. The war fighter demand is there too. So the hard part now is whether the government can align fast enough to take over that advantage.

Mr. Swope:

Yeah, Rob, I think, you know, one thing that you raised, which is interesting, that you do see a lot of companies. This isn't just for the Pentagon customer. This is also, I think, for NASA. They're using private capital to do a lot of the development. I think the commercial LEO destinations at NASA is a good example where you see a lot of companies doing that.

You know, one thing, just kind of your thoughts on this, at the other end of that, though, kind of the customer side of it, you end up sometimes with companies who have built their entire business model around a government mission set. And they are really looking to the government to be the core anchor customer. How do you navigate that when – and, just in my mind, just

brutally honest here, I think the main part of the space economy that's independent of the government customer is really just satellite communications. And everything else, it's really looking to the government to be that customer. But you're totally right that private investment is powering the innovation. How do you – how do you handle a situation like that, where a company is really kind of basing its business on you, or a peer at another government agency – maybe another country, but still a government customer?

Mr. Perez-Alemany: So I'm going to be totally blunt with you, right?

Mr. Swope: That's what we're here for. We do hot takes at CSIS at best.

Mr. Perez-Alemany: (Laughs.) Yeah. So I want to be totally blunt with you. One of the things that we encourage companies to do at DIU is do not depend on the government to give you the answer. In my previous comments, right, I stated that, like, we are looking also, like, to ensure that not only are you providing for the government, but you're also making a commercial case for it. And the reason that is, is because we want – like, DIU is not only looking out for the government.

DIU is also looking out for the commercial health of those companies, right? Like, we care about you. We care about your success. If you're successful, we are successful. It's a whole partnership situation going on here. So if you're focusing all your area on a government entity, and in – and you're – it's a success or failure based on us, that's definitely a no-go. That's a warning sign for us to say, like, you need to slow down, you need to make a commercial case. We always ask companies, if we say no right now to this company, like, saying, like, hey, we won't accept this proposal, can you still survive without us? And if the answer is yes, that's a good sign that your company is healthy. Because we care about that, right? Like, we care about you succeeding on that front.

Ms. DeRaad: And if I can interject, I know these government entities are really working to figure out the best way to integrate commercial technology. And Colonel Trimailo just talked about this at the our recent SSIB conference, where, you know, that it would be a shame if they met, you know, with all these commercial companies, and at the end of the day the end result was, you know, they changed to fit the government. So they want to – they want to have this commercial innovation that is most valuable when it remains commercially viable. So just as Rob was saying with DIU. And a healthy commercial customer base can reduce government development costs, but you don't want to – we don't want to change who they are, so.

Dr. Howard: If I might jump in here also. And, you know, one of – there's a little blurb in this year's report that actually suggests that maybe including that kind of

market diversification, whether or not a company can stand without government dollars, or to what degree it can, as part of a scoring system, as one of the factors that are looked at when you're – you know, when folks come. And, absolutely, Colonel Tim Trimailo did say, stand up. Don't get sucked in.

So I thought that was really powerful to hear, because, you know, a lot of what we're – what we're seeing is a better culture between industry and the government. And there is much more listening going on now. And it's going on much sooner. And I think that's what you're describing, Rob. It's this increased awareness of what can be done, and then also not waiting to be given permission. Going ahead and developing it. And that's what innovation is. Innovation doesn't ask for, you know, the marching orders. Innovation says, I see a connection. I see a need. I'm filling it.

Mr. Swope: Yeah. And I think that all sounds great. I mean, I would love a space economy that's independent of the government as a customer. But I also don't want to throw out good ideas because the government is the main customer. I'm one who would recognize that sometimes the government has its own unique requirements that innovative companies might be able to fulfill, but they're not going to be able to sell that to somebody else. And if I don't want to turn those people away. That's, you know, my thought there. That you do have a lot of good ideas that only the government would buy. And I'm OK with that. And I don't think that's new this year. That's probably not new to space. I don't think there are many other customers for the tank, but, you know, companies survive making tanks.

I guess-

Dr. Howard: True that. True that. But I will jump in again, one more time –

Mr. Swope: (Laughs.) Please.

Dr. Howard: And that is that, you know, companies don't have to be, you know, committed to one product and one product only, either. So, you know, that is also a company choice. And I'm not suggesting that if you have a great thing that only the government can use, we need it, we want it. That's why we want innovation. But I'm also saying, also, you know, find that balance point, because we want an ecosystem. And that ecosystem is going to require other things as well. Develop your product lines.

Mr. Swope: Yeah. And, I mean, publicly, I would admit I don't know that much about what's going on. But I do feel like maybe the bifurcation between Starlink for commercial civilian customers and maybe Starshield for government customers is an area where you do see a company that had a really cool commercial product that it's trying to separate from a product that it offers

to the government. But there are probably a lot of similarities, if I had to guess, between the systems.

Dr. Howard: Yeah.

Ms. DeRaad: Right, right.

