

28 September 2021

## Space Sector Market Conference

### **Opening Panel: Creating the Space Eco Systems in the 2020s**

Moderator- Sandra Erwin, Journalist, Space News

Dr. Derek Tournear, Director, Space Development Agency

Dr. William LaPlante, President and Chief Executive Officer, Draper

Dr. Daniel Hastings, Aeronautics and Astronautics, Department Head and Cecil and Ida Green Education Professor, MIT

S. Sita Sonty, Partner and Associate Director, Boston Consulting Group

Dr. Bhavya Lal, Senior Advisor for Budget and Finance, NASA

### **Q&A**

#### **Q- Do you have any concerns about [possibly moving at a slower pace once absorbed by SF]?**

Dr. Tournear:

Time scale of new releases. Every year there's a new cell phone compared to last year's release. Automobiles, they have minor shifts mostly every couple years. Airplanes, maybe once every 30, 40 years there's a change. In the satellite industry it was similar, very long time frames. I think that's one thing that has significantly changed. The more affordable they are the more you can get into spiral development. That's why we're doing new releases every two years. That's what we want to shoot for. That's what's setting this new mindset. This is a new model and commercial industry has shown the parts can be commoditized. **I don't believe SDA will fall back into that old model once we're in SF.** We have demonstrated this new model is viable and we will continue to push that. Sec. Kendall said we are moving from constructive disruptor to mainstream. There are still exquisite missions and there you'll still have longer cycle times. Service model is what's driving people to this new way of thinking. There is a push to see what we can do for more service buys, but we have to consider DoD has specific mission sets. We need some technologies to come through DoD so that we can ensure priorities align. There's also no market for some technology DoD is needing. You have to be careful in DoD because the decision we make to buy, once we commit, we have locked the department into that decision for what could be decades. I don't think SDA will ever scale back.

#### **Q- What are some areas to work and invest in with government?**

Sonty:

The demand signal is extraordinarily high. The scale of capital is a reflection of interest in what the technologies will actually deliver. The prediction for what space tech can offer. Targeting climate change goals is driving investment. It's motivating investors to see who can deliver Earth imagery data and make predictions.....In space, people are making large and small bets on companies without market dynamics, and technology readiness. They understand space technology will be driving so much of our [everyday lives]. Investors and government agencies are becoming more agile.

**Q- How could you reconcile the security challenges posed by China while keeping space a free ecosystem with commercial activity without people thinking there will be attacks?**

Dr. LaPlante:

When you're briefed on what's going on in space you're absolutely horrified. Does that mean we're going to war with China? No. We're in a race and it's a race about economics and standards. We need to talk more about the STM challenge. LEO, there is so much stuff including debris. We know this was given to Dept. of Commerce, that's all good debate. But the standards of LEO governance and STM, and it's a global standard, that's an example of where the China issue comes in. We hopefully will never have war in space. Any conflict in the future is going to involve space. We have to do more educating the American public. It's a very serious issue.

**Q- How is SDA going to move this technology that you're doing forward while addressing security issues?**

Dr. Tournear:

Supply chain is critical. We are not in a position where we are trying to build satellites just because. We know we need to give our decision makers trade space so that they can have an understanding. We need to make sure we have a resilient architecture so that we can deter and not have a war. That's the ultimate goal. Supply chain, there are several aspects that are important. It permeates everything. Right now, we are having trivial problems. Another concern is the supply chain [counterfeit]. That's something that we watch because we're in a great power competition and we have to understand what's going into these systems. We need to make sure we don't have any counterfeit parts. These are all concerns we push forward. We have to make sure we can give the military what they need.

**Q- What is government going to do with debris? What is industry's role?**

Dr. Lal:

It is absolutely a complicated issue. We need to generate less debris which means not have ASAT tests. We need to really understand where things are. **We need to have much better SSA than we currently do.** Lastly, we need to remove the debris. Government has a critical role and there are lessons we can learn from other domains. Whatever we do it needs to be government and industry together and it needs to be an international effort.

**Q- What do investors need to hear from the government?**

Sonty:

Investors need a problem, the problem is space debris. They need to know there's a viable solution. There needs to be a regulatory framework. FAA is a great example and there are lessons to be learned for how to handle debris management and let US lead. Let there be an establishment of an organization. It is challenging to get countries to agree on something and what those standards should be. But the time is now. Let the US lead. There are companies worldwide that are creating the tech now that will service those platforms in the future.

