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Sean Maday:

All right everyone, good afternoon. We're coming to the tail end of the conference and is the tradition, we've saved the best for last. Really excited to moderate this panel today on space innovation to the tactical edge. We tend to talk about the concepts of space, and cyber, and tactical edge as abstract, concepts on an OV one slide, a PowerPoint slide somewhere perhaps. But in the last seven months, we've seen space innovation to the tactical edge change the battlefield in Ukraine. The day before the war kicked off in Ukraine, a malware attack, a wiper malware attack originated that specifically targeted the commercial satellite modems that the Ukrainians depended on for their command and control. It's easy to see how a few Russian planners at a table in Moscow may have thought this would leave their adversary stranded at the tactical edge.

But what incurred was the best of American ingenuity and modern human innovation. We saw very quickly Starlink terminals deployed to Ukraine. Now over 20,000 Starlink terminals on the ground in Ukraine. When the Russians again tried to change the dynamic and began tactically jamming this capability, a small team of software engineers in California wrote a few lines of code that again outmaneuvered their adversary.

So at no time in modern history has space innovation to tech ledge meant as much as it does today. And I'm really excited to carry the conversation with these amazing panelists. General Burt to my left is the special assistant to the Vice Chief of Space Operations. Bucky Butow is the Director of the Space Portfolio at the Defense Innovation Unit. Chris Kemp is the Founder, Chairman and CEO of Astra and Marc Bell is the CEO of Terran Orbital. So before we dive into the meat of the conversation, I would like to give each of the panels just a couple minutes to introduce themselves beyond just the title I shared with you and to talk to you a little bit about how they're thinking of this concept, Space Innovation to the Tactical Edge.

So General Burt, please.

Maj. Gen. DeAnna Burt:

No, thanks Sean. It's great to be here today to talk about what our Airmen and Guardians do at the tactical edge and innovation. So I'm really here today, not as a special assistant to talk to you, but in the job I jealously gave up to General Doug Schiess, as the Combined Force Space Component Command Commander and the Vice Commander at headquarters Spock. Our Airmen and Guardians at the tactical edge are doing both material and non-material innovations every day. You've heard on the stage all week, it's about the pacing threat in China. We as war fighters have to fight with the hand. We have been dealt for fight tonight. So how do we innovate with everything that we have? And we've been building super coders over the last few years. You heard General Schiess talk about that in his panel yesterday and Headquarters Spock. And what we've been doing is having those folks down at the tactical ledge trying to work software, innovations as we see jammers as Sean mentioned in Ukraine or in other places.

How would we respond to that on our own weapons systems? Nonmaterial as well, how do we exercise and do tactics, techniques and procedures as you've heard general Bratton discuss with the sky series of exercises that Starcom is doing? How do we improve our tactics, and techniques, and war fighting? And then the material solutions? How are we working to quickly develop software to change our weapon systems and the hardware itself to survive as we move forward for the future? So innovation top to bottom that American ingenuity is what it's going to take for us to defeat our potential adversaries and we need everybody in this room engaged both commercial, our coalition partners as well as all of our

long term military industrial base. So it's an honor to be here today with this panel and I appreciate it Sean, for the time.

Sean Maday:

Thank you ma'am. Bucky.

Steven J. Butow:

So earlier today Gerald Dickinson talked about the number of objects in earth orbit and it was very staggering number, and something like 47,000 objects. But more importantly is that the greatest growing number of objects is not space debris, it's commercial systems for remote sensing, for communications for other applications. By the end of this decade, that number will increase significantly more by a factor of at least three. How do we leverage all that capability so that we can fight the fight today with the capabilities that we have access to? The Defense Innovation Unit was started in 2015 by then, Secretary of Defense, Ash Carter with the idea of accelerating the adoption of commercial technology. And we do things a little bit differently. We don't go to companies with requirements. What we go to companies with is a problem statement. And we say, "Tell us how your commercial solution can solve this problem or other relevant problems."