Dr. Howard: Great example. Great example.

Mr. Swope: Laughs.) One thing I was curious, you know, since you've been writing this report for a bit – maybe this question – and, Diane, too, you've been involved too for a while with it. Just it's been seven years since you started publishing this. And I see this too when we publish our space threat report, which started around the same time. I could look back to that original report and say, yeah, this isn't – we write it annually, but that's really the same thing we were talking about seven years ago. What do you see that's persistent, maybe from a challenges or maybe just positive trends too? But I definitely want to know, like, what's been a blocker that we just can't seem to – or a bottleneck, or a barrier, whatever we want to call it – that's really impeding the growth of the industrial base? Is there anything that comes to mind there?

Ms. DeRaad: Well, you know, I'd love to give kind of a little overview of how they've transformed. Where, you know, 2019-2020 emphasized on, you know, what are the challenges and some of the critical solutions, and having space infrastructure thought of as a national critical infrastructure. Then it moved to really accelerating these commercial capabilities. And many of the industry pointed back to the government, you know, you need to – you need to look to us first. And, you know, one of the – one of the terms came out of it that the government needs to, you know, buy first and only build what they – what they must. And which led to, you know, Space Systems Command calls it exploit by build. And I really think that this came from some of these recommendations.

And then later it shifted towards the integration. You know, both DOD and Space Force put out integration strategies, which now – which they – which has changed a lot of – some of the acquisition, and really looking at how to realign, you know, now they're talking more sort of aligned with missions versus programs. And so I think now, like I said, this – now we're talking alignment. How do you align with sort of these mission areas? And then for the government to really open up the aperture of the number of innovators that they're looking to meet their mission. So over to Diane, where she can – she did a great – she was – we were very thankful, she did the main editing of the 2025 report. And she did a really good look back at the different reports, and where some of the recommendations through the years, and what are still pending. And so probably can line up that.

Dr. Howard:

Yeah, absolutely. So one of the things that we introduced this year was a table. And it came out of the session that you were in with us last year, Clayton. And that was, let's look back and see what actions have been recommended, and whether or not anything's even started, or if it's ongoing, or if it's completed. And then we tried to cross reference it. And so it was, you know, predominantly the things that had come from the policy chapters over the years, because that was our working group. But it was so useful, from where we sit, that we decided to continue that.

But there are some things that continue to be there. And, of course, you know, I'm going to start with regulatory stalemates, because of who I am and what I've done. And so, you know, I think that that remains a challenge. And sort of, you know, authority creep and overlapping jurisdictions within the government when it comes to our regulatory framework. And that's something that continues. It's a persistent challenge. I think, that, you know, the funding for things – so the financial markets have been a challenge. But I agree with you, Rob. It has gotten so much better. I mean, we've got a heck of an interesting IPO, like, you know, in the news right now, on the road show. But traditional investment vehicles are, like, really coming into their own for the space sector. You can see that. And that's not the first IPO. So super cool.

You know, I think another thing that's kind of – you know, it's kind of bubbled up, but in different language, over the years. And that is, you know, sort of inconsistency between election cycles, you know, and, you know, budget lines. And that's why everybody wants a POM. So that has been a challenge. How to deal with emerging tech. And interestingly, we kind of touched on AI last year. And you know AI is a big part of this year, so clearly it's something we're thinking about. But like nuclear, we really didn't have a whole lot of nuclear from the working groups, because they took place back, I want to say, in May.

However, after – you know, once we got that executive order in December, wow, we had something to put in there. But this year we had a whole lot more to think about, to talk about. And I'm sure that we will have a lot more to write about. So those are just a few things that have, you know, remained through the years. But you can see some movement. I just wish that we saw more movement with regard to the regulatory stalemate I mentioned.

Mr. Swope:

Diane, just a quick follow up from the nuclear energy side. Like really how hard it is to operate in space, and how – what you need for power, that's the same challenges we've had for a long time. What do you think was behind the executive order? And I don't want to say a change in direction because there were definitely efforts involving nuclear power space that were happening before the current administration, many of which were canceled. And then we had a breakout.

Dr. Howard: We had DRACO.

Mr. Swope: Yeah. So what happened? What do you think is the reason?

Dr. Howard: I think – first of all, I think knowing that our near peers are thinking about doing things with nuclear on the surface of the moon, and do we want to be caught on the back foot when we actually are, you know, further along than them, maybe? We were working on some of the nuclear issues back, you know, a few years ago when Scott Pace was the head of National Space Council. And so we got a good policy, and we got a good space policy directive out of that. And then it kind of – you know, not a lot was happening. DRACO was moving through, and then it got canceled. And that was somewhat shocking.