**Q-How will SDA help with SSA?**

Dr. Tournear:

We've stayed out of that in regard to plans SF has. There are a lot of companies out there like LeoLabs that have good tech and can do this. Space is big and the problem with debris is the uncertainty. The first step in the solution is better SSA. SDA is not really involved in that. We

are going to help provide data on where our satellites are. Those are the kinds of norms of behavior that need to be demonstrated. NASA is one of the leaders in those kinds of norms.

**Q- What all needs to be done for space sustainability? More cooperation? More convos with private sector?**

Dr. LaPlante:

More conversation and more education are good. We need to get mobilized in commercial and globally and everyone agree on things like standards. I don't know that there is a space version of FAA. We need to educate people that this is an opportunity. All the excitement to make all this real, we need to think through these governance issues. Let's figure this out.

(end)

**Space Capital Panel: Investing in Success in Space**

Moderator- Lisa Rich, Founder and Managing Partner, Hemisphere Ventures

Jennifer Santos, Principal Director for Strategic Initiatives in National Security Space, Draper

Karen Gaffin, Space Portfolio Manager, Office of Commercial & Economic Analysis

Kevin O'Connell, Chief Executive Officer, Founder, Space Economy Rising

CAPT Colin Supko, Director, OUSD Trusted Capital

Brett Rome, Managing Director, Fine Structure Ventures

**Q&A**

**Q-How is capital flowing?**

Rome:

The space sector is a newer one for venture. You would think venture firms as a whole would want to be cautious because of this. What's attractive are the opportunities developing in the future and those that will come along as more and more data becomes available. We believe this is an outstanding, long term investment play. I think the opportunities to get a return are driven by when you enter and exit.

**Q- Thoughts on small investors interested in space and investing but not necessarily knowledgeable?**

O'Connell:

We are seeing financial innovations, everything from companies wanting to take small companies through a series of developments. Government will be relying on commercial capabilities so I'm really excited.

**Q- Will there be more regulation as investment increases?**

CAPT Supko:

As an entrepreneur, there's dumb money that doesn't have due diligence, and there's smart money that has deep due diligence. I'm very long on blockchain everything and I think it will be really important. There are certain levers the government can pull. The market will do what's in the best interest of the market.

**Q- Thoughts on companies that are waiting for awards or entire funding cycles? How should they get government to invest in them?**

O'Connell:

Government are better customers because they plant seeds. The investments are more sizable, but they are modest. We're seeing space become a normal market where there will be successes and failures just like you see in any market. We always worried about the space market because of national security, or only having one big commercial company. We really have the breadth and depth.

Santos:

Creation of SF made this a clear market and made clear we should invest. Establishing a separate line in appropriations bill, you can have clarity and you can match it with commercial. This will allow a better understanding of where government is with spending. SPACEWERX was created. It's exciting.

**Q- How does the government see this challenge of supply chain?**

CAPT Supko:

Supply chain is one of the most important things that we're focused on right now within DoD. From the supply chain working group, to the executive orders, to the language in NDAA....dependency on adversaries for some critical systems is not in the best interest for the US. Our President is working on this.

Santos:

We need to get to action. Understanding your supply chain comes back to industry partnerships.

**Q- Does government understand the sense of urgency to enable companies?**

O'Connell:

It's the early-stage companies that are really at risk here. As we strain the supply chain, we need to keep as open as possible to work with partners and allies.

**Q- Conversations on SF partnering with Draper?**

Santos:

Absolutely. We're evolving. We're working on our space strategy right now. It's part of our heritage. Building PNT, guidance navigation, Draper is a supplier. We are asked by industry partners to do work for them, and we have people working for us too.

**Closing Remarks**

O'Connell

-There are startups that don't want to start with defense dollars. How do we think about SF and DoD using those dollars?

-My time at Commerce I spent every day on space safety and sustainability. Private sector is one of the best tools in our tool kit. It is the only thing that will allow us to stay at speed.

-We're seeing investors taking interest in space safety because it is the single most important thing that can harm all of the goodness.

(end)

### **Space Data Panel: Big Data/Cyber Security on Orbit and to the Ground**

Moderator- Nick Rossman, Global Lead, IBM Security X-Force

Col. Eric Felt, Director, AFRL Space Vehicles Directorate

Brent Andberg, Special & Enabling Capabilities Portfolio, SCO

Chuck Beames, Executive Chairman, York Space Systems

James Penrose, President SEMPRES

#### **Opening Remarks:**

Col. Felt-

-SDA is a mission SF is tasked to perform. The vision for what we want to do is know everything of importance everywhere, all the time, in real time. In real time is where I see lots of opportunity. As we are able to bring the internet to space, there are huge opportunities to leverage data in real time.

-This is a mission area where we are at 1% of the mission. Over the next years we will have a lot of data coming.