And then we contract around that for prototyping. So the goal is to work with companies that are already doing something in the commercial context, they have a nexus to the commercial Marketplace, and then provide them with an opportunity to demonstrate for national security and defense, how their technology can help us solve tough problems and then we can help them out with transitioning through a DOD partner. So we're not an acquisition agency. But I think this is, the Ukraine conflict is a great example of, as Sean mentioned, of the impact commercial capabilities have at the tactical edge can help us achieve strategic outcomes. And I'll come back to that in a little bit after the-

Sean Maday:

We'll dig into that in just a minute. But Chris, please.

Chris Kemp:

Chris Kemp. Probably one of the newest space companies. We were in a garage in San Francisco in 2017. In 2020, we bid through the DARPA launch Challenge to be one of the companies to deploy a launch system and conduct an orbital launch and then do it again in 30 days. We were the only remaining company to bring hardware out of the field. Last year we conducted four orbital launches. We had two successes, delivered 23 satellites into operational orbits that are operating today.

We have a launch system that we deployed out at Cape Canaveral in six days with five people. And we're now able to operate this system with increasing levels of efficiency. In San Francisco we have a rocket factory that will produce one orbital class rocket per week starting next year. And this will allow us to provide the lowest cost launch to the edge. And what we realize is to serve at the tactical edge, you have to put your infrastructure at the edge, which means above the theater where it's needed. And with all of these incredible new capabilities being developed by the commercial sector, being able to deploy these sensors and these new communications assets above the theater rapidly, quickly, and responsibly is a really key piece of the equation. So we're really excited to be here and be the newest space company to be delivering these assets into orbit.

Sean Maday:

Well thanks, Chris. From one of the newest space companies to a space company that spawned an entire small set market. Marc, please tell us a little about your-

Marc Bell:

Thank you for having me. So Terran Orbital, over a decade ago invented something called the Cubesat. And so you could either thank us or blame us for this whole industry that came up here. And we started with cubes, we did it as open source. We now build satellites up to 800 kilograms and we build them predominantly for the DOD in the IC community. A lot of people here today are our customers or their organizations are our customers and we thank you for that. And we solve problems. So you come to us with a problem, we give you a solution that we can solve from space where you build buses, but we're payload agnostic. So we build everything from synthetic op to radar, to electro optical to infrared, to internet of things, 5G. So we're payload agnostic, but our job is to help integrate that. We help integrate them into rockets.

We build now about a satellite a week and we're moving to go to about three satellites a week coming next year and continuing to speed up production as we bring more facilities online. And we are here, we look, we have our own ground stations, we have our own mission operation centers. So we give you a complete solution to when you want it or we just hand the satellites off to the customer and let them do whatever the mission is for that satellite. But it's really all about protecting the war fighter at the end of the day. It's helping to provide data that's tactically relevant in real time to the war fighter on the ground to save lives and protect American soldiers. And with that I want to thank everybody for their service who serves today because without you we wouldn't be here today. So thank you.

Sean Maday:

Thanks, Marc. So Bucky, we started the conversation with Ukraine and talking about the way commercial internet, COMSAT kind of changed the game in Ukraine. But there's another side of the story, it's a side that Marc alluded to, right? Commercial remote sensing, electro optical, infrared, SAR. This has made a difference on the battlefield in Ukraine. Can you tell us a little bit about what you've seen there and give us some perspective?

Steven J. Butow:

Sure. If you think back not too long ago in our history and 2014, when Russia invaded and seized Crimea, the world was really caught off guard by that. And largely because at that time, most of the commercial remote sensing capability was really in its infancy. That's no longer the case today. And I really think the first strategic shift that we saw was that the amount of remote sensing, unclassified, remote sensing data that was available to the world, the world was watching the buildup to the Ukraine invasion and that really put the Russians in a disadvantage. The other wonderful thing about that is I think that, and every time I have an opportunity, I always throw props at NGA and the NRO, the commercial SPO at the NRO because they were really the enablers here. They've been working to get commercial remote sensing companies on contract and provide the infrastructure so that this information could be immediately releasable to our allies.