However, there were those of us that were, you know, kind of following the progress that were not completely satisfied with the fact that it was, like, a really expensive science fair project that didn't have any plan for how to operationalize it. So the reboot right now is far more operational and good. That's great, because there is a lot of know-how. And there's expertise here, private companies that are looking at new and innovative ways to do things. There are new technologies that are far better and safer than they were years ago. So I think that that is – you know, this is another – one more example of where sometimes something kind of goes quiet, but it doesn't die. You know, the timing, the situation changes, the factors change, and then it has an opportunity.

That said, I think that we also have a lot of – people are very, very aware of, you know, sort of the things to be concerned about with regard to developing nuclear. And so, good. Glad those voices have platforms and that they're in the room. And so I think it's a robust discussion, one we need to have. But I think that that was the trigger, if you will.

Ms. DeRaad: If I can interject, I'll tell you, with the current SSIB and, you know, announcements out of OSTP. And I would say the space nuclear is sort of this generational opportunity that it is – it is really big. It was a big part of the discussion this year. And I think we're going to see a lot of great progress in that area.

Mr. Perez-Alemany: So, listen, I'm going to talk from immediate experience. I am the Advanced Nuclear Power and Propulsion Program Manager for DIU when it comes to space. Currently one of the challenges that we are seeing is the fact that before the signing of this executive order we presented to different factions in the government – Space Force, Air Force, AFRL, NRO, all those stuff, right? And every time that we discuss nuclear power, specifically nuclear fusion, it's always about, like, OK, can you provide Q greater than one? Meaning, like, is

the internet energy greater than the – net energy greater than what you input into the system. Every time we said, it's not there yet, we need the funding for it. They were like, OK, well, we can't back you with that. We can't fund you with that, because you're not there yet.

But that is the – like, the black hole of nuclear power, right? It's, like, you cannot – if you cannot provide X, Y, and Z, then we're not going to invest in it. But we need that funding anyway to get to X, Y, and Z. So now with this executive order, like, we are seeing, like, a better interest. But that specifically was done not only for the competition, right, to compete against the adversary, but it was also done because we wanted to get out of that black hole that we created for ourselves.

Mr. Swope: I think that's really interesting. Yeah, you see a lot of cases like that, at least in my mind, where it is – like it or not, there's not really a commercial reason yet to fund something. That startup is not going to take it when it's – you need the basic research and development in the science still. I mean, I think back to things like how important is spectrum today in wireless technology? Well, you know, you have Maxwell's equations, which were proven by Hertz, and then eventually Marconi comes around and makes a radio that's very commercially successful. But that took, like, sixty or seventy years to get to that point.

And only then really was there kind of that flywheel effect where there was customers and interest in buying it. So this is the case to me where there is, you know, like it or not, a government role there in funding that effort to really get it to that point where – it's a huge capability that the government wants. The government wants it where it's ready and it can operate operationalize it for, you know, a lunar base, for example. But to get there it just kind of has to help out a little more, maybe, than a technology that's more mature. I think this is a super good example of that.

Dr. Howard: Absolutely.

Mr. Perez-Alemany: I'm going to be blunt with you. Like, it's not that the government wants it. And credit to the administration, the administration wants it. And I think the government doesn't understand what it has. And that's the unfortunate part. And we, as the people in front – like, that are here, we have to educate and inform of the need for this product, and also why is it important for us to invest on these specific – these specific bottlenecks that nuclear power has, that we just can't get past.

Mr. Swope: Mmm hmm.

Dr. Howard: If I might jump in and say, I think that that's one of the roles of government, personally, is to get things over that hump, and invest in, you know, the R&D

that supports us as a whole, not just one specific mission set. So I agree with you. And, unfortunately, it doesn't always work right away. But I'm so happy that DIU is there to, you know, kind of, like, push things over the hump. So thank you.

Ms. DeRaad: Yes. I'm happy – I know, Rob, you participated as a generalist for DIU. I'm happy to find out that you have this expertise area, as we have a new initiative with NewSpace, as how to catalyze that space nuclear industry. So I'll talk to you later about it.

Mr. Perez-Aleman: I have to be thankful to West Point, because I'm an aerospace and astronomical engineer by trade. And West Point, and when it comes to physics, it was all the nuclear power stuff. So I learned all my stuff about radiation, nuclear power with them. And I've been able to translate it here.

Dr. Howard: Right place, right time.

Mr. Swope: Well, I think –

Ms. DeRaad: A topic for another webinar later, Clayton.

Mr. Swope: I would love that. This is a very important topic. I'm glad we're emphasizing it again, and this administration is prioritizing this. So just – yeah, I think one thing to think about when we're talking about how the government can help get these technologies over the hump, the government as a customer, in some cases, there is a – this is not just space, but broad talk of the importance of acquisition reform at the Pentagon. I just want to get, you know, anybody's thoughts on this. I was definitely thinking Rob, but not to put you on the spot. But how does acquisition reform that's happening right now, how does that play into what is happening in the space industrial base? And what opportunities, or even challenges, are there with that kind of reform?

Mr. Perez-Aleman: So when it comes to, like, that commercial – those changes that are happening right now, I will say that it – I would say that it allows us to communicate more throughout the government how innovation is done. So at DIU and other smaller organizations, we had our own OTA process, other transactional agreement process, and we were able to provide – or, expedite prototypes as fast as possible. The way that we diversify our systems now allow us to better communicate throughout the government how exactly this is done, because we are – what we're seeing right now is – and this is something, like – this is something that is actually kind of, like, killing the tempo, right?

It's like we have – we have OTAs, we have CSOs, we have rapid prototype pathways, and all that stuff. But the problem is that those tools are often

treated like exceptions instead of the normal operating procedure. So, you know, the issue is that, like, acquisition, budgeting, like I'm talking to security, tests, all that stuff, it often moves, like, on different clocks. A company might be able to build in twelve months, but the government's funding cycle works – takes, like, two years. Or the prototype works, but there's no transitional owner. Or the mission partner wants it, but there's no color of money. Or everyone agrees it's promising, but we spent a year figuring out how it – like, it owns the requirements, right?

So those are issues that we're seeing right now. And that actually kills the space momentum. So what this reform, what we're looking at right now, is that it aligns the team around an operational problem from the beginning. So we have buyer, user, tester, security office, contracting office, transition partner, budget owner, all that stuff, early in the room. Not after the demo. Not after the company burns, like, two years of runway early. So we can take parts of the commercial world, like, in portfolio discipline. So not every prototype should transition. That's fine. But the ones that work need your path to scale. And that's what this innovation change is going on in the Pentagon. We can't celebrate demos and then abandon the companies that perform. That sends the wrong signal to the industry.

Ms. DeRaad: I agree. That –

Dr. Howard: Actually, you know, you mentioned alignment, Casey, as being one of the things we identified as –

Ms. DeRaad: This is it.

Dr. Howard: This is it. That's exactly – the timelines, definitely, for sure. Some of the understanding of when you involve industry with all the right people in the room early, not later, those were the primary alignment issues that we were talking about.

Ms. DeRaad: Right. And as, you know, for NewSpace, we have sort of this innovation pipeline. And what we found, you know, we're trying to help these companies get to those government customers, or investors, or other primes, or – and what we found is on the government side, you know, we would talk to them, like, hey let us line them up. And they would say, if you can help us with each other, because all the government offices are having trouble with this.

And what Rob just explained is having this whole sort of end-to-end pipeline of when you plug in these innovations, and how it goes to the next step, and the prototype doesn't just die on the vine. So it's all about, I think, where the acquisition changes have been great, but the execution takes this alignment and more of this mission focus and bigger picture, and having a good end-to-end pipeline or path for these companies, and knowing when to plug in and

not to spend all their money before they get to this. And also just the government giving better demand signals on what these mission and operational needs are so that the companies can know where to innovate.

Mr. Perez-Alemany: Exactly. So my –

Dr. Howard: Something that –

Mr. Perez-Alemany: My view is very clear.

Dr. Howard: Go ahead.

Mr. Perez-Alemany: Like, is that speed without transition is just theater, right? And you told me to be blunt, so I'm just being straight with you. Speed without transition is theater. And transition without speed is completely irrelevant. What we need, and what these changes are – the reason why we are doing this – is because we actually need both, right?

Dr. Howard: Well, so –

Ms. DeRaad: For some – (inaudible) – Kelly Hammett – I'm going to say it came from Kelly Hammett – but, yes, speed without direction is – and so we're saying that we need velocity. You know, we need that vector more so than just the speed.

Dr. Howard: I actually told that to somebody here in Rwanda yesterday, while I was, you know, talking space. But, you know, I think one of the things that's really remarkable right now is not only do we have acquisition reform from, you know, the different vehicles that are available, and some of these timeline questions. But it's also, like, a complete reorganization of structurally of how acquisitions are going to be going on. And that was laid out for us. I'm not an acquisition SME, but I can tell you the portfolio is incredibly interesting. That it kind of has this kind of capability and expertise that goes pretty vertical and pretty deep. And so there's a lot of integration there. And I think it's very interesting, because we see some legislation to push things through, we see some new vehicles and new authorities to push things through. But now we also see a structural change to support all of that.

Mr. Swope: Yeah. I think, yeah, having the ability to bring it from that idea to scale, that really is it. And then the integration, and I think the sustainment, and the maintenance that over time too is just kind of that critical piece. Maybe we haven't quite got to that tail yet with some of these ideas yet, because we haven't gotten them that far. But that does seem like kind of the whole package of what we should be thinking about.

And to me, too, though, I just – yeah, I don't want to beat a dead horse here, but in a lot of cases, these ideas, we're worried about them going away if we

don't transition that chasm. We're worried about them going away, because, in fact, they actually don't have customers outside of the government, or DOD. And that the idea that we'll lose out on that because that company went away, or they couldn't develop it, we have that idea because they just don't have non-government customers. And again, I don't think that's a bad thing, necessarily. I'm just recognizing reality, that that's just kind of the landscape that we're faced with right now in the space economy that we have. It's not the one that we want, I agree. We want the one where it's many, many, many customers. I'm just dealing with the realities today. And I think this just reflects that. That's just my two cents.