And that is if you're from one of those two organizations in a room, you deserve applause. Now we have to scale it and we have to incorporate advanced analytics because as you said, you named off different phenomenologies, SAR, electro optical IR, but the radio frequency. But the real, what we need to do responsibly is take all that and produce information that tells the war fighter specific things that they want to know. And the only way we're going to do that, we have to synchronize that all the way through the operational elements and have the commercial sector as contributing in a steady state capacity to

meet this need, not just in Europe but globally. So one of the big challenges we have now is to take the communications, the remote sensing, the GNSS interference. That's probably one of the greatest new innovations that what we're able to do with unclassified sensors and then scale that so our allies and partners in regions, including the end of Pacific, don't have to wait until trouble's knocking at the door to have access to these things.

Sean Maday:

Thanks Bucky. I mean I love that point about synchronization, right? I truly believe that tyranny thrives in the dark and America, tight integration of American commercial technologies, space Force, DOD, to your point, put the Russians at a disadvantage. And I think a big part of that was General Burt, your work, your team running the commercial integration cell within the combined Space Operations Center and providing that connective tissue between DOD and these commercial entities. Can you talk to us a little bit about what that integration has looked like?

Maj. Gen. DeAnna Burt:

Yes, I can, Sean. It's a pretty small organization right now. We're really excited. I don't know if General Dickinson, I didn't get to hear his comments this morning if he talked about their new commercial strategy that US Space Command just signed. Part of that was, as Bucky mentioned, different entities have had relationships with commercial partners in different ways. So for example, in the commercial integration cell that General Schiess now commands, there are 10 companies that are part of that organization and those are built with CRADAs. So we do at the TS SCI level, we're able to talk to those partners, we're able to share ideas and experiment on different things. No money exchanges hands there, there's no contract per se with the government. It's really about how do we explore doing things in a new way and exploiting them and then how do we then bring that to scale, handing that off to the commercial space office in the front door with Space Systems Command to then look at how we contractualize that in some way.

As we went through Ukraine, each of those companies were obviously providing capabilities to three of our key partners that were involved in Ukraine that we worked with very closely. Maxar when we talk about a commercial imagery perspective, Viasat from a commercial SATCOM perspective as well as Starlink with SpaceX. So all three of those companies were very much engaged on their own business working with Ukraine. But we tried very hard to make sure where we could and where we could talk with them and integrate with them and what they were providing and as US companies, was there anything we could do to help them as they started working through that troubleshooting and trying to identify where they were having issues? That needs to continue. That commercial strategy that US Space Command signed now gives us the joint requirements to then as a service and in the Space Force and the other services and with the NRO and NGA to say, okay, how do we now codify our relationships with commercial to best bring those capabilities to bear in a fight tonight where the US would be engaged in how we would leverage those capabilities?

I think one thing that will be interesting for all of the services and agencies to addresses, we have historically bought bandwidth or a transponder or we've wanted to have the whole satellite dedicated to us. I think Bucky has pointed out pretty vividly and as we saw across working with our commercial integration cell partners, we need to think about buying things as a service. I don't have to, as Marc mentioned, he's going to give you all those satellites and a C2 system and everything to go with it. Well why don't I just let him do that and I buy it as a service as the government, versus I now have to put Guardians on console doing that? Because again, we're small, lean and lethal. An SSC statement you'll hear, and I'm sure you've heard a bunch of times over the last few days, "Buy what we can build what

we must." That's absolutely true and that buy what we can, I think, we've got to think differently. Can it be a service rather than leasing an entire transponder or satellite?

Sean Maday:

Thank you, ma'am. I hesitate to open this door, but I'm going to. We could quickly devolve into a conversation about all the challenges with procurement and acquisition. Anybody who's heard about the value of death for funding of SBIRs into production, I'm sure you have all had the value of Death Square on your bingo card punched multiple times over the last three days. But I do think it's worth acknowledging some of these challenges, right? General Burt just talked about how we incorporate these exquisite services, these amazing capabilities, but there are challenges. Chris, what are your thoughts in terms of how this data as a service is evolving and where some of the friction is right now in this changing business model?