You know, I guess, does that mean – maybe, Rob, this is a question for you. That are we – the ideal of unlocking the power of these companies and their new ideas for national security, for defense, are we doing that now? Are we doing it – do we have a B-plus? Are we an A-plus? Are the things that, you know, maybe we're not quite doing well to unlock the full power of that for U.S. space power. And just, you know, I – actually I shouldn't – I'm not asking you to grade the government. But just, are we there yet? Or we still really – we still have a long way to go?

Mr. Perez-
Alemany:

All right. So one is, again, no, we're not fully there yet. We're definitely getting better, but we're not there yet. The frustrating part is that there's a lot of innovation we need that already exists, or close enough that we should be moving faster. Commercial companies are building capabilities that can help with a lot of the stuff that we are requiring – tactical ISR, resilient communications, you name it. The orbit, as a service, is a huge one for me right now. I'm working on that one. These aren't abstract ideas. These are real capabilities.

The problem that I'm seeing is that government still tends to admire innovation longer than it adopts innovation. We'll take the meeting. We'll ask for the white paper. We'll ask for the demo. We'll ask for another demo. And then the company just gets stuck in the valley between interesting, interesting, and funded. That valley is where a lot of the good companies die, unfortunately. Part of the issue is that we confuse technical risk with institutional risk, right? So technical risk is normal, right? A startup should have technical risks, that's why we prototype. Institutional risk is where we can't decide who owns the requirement, who pays for the next phase, who accepts the data, who handles the accreditation, or even who handles transition of the capability if it works.

That's the risk we control. And that's where we have to improve. The national security community also needs to get more comfortable buying outcomes, services, and data, instead of always defaulting to that owning the entire system. And I see that a lot. I fight with the Space Development Agency all the time. In some cases, government ownership does make sense. In other

cases, commercial service models are faster. I mean, I'm talking cheaper, more resilient, you know? We should be honest enough to know the difference. And the way I see it, commercial innovation isn't a substitute for national security space. Not at all. It's a force multiplier. But we only unlock it – let me think what I'm going to say – we only unlock it if we connect it to real missions, real money, real transition partners, and, especially, real timelines.

Ms. DeRaad: Agree.

Dr. Howard: What he said.

Mr. Swope: Yeah. Hear, hear. Make a lot of noise in the British Parliament when someone says something that you agree with. Noise is being made.

I guess, as we have, like, 20 minutes left in our discussion, I do have one question from the audience, which we'll get to in a second here. But I just want to set up the last part of this chat. And just when we look at the recommendations from your report this year, if we just bin them, maybe, short, medium, long term, I just want to know, like, what are the – and I've kind of – your thoughts, each of you. And you could divide this as you want. I had some thoughts for how we could split this up, but what are the highest priority recommendations that, if someone's watching this now, you want them to know? If there's someone who's important watching this event, maybe – I mean, Diane, can I start with you?

Dr. Howard: You can start with me. And I'm going to say, if you want to read the highest priority recommendations in the report go to the executive summary, because we lay them out for you. So I'm going to tell you what those say. And then I'm going to invite my colleagues to, like, jump in and add some more.

But we in the report identified clarifying the mission authorization and export control rules, and export control rules writ large because that didn't get finished, but certainly mission authorization for novel activities. That's one. Commit to coherent architectures for SML and SATCOM. Reduce single-vendor dependence. Modernize space infrastructure and environmental processes, which also are outlined in another executive order. And invest in sustained regionally grounded workforce systems. And I know Casey probably has some remarks to make on that. So those are what's identified in the report. And as the fearless editor, I will put those out as the starting shot.

Mr. Swope: Well, Diane, let me just follow up on maybe in-space service union manufacturing, that specific function.

That's the question we have from the audience, from Mathis Shinninck from Quest Space Capital. His question basically boils down to, are they – are they

relevant today? And how is that changing when we're talking about in-space services? Is the landscape improving? How does that fit into kind of where we want things to go? And then really, what's the reality today?

Dr. Howard: Well, we're not there yet. That's for sure. I mean, there have been – there's some money that's been spent. Personally, I see SML as being a piece of ISAM, writ large, and a piece that maybe has more immediate relevance to the national security community. You start where you are. We sit where – we stand where we sit. But that said, I think that we're still getting mixed messages. We still see inconsistency, again, between – not even election cycles, but year to year. And that's just another nightmare. And I think it's unfortunate, because I think there's a lot of – when we talk about building something that's not just, you know, the national security uses of the state of the space industrial base, but all else. I mean, certainly civil.

You talked about NASA and how NASA is using the industrial base more and better. But when it comes to ISAM, I don't think we're anywhere close to being where we – where we need to be and where we want to be. And I think that's a great example of where there's goodness that would come. It's goodness across the board. It's not just goodness for the national security community, but you got something to start with. Start with refueling, maneuver without regret. But this is a place where – don't let that institutional risk stop us from just somebody get off the gate and start it. Or start it in a way – don't fall victim to the DRACO trap. Have your operational plan, but let's get the government behind it, and in a consistent way that goes forward for years, not a year.

Mr. Swope: And I feel like I need a – I need an aide, or someone here that is helping me, or the AI doing fact checking before I say this. But I think the budget, so the Pentagon budget this year for whatever that – where there is a program element for, I think – I don't know if it's called ISAM, or SAML, or whatever it's called.

Dr. Howard: I think there is. I think it's SAML. I think it's SAML.

Mr. Swope: I think it's a big goose egg. I think it's a big goose egg this year.

Dr. Howard: Yeah.

Mr. Perez-Aleman: Listen, from my experience, I am a big proponent of ISAM. I believe that that's the future of subsystems. But I also think that we've been – we've been looking at this the wrong way. And I want to emphasize this. Most of the time we see the next shiny thing, and we focus so much on that, that we forget A, B, C, and D. And this is what I mean. I said it's fantastic, but we got to get there first, right? And a lot of companies just focus on that and they forget that what we still need, the manufacturing here in on Earth, we need the

satellite manufacturing here on Earth, which is extensive, right. We need to broaden, like, our remote sensing. We also need to broaden, like, our constellations, our broadband constellations, and space logistics in general.

At the same time, this is where I'm coming from, it takes, like, freaking two or three years to get a satellite up into space. It's, like, it's expensive still. Like, we don't have enough launch vehicles. We have SpaceX and Blue Origin. You know, you saw what happened to them. It's challenging. These are hard things. We have at most four or five ports or spaceports in the United States where we can launch something. Like, we need more. We need partnerships. We need, we need to launch more vehicles up in space, because that's the way that we're able to do – actually achieve ISAM.

At the same time, ISAM is good, but we forget one crucial and extremely difficult thing – rendezvous proximity operations. That is extremely challenging. The software, the dedication, the LIDAR systems, all those things need to improve in order for us to get there. It's, like, and a lot of companies they look all the way, like, oh, we're going to – we're going to do the sexy – we're going to mine this asteroid. I'm like, OK. That's fantastic. But at the same – at the same time, we need to think about, like, how exactly are we going to solve these other issues that are in between the mining of the asteroid and getting out of the Earth orbit, right? So those are the challenges that I see.

Dr. Howard: But I think really, though, you can kind of use some of the same thinking that you were explaining to us about nuclear, and how you see that there is – you do it also because you know that it's something that we need, something that ultimately will be good for the long term vision. And so I get what you're saying, that we don't need to be thinking about resource extraction somewhere. But there – that's why, I said we stand where we sit. At least start with something where there is a more immediate need. And there are people – there are companies that are technically capable of doing a great lot of that mission.

Mr. Swope: And I fact-checked myself. It's 10 million (dollars) for the '27 budget, and the RDT&E lines. Sorry about that.

Dr. Howard: Oh, gee. Woo.

Mr. Swope: That's 10 million.

Dr. Howard: Eh.

Ms. DeRaad: Ten million (dollars)?

Mr. Swope: Yeah. I don't want to say that's change because that's offensive, but it's not much in the grand scheme of the Space Force budget.

Ms. DeRaad: Drawer dust, right?

Mr. Swope: I guess, you know, other areas that I know I wanted to hear from you all about that, when we talk about recommendations and looking forward, I mean, one thing, Casey, we've talked a lot about workforce issues. What's your thoughts here? What's a big takeaway from the report?

Ms. DeRaad: Right. Some of the – you know, basically workforce was identified as a binding constraint. And the talent across engineering, trades, operations, and the new data and AI roles, are not keeping pace with the demand. And so a few of the recommendations were, you know, that we need to be developing and professionalize a space logistics corps similar to other domains. And we need to scale these workforce pipelines and really work on expanding paid – like, these work-based learning opportunities. These are near-term recommendations. You know, expand the internships, pre-apprenticeships. But tied to these mission critical roles, so the engineering, trades, operations, data, AI. And also, sort of more of the midterm. I think keep building these regional consortia and these networks that work together and have some consistency on how – you know, how we pull some of these – you know, identify these shared skill standards. Industry needs to be involved in understanding, you know, what is needed.

A lot of – what I always say, a lot of the workforce efforts are these pockets of good. You know, great programs, great outreach. But it's not tied to, you know, a consistent pathway. One thing NewSpace has done for the last couple years is Pathways to the Stars, where it's meant to not go reinvent all these different programs, but really look at what's there, get industry involved from the beginning, and identifying those skillsets needed, and then really work to make sure these – you know, these young students go through the pathway and stay on the pathway all the way to the career point. But it can't be done alone. It's a big issue. And that's where building these, you know, partner consortia that we can all work together and try and pull some, you know, consistent standards and skillsets that we're trying to build, and work together. So it's solving world peace, but, you know, we got to start somewhere.