Chris Kemp:

Well, I think if you look at some of the new entrance into the space sector, Starlink is a great example. Amazon will be entering with Kuiper in the near future. You're seeing these companies leverage their ability to raise capital and using their own balance sheets to invest in completely vertically integrated solutions. So they're not leveraging the industrial base, they're leveraging... In fact, they're hiring a lot of the most talented engineers from the industrial base to build these vertically integrated systems, which they will provide as services, in fact do provide as services in the case of Starlink. And so I guess the question is, do we want to see a future where there are standards and interoperability between a diverse group of innovative companies that push the edge and provide unique capabilities to the war fighter in this environment, like the internet if you will? Do we want to see the internet expand into space and then have a zero trust environment where security and capabilities can be deployed securely to the tactical edge across this diverse and vibrant ecosystem of the industrial base?

Do you want to have a few vertically integrated, frankly new entrance into the space, control the entire stack? And so I think Marc and I probably agree, we love the diversity and the innovation and the entrepreneurial technology coming from almost a dozen companies that have gone public this last year to be inserted into an environment that supports innovation and competition. And you get that through open standards and you get that by expanding the internet into space, not necessarily having closed walled gardens that are vertically integrated and potentially competing with the rest of the industrial base emerges as the end state.

Sean Maday:

Marc, I mean your team recently put what, seven satellites in orbit in 10 weeks. I mean I think you guys are at the front edge or the leaning edge of getting assets in orbit. Where does this conversation land with your perspective?

Marc Bell:

We look at all these great new companies starting up and unfortunately in space specifically, Constellations has a very bad track record of bankruptcies. And the reality is then the DOD has to step in, whether it's Iridium or other systems and bail them out. If the DOD were to, and the IC were to embrace these startups from the beginning and help them grow and provide them capital and provide them funding, they'd be fully vibrant companies. Because as General Burt said, it's all about data as a service and you're providing them data on demand. They don't need to own the satellites, they just want access to the data. And if people in this room, people throughout the community embrace these

startups and help them with funding, it's a de minimis amount of money if you think about it in a total budget. But the value that all these companies can provide in terms of data as a service years from now is invaluable.

And so we've got to change how we do procurement. The government's got to change how they look at these startups. They have to look at the big primes and say, "That's great. They're building things that are fabulous and they're big juicy targets in orbit and that's wonderful." But what we're doing is we're building things that are resilient, that we can build quickly. We can build them in what used to cost a billion, we can do for 10 million. What used to take 10 years to build. We can build in 18 to 24 months. But as Bucky said, it's not just about the hardware, it's about the software on the ground. Having that computational power on the ground to in real time, take that data and then interpret it and deliver it to the war fighter. And here's where innovation really can take place. And here's where places like the DIU really help is help by seeding all these companies, but we have to take it a step further. It's not just seed them capital, but get them real capital to grow, to become fully mature and profitable and stand up on their own.

Sean Maday:

Well let's take that DIU pivot real quick. We heard a little bit from Bucky about DIU's mission to bring commercial technology into the DOD. I will I'd love your team, Bucky, you've done amazing things over the last few years. I believe this hybrid space architecture is a project that's in your portfolio now. Can you talk to us a little about that and specifically what is... Through the lens of that project, what does Space Innovation to the Tactical Edge mean?

Steven J. Butow:

Sure. I want to just tag on to what Chris and Marc just talked about first. It was discussed earlier that we're already being attacked in the cyber domain as we speak. But there's one other domain that wasn't included, and that's the economic domain. So there are companies, multiple companies under civil military fusion in China that are looking to displace both of these companies to the left of me and others. And so that attack is alive and well, both in terms of going after intellectual property, price gouging, basically setting up to try to displace this. And we work with XM Bank, we work with others across the government ecosystem to make sure we're competitive. But we have a vested interest in making sure that our economy is not left in the trail. In fact, we were the leading economy going into World War II and on that manufacturing capacity is what actually enabled us to do things responsibly 75, 80 years ago now.

So this is something that we have to keep in the discussion that it really is a national security interest to make sure that we have a vibrant commercial space industrial base. And with pivoting now to hybrid space architecture, that is actually, General Raymond probably for the better part of two and a half, three years, that's one of the things that he's been talking about repeatedly and we're involved, but we're doing the commercial slice of this. And for those in the room, if you don't know, This Space Warfare Analysis Center is doing force design for the hybrid space architecture. And their goal is to integrate all kinds of different things, commercial, government, even civil capabilities. So we have diversity, secured, assured, low latency communications to the war fighter. So a lot of people will say, "Hey, that kind of sounds like the back plane for Jatzy 2." I think it is.