Mr. Swope: So one thing I just realized that I have – you have to say it at every single podcast when we talk about space these days – but we haven't talked about China yet. So I was wondering your thoughts on how does what we're talking about in the report and the U.S. space industrial base, how does China fit into this? Kind of open that up to anybody's thoughts here. We've got about eight to nine minutes left.

Mr. Perez-Alemany: OK.

Dr. Howard: I can tell – I can tell you that the launch section – real quick, the launch section, used that as it's, like, *raison d'être* was, what's China doing? So I can say that that was really a concern to them. Over to you, Rob.

Mr. Perez-Alemany: So, I mean, China's commercial, like, space sector is different from ours. Like, we use the term "commercial," but in China it's the line between commercial, civil, military, like, it's actually very much blurred. That means their commercial ventures can support state objectives very directly, especially in launch, satellite manufacturing, you know, you name it, remote sensing, broadband constellations, lunar infrastructure, space logistics. The most direct impact on U.S. industry will be in scale and price pressure. If China can mass produce satellites, subsidize launch, build domestic supply chains, and offer space services internationally at lower cost, they're not just competing for technology leadership. They're competing actually to become the default provider for countries that need space capability, but don't want to wait on the U.S. system.

So that actually matters a lot to us. (Coughs.) Give me a sec. Sorry. That actually matters a lot to us because once a country buys the satellite, the ground system, the data pipeline, the launch service, and then financial model from China, that becomes the strategic influence. It's not just commerce, it's architecture, and architecture that creates that dependency. The areas I watch closely are remote sensing, SATCOM, positioning and timing alternatives, launch – that's a big one – and lunar – or cislunar infrastructure. Those are the places where commercial-looking systems can directly have a military value.

The U.S. response – and I'm – let me be clear, the U.S. response shouldn't be to copy China's model. Our advantage, I'm very proud of this, is that we have real private capital. We have real entrepreneurial talent, real competition, a real allied demand. We should use that. And we are using that. But we need to move faster, reduce that friction for allied and partner sales, and make the U.S. the easiest country in the world to build, test, launch, operate, and export responsible space capability. We also need to stop treating commercial space as something separate from national security space. China doesn't make that mistake, and we shouldn't either. Over to you.

Mr. Swope: I mean, I would just add just, I think, maybe, you know, in the lexicon, the way that we speak, there is a – there is a huge difference between how China manages its commercial space enterprise. But I just want to point out, companies in the U.S., they really are dependent on the U.S. government as a customer, outside of SATCOM, to the extent that the U.S. government says, please don't share imagery of the Middle East to nonprofits and journalists, and the U.S. company just does that. So I know on, you know, the lexicon that

we used to talk about that is different, but I just do want to point out the central role the government plays and the development of the U.S. space industry. And a lot of it just comes down to having the government as a customer.

So I think we should recognize that that is – the government has that central role. The second thing – yeah, I think I don't think this is counter to anything you're saying, Rob – but the second thing, just pointing out, that when we think about China selling to other countries, I still think the U.S. has the advantage. People want to buy stuff from the U.S. They don't trust China. I don't think you're going to see Europe, Australia, Japan, certainly not the United States. We're not going to be buying satellites that were launched on Chinese vehicles. We're not going to be buying broadband for enterprise or government users from GuoWang. So I just wonder, you know, are they going to be self-sustaining, funding-wise, or drain on Beijing's coffers? Which I think they will be. And I don't know how much Beijing is ultimately going to have to spend to make that work.

Mr. Perez-Alemany:

Those are good assumptions. But I'm basing it on the fact that, like, we want to risk reduce, right? Like, yes. You're right. There are countries that don't trust China. But that doesn't mean that we cannot do better, right? We cannot just depend on those assumptions. We have to do better for ourselves and make this the easiest country for accessibility, for, like, transitioning, for working with industry. Like a synergistic and symbiotic relationship between industry and government.

Mr. Swope:

Yeah. Yeah, I agree. And I think – I know we talked about Starshield a little earlier – but just news that Starshield's maybe being sold or used by New Zealand or the U.K., I think that's great. You know, that is great for allied cooperation. That's great for U.S. companies and integration. I think this is – that's a good case, if that's true. If those, you know, the reporting is true, of where this is where the U.S. strength really shines. That we do have something that these allies and partners want to buy. And not just want to buy for commercial use. They want to buy it for their government. So I think that is – that's the type of strength that I know we bring to the table. And that's really based on trust too, in addition to really good products and services. And I'll shut up.

Dr. Howard:

So thank you for helping me – thank you for making the argument for why we need our export control modernization to be completed. Thank you so much. Because, again, that is a sticking point. And it has been consistently for a long time.

Ms. DeRaad:

Agree.

Mr. Swope: Well, hey, I think we're almost done, but what I want to – here's what I kind of wanted to end. Just this is, I think, really good, and this is Chantal, who's on our team. She was – she read the report. She said one thing. I liked how she says this. She said in the outline that she prepared for us that the report talks about the failure to act won't preserve the status quo. And that in five years when we look back, what is the proof to you that we seized the moment, or that we let it run by, that we let it pass us? What proof do you want to see, if you look back from five years into the future, to know that people listened? So I quickly maybe go around, a lightning round. And I don't even – you don't need to answer in 30 seconds, but just I would love to get everyone's perspective on that. Looking back from five years into the future, how do you know that you succeeded?

Dr. Howard: I'll start. OK, you go. Go.

Ms. DeRaad: No, you go.

Hs. Howard: OK. I would like to see some stability. I would – I think five years from now if things are more stable, and we have renewed international cooperation and leadership, and more equitable partnerships internationally to counterbalance volatility, I'll feel that we've made a great deal of progress. And I think we do that through strength, for sure. But I definitely think that those would be three indicators that we had made some progress from today.

Ms. DeRaad: Right. All I was going to say is that I want to see this alignment. And where a lot of the points Rob made, where our – you know, we do these things, we change these expert controls, we make it easier for commercial and our allies to be able to integrate with our systems. And that, you know, we move fast, or we move at the right velocity in getting these things done.

Mr. Swope: Rob, your thoughts?

Mr. Perez-Aleman: So, I have a couple, right? So the first one is, like I mentioned it before, but commercial capabilities, like, actually being integrated into the national security architectures. Again, like, I'm talking about not just demo, not just study, but actually being used. ISR, SAR, propulsion, maneuver, space logistics, like, those are innovative things that we're already kind of using, but I wanted to see it more involved. Secondly, I want to see, like, the transition move faster. So a successful prototype shouldn't need to survive two or more – two more years of confusion after it works. If a company proves itself, they should be – there should be an actual pathway to scale, right? If we're still celebrating demos without buying the capability afterwards, then we didn't listen.

Then, third, I want to see the acquisition and budgeting aligned to operational tempo. Commercial companies, and you guys know this, can't

wait for the government to admire the problem for three years. If we shorten that timeline between identifying the need and selecting the company, then that's real progress. And finally, and this is, to me, I'm a war fighter too, I want to see the war fighter asking for these capabilities by name, because they've used them and they trust them. That's a real test. By name. Not whether a technology brief looked impressive, because we have those a lot, but whether an operator says, I need that capability for this mission. So for me, that proof is simple. Three years from now, commercial space capabilities are funded, fielded, integrated, and trusted at operational speed, then people listen. And if we're talking about the same barriers that we're talking about now, then they didn't.

Dr. Howard: Not so much.

Ms. DeRaad: Right. Agree.

Mr. Swope: Yeah, agreed. This is great. I thought this was a great discussion. Thank you everyone for joining. I should have mentioned, too, none of us, I don't think – Rob, are you in the D.C. area? Or are you also somewhere else in the country?

Mr. Perez-Alemany: I am in the D.C. area.

Mr. Swope: OK, well, it's just us then. Me and you are in the D.C. area, and then Casey and – Diane definitely is not right now.

Dr. Howard: I definitely not, no.

Mr. Swope: So thank you all for making time where you are to have this discussion with us today. Thank you all. And let's see. We'll talk next year –

Ms. DeRaad: I have one –

Mr. Swope: Oh, sure.

Ms. DeRaad: One thing. Save the date, May 24th through 27 May, come join me in New Mexico for SSIB 2027.

Mr. Swope: Nice place to go. I've only been there for your conference. It's a very, very dry and warm, which is refreshing sometimes.

Ms. DeRaad: And sunny, and blue skies.

Mr. Swope: And sunny. Yeah, and hot air balloons, I think, too, out there.

Dr. Howard: And hot air balloons, yes.

Mr. Swope: You actually stole it from my hometown, not to just – the national hot air balloon champion when I was growing up was in Middletown, Ohio, and then it went to New Mexico and never left.

Ms. DeRaad: Well, I have to say, I was trying to move SSIB to the end of September/early October, so that it would line up with the International Balloon Fiesta.

Mr. Swope: Oh, wow, OK.

Ms. DeRaad: And then people could stay or come to that, and then go. But we finally – we nixed the idea because it's also the fiscal year change, which makes it very challenging to travel at that time.

Mr. Swope: Oh, yeah. Yeah, yeah.

Ms. DeRaad: So sad to say. But you still could come visit us.

Mr. Swope: Yeah, I would love to. Yeah, thank you. OK, everyone, thank you. Have a good weekend. Thank you all to our listeners and watchers.

Dr. Howard: Thank you. You also.

Ms. DeRaad: Thank you so much.

Mr. Swope: Bye.

Mr. Perez-Alemany: Take care.

Dr. Howard: Thanks.

(END.)