Sean Maday:

Nice.

Steven J. Butow:

And of course what we did is our contribution to this working with the SWAC and AFRL RV and others is that we're bringing in world class Fortune 100 and other commercial companies that have innovative technology, big and small, and they're going through this process right now, but it's really amazing. And the cool thing is, we always have to have a commercial nexus. And our commercial nexus for this is really to constitute internet in space like Chris was talking about. The internet on the ground, terrestrially is what, is it like a 6 trillion dollar year part of our economy and that's pretty phenomenal. So imagine what the space will be. It's in Jeff Bezos terminology, it's going to be digital infrastructure on which future businesses will be built. And so we have a compelling economic reason to do hybrid space architecture, a compelling natural security one. It's going to include allied systems and so it'll be ubiquitous. But it's going to really provide the multipath secured, assured way for us to get the timely information at the speed of relevance.

Sean Maday:

I love that. General Burt, sometimes the challenges here can seem daunting. Obviously there's policy challenges outside of our control. I mean you are at your core, ma'am, a space operator. Where does this conversation kind of dovetail with your experiences and your observations in the fight?

Maj. Gen. DeAnna Burt:

No, I think everyone, every day is trying to find new ways to do business. And anything we can do to fight tonight to do what we do better. I mean, we are taking systems that frankly weren't built for this fight. And how do we take operators on the system who understand how they work and maybe use them in a different way? And we've been doing this in every domain. This isn't new to space. We've done it with, I mean we do close air support with B-52's for example. I mean that was never what that platform was built for, but that's what we do.

And so as military members, that's what we're doing is innovating every day. I think the Space Force is very much focused on being small, lean and lethal, and how do we do that in a digital age? So the super coders have been our forefront to how do we start learning and we send our super coders out to learn from industry, but then how do they come back to the legacy systems that we have and build side cars or ways within our legacy systems to make the systems work faster, better, smarter, more efficiently for us?

And they're doing that every day. I think the other piece as all of this discussion really would be what I would talk with general Guetlein is, but I think we're exercising ways with our Space Enterprise consortium over the next five years. They're going to give out about 3 billion over to multiple prototypes on the order of about 101 prototypes across the enterprise to try to get after some of these cutting capabilities. But is that enough, as these gentlemen have said, is that seed money? How do we keep those programs alive to bring them to fruition across the enterprise? Space Works is another, just like all the other domains have their own works program. We have our own space works and they awarded 227 million to 160 different companies. Again, building that seed money, but how do we keep them alive? Our coalition partners have been critical. Sharing of data, getting data standards as these gentlemen mentioned, I think is what's going to take us to the next level to be able to work with our coalition and commercial partners.

If we have a standard of how we do, for example, space domain awareness data where we make it available. Our CTIO office has been working with Ms. Costa has been working very hard on the unified data library. How do you make data available in the data lake to solve the tactical problems that you're working on? If I could encourage everyone getting to software based capabilities, whether that be the

satellite, the ground system, or the receiver, rather than being so hardware focused. We are in the digital age, we need to step to that next level if we're going to win against our potential adversaries. The discussion here of, for example in SATCOM, if I went from a military capability pick a band, EHF, UHF, SHF, any of them and I were denied in an INDOPACOM scenario, could I quickly transition to a commercial partner and my receiver could transition to that?

Those are the kinds of conversations we're having with our commercial integration cell partners who are largely SATCOM providers. But how do we get to those kinds of solutions working with industry so that when we're in a denied environment and have to fight tonight, we can quickly go. Now I make that sound simple. We all know when you try to change out receivers on ground systems or hardware, any aircraft or ship, that's difficult. But I think that's why we've got to get to software based capabilities so we can quickly evolve as the threat changes rather than I've got to change out a whole hardware set in order to win. And so again, why the focus for the Space Force has been all on the digital side.

Sean Maday:

I love it. I Mean we talked up front, right, the age of software defined warfare. A small team of engineers in California pushing a patch to Starlink terminals in Ukraine to change the game. Chris, you've got a long history with software. What, from your current vantage point leading this new emerging space company, where does this conversation take you?

Chris Kemp:

Yeah, we're in Silicon Valley for a reason. If you look at our executives, they mostly came out of Google and Tesla and Apple. And the way we look at this is there's almost like an evolution from the mainframe era of space where these billion dollar computers and these billion dollar satellites that would have the critical capability in one asset is now being distributed. So just like Gmail and Google run across millions of servers across data centers around the world, no one server matters anymore. And if you look at capabilities like Planet Maxar, Starlink either distributed across constellations and the service is being provided by the sum of all of those satellites. And increasingly as bandwidth through new KA-band, optical laser, V band technology, the cost of bandwidth just as it has on earth, as the cost of bandwidth comes down in space, what will become critical is the cloud systems that are connected to the constellations.

So whether it's the Google Cloud, that Microsoft Azure Cloud, Amazon Cloud, because most of the processing will be done on the ground where you have the computational resources and the storage resources. Traditionally space, launch has been very expensive and traditionally bandwidth has been very expensive. Those two things are becoming less and less true. And as launch becomes less expensive, more frequent, you'll be able to put more assets above the war fighter. You'll be able to move the sensors and the sensing to the tactical edge and you'll be able to move the computation to systems that are incredibly powerful yet directly connected like Alexa. I mean the power in your iPhone and the connectivity to the cloud enables you to have an enormous amount of capabilities that is now completely available as long as you can put that capability in space and on the war fighter. So just it's about taking the best technology which is no longer being developed at very high cost by the DOD but is being developed by Apple, Tesla, Google, Amazon, Microsoft, and leveraging that technology at the edge. That's where the innovation will come from.

Sean Maday:

Yeah, I mean Marc, you and I talked a little bit earlier about there's a lot of people pushing for data centers in space and sometimes I tongue in cheek wonder how people who can't actually run data



centers on earth are going to run them in space. But what is this, where is Terran Orbital's kind of position in this? How are you thinking about the future? I mean, one thing you and I talked about was, you have a vision for 50,000 launches a year in 10 years. Talk to us what that future state looks like.

Marc Bell:

Well it was 50,000 satellites a year that are going to be built over the next 10 years. But we view it as we're going to continue to drive down the cost of building a satellite and increase the functionality. And what we're trying to do is work towards a common bus for all of our clients. And you know how that easy that is to get every service and everybody in the intelligence community to agree on one thing. So the goal is to get a common bus that has a set of features like collision avoidance, resilience cyber, all the things because by everyone agreeing on standards, as Chris mentioned earlier, we want to... It'll lower the cost and provide more opportunities to do more satellites in orbit, faster revisit rates, faster with the SDA's transport layer, you're always connected to the ground and we're building SDAs.

We're Tranche 0, Tranche 1, we're building now for the SDA for the transport layer. And that's really the cornerstone of all these new satellite constellations will connect into the transport layer to transmit the information back to the ground. And so we see a future of you then on the ground, everything you're talking about data centers and being someone who used to be the second largest owner of data centers of the world back in the nineties, computing power is important and it has to be. Unfortunately there's not enough power in space yet to do it. The technology's not there yet, but it's coming. Everyone's talking about it. But on the ground, it could be done quickly and suddenly and get it into the war fighter's hands within milliseconds. And that's the idea, is time is money and time is lives and saving lives. And that's the whole purpose of everything what we all do in the room today, is find ways to save lives.

Sean Maday:

Yeah, I love it Marc. Well we're drawn close on time so we'd just like to give each panelist a couple minutes to just bring us home. And ma'am why don't you know, to start with you. I mean you shared some great innovations with us, but kind of want to give you the mic here to talk about some of maybe the innovations that you've seen or that you're most proud of since Space Force launched in 2019.

Maj. Gen. DeAnna Burt:

No, I think there are a ton of innovations across the board. I really want to close though with kind of a discussion here that I think the team has identified. The space domain started backwards compared to every other domain. Every other domain started with an entrepreneur who built something and then the military saw it and said, "Hey that's a great thing and let's do something with that." Henry Ford builds a car, we put armor on it and becomes a tank. Orville and Wilbur fly an airplane into World War I, we realized, hey we could do ISR with that. We could put guns on it, we could drop bombs from it, we could do different things with this. Space started in the government domain in the space race against the former Soviet Union and has continued that way for a very long time.

With the evolution, as we mentioned earlier, of cheaper launch and the ability to do launch at lower costs, that's now opened the door to commercial industry. The problem is, we've spent decades in the space business with the government leading this. And the way the government would do this is very different than a business model and what entrepreneurs in the level of risk and how they would set this up. I think we as a department of defense have to be bold. As the chief tells us, we have to be innovative and we have to get out of our own way and work with congress and lawmakers to make sure that we are setting ourselves up to leverage all the great capabilities these three gentlemen have talked about.

Because again, the way we did it was great where the world's greatest space force and we've come a long way. But now industry is coming and they're doing the things we need them to do and we have to figure out how to get out of our own way and enable them and let them now lead the norms and how we would go after this from a risk perspective. And again, it's great for us because it lowers our price point, it helps us work more with our coalition and allies who now want in this business as well and how we would do that better as a combined team. So I thank you gentlemen for sharing these, but I think ultimately the government's got to get out of its own way and let commercial take this every other domain to the next level.

Sean Maday:

Thank you ma'am. Bucky.

Steven J. Butow:

I've been here most of the week in a flight suit. I'm an air guy, but I do space, is my hobby. But I will say that the future is space enabled and software defined. And we have a vested interest to make sure that it is US led, right? That's why we created this space force. That's why we have and we should be embracing and supporting a vibrant commercial space industrial base. And China becomes a much more problem if we bring in our friends and allies. At the tactical edge, everybody in here who's not a space person would love to see a pile of radios over here in exchange for the software defined man portable capability that is streamlined and multifunctional. Same thing for ground terminals, everything else. So the people who pay the tax, who need the information the fastest are the people at the tactical edge and we can't burden them with yesteryear technology. We have to be thinking forward and taking advantage of all the diversity that Chris talked about and it'll lead the way, and we'll be much better in the future because of it.

Sean Maday:

Yes, sir. Chris.

Chris Kemp:

I think America led the world in space with the Apollo program. America led the world with the internet, America's leading the world with electrification in the automotive industry. And we have had opportunities to lead the world with drones and autonomous flying technology. We lost it. And I think there's a moment of truth right now where we had a dozen companies go public this last year based on the promise of everything we've been discussing on this panel today. And it's ours to lose. And you all in this room have the power to drive the changes in procuring solutions, in procuring services, in and just simply buying the data from the companies that are now right before you. And if you do, America will lead the world in space for the next decade.

There are some of the smartest people in America. Elon is in a 400 square foot house working on incredible technology. And it's not because a government contract was awarded to him, it's because he believes in the future of a multi planetary species. We believe in space, improving life on earth, providing a more connected, healthier planet. Now's the time for you all to support this because it'll take another decade to rebuild it if in the next year when the economy continues to falter, we don't have that demand signal from you to support these businesses. So I need your help.

Sean Maday:

Great.

Marc Bell:

I think everyone here said a lot of things that in the closing that are very relevant. For example, we're building, like we talked to software defined, we are building something called software defined synthetic ature radar. So it's taking synthetic amateur radar to the next level using software and to really be able to focus it on different objects you're looking for. We are the goal of buying of data as a service, building satellites so you don't have to buy the satellite, you could buy the service. It is also the way the industry's changing. And the DOD and the Space Force is changing with it. And they're very open to listen to these conversations and they're adopting them and they're giving out creatives and they're giving out awards to buy data and then to interpret that, empowering other companies to interpret that data to put into the hands of people.

And this is an evolution and we're evolving as we go and we will continue to evolve our dominance in space. But they're newer threats. You have hypersonic missiles. How do we track them? How do we take them out? How do we... You know this is a whole new set of problems that just came up. And things that we could do from space in order to help solve those problems. So as threats continue to evolve, we will continue to evolve with those threats to meet the demands that everybody here has in order to help keep our country safe. And so thank you very much for your time today.

Sean Maday:

Thank you to all the panelists for this conversation and thank you to all of you. Our future together is dependent on your creativity, your ingenuity. That is what is going to give us the edge in great power competition. So thank you and enjoy the rest of the conference.