-We have a UDL we want people to put data in. Then you expose it to the appropriate apps.

There are lots of great entrepreneurial opportunities we see that we want to use.

-We don't have a lot of training data for what a space war looks like. We need to focus on this. There's some thought that needs to be put in.

-We have an opportunity to improve in the market sector. The more it improves the more we can use the power of the market to drive the behavior we want.

#### **Q- What are key requirements that will shape the space market?**

Beames:

The best thing the government can do is stand back, identify the needs, buy what's useful, and don't buy what's not useful and communicate why you don't want them.....I think it's hard to let go but the key part of the answer is, for much of the space infrastructure that was created by the government, much of it can be better [dealt with] commercially.

#### **Q- Is it worth bringing government in to create a baseline of requirements for what security should look like?**

Andberg:

It's about security, availability, and profitability. When you realize availability doesn't have to come at the expense of security and security becomes profitable, then it's in commercial's interest as well as government's to have that secure infrastructure. Government, a role could be rewarding good behavior and make it known that security is just as important as availability.

Col. Felt:

Requirements will always fail if you make a list for what you think you'll need ten years from now. Instead, you want to reward the good behavior. The requirements I like are things like-

you'll have a red team to consistently challenge vulnerabilities and then have a team to fix them. **You want a process requirement.** That we have found works really well.

Penrose:

You have to embrace the concept of everything as a service. That will be how you take advantage of what commercial has to offer. Companies will invest in security tests and penetration tests.

Beames:

I've noticed...we have companies, fortune 30 type companies, that are investigating having their own network. They are looking at provisioning their own separate thing because the price is getting so cheap. I don't know if this will last but it's an interesting turn of events.

Penrose:

People make an entire living out of bridging. We have to assume from an attack model perspective that that's going to happen. All of the things we've talked about, those all still apply even if you have your own private network.

Col. Felt:

Having your own network is not a silver bullet, but it's now economically feasible and it's a tool in the toolbox. One of the most effective techniques is having multiple data resources so you can compare the data. That's one of the best benefits of the hybrid space architecture...We have a lot of examples of safety privilege within DoD. It says, 'hey this is privileged information we won't process you,' that way you can find out what happened. Some of these principles can be applied to cyber as well. This won't happen overnight, but I have seen benefit from this.

Penrose:

We have ISACs where you can share compromises and lessons learned. That's a method which information is shared today. As an intelligence professional, you want to be forward looking. We have to continue using machine learning and AI to be more predictive. If you're using this to figure out how to see if you have an anomaly, you'd be better off than exchanging information in an ISAC.

**Q- What's DoD doing to define formats for and certify the quality of data, for example SDA data, so that the commercial market can bring that data to you?**

Col. Eric:

The best standards are things we can come up with together. That exists for SDA. Standards are key. What I think the government has not yet done to enable this to thrive, we haven't shown the value of that information and have not been the best customers we can be. That is our goal, better showing what our SDA needs are and its value and then we can go out [and see our options]. A lot of what we find is commercial data is better than government, but we want all the data because it can all be useful to figure out what's going on. Better value functioning will better release the power of private innovation.

**Q- What are the key focus areas of research as we look towards needs?**

Col Felt:

The utility function I'm using for SF is, 'hey, will this move the needle in conflict with China or will it help deter conflict with China?' If it won't then I don't go for it. I do think the transport of data, where it can be processed, that will be a big deal. Then you get into what are the sensors that will produce the data SF needs. We can look to air. We can move some of those missions to space so airplanes aren't shot down when in conflict. That is seeing investment. Space solar power reading...that is a very high ORI. That's the process we go through.

**Q-How would we recognize that adversaries are trying to operate in space in this information layer?**

Penrose:

Humans are the key weakest link in all this. Why is it that managed service providers get hacked so often? When you hack one MSP, and they've already serviced 50 companies, you can hack all 50 companies at once. There's always the goal for bad guys to go after this stuff so they can see what more they can get in their basket and then move somewhere else. Everyone needs to have authentication turned on. Don't allow just anyone to walk into your facilities. You need to plan for vetting individuals and the machines they are using.

Beames:

Supply chain part...that's really important and the supply chain of software also. I think that's an area where the government can set standards so that there's a certification process. I think that's an area where government would be justified in show me don't tell me. We need to be mindful of not creating vulnerabilities. I'm hoping we'll see SF open up. I'm hoping they'll open up because of the effects that space capabilities bring to a terrestrial fight.

Penrose:

Third party cyber risk management. This is an upcoming instrument that's coming into play. Having this, actually going and cross checking to see if people are actually doing what they say they're doing...

**Q- How would we be able to see adversaries operating in key areas?**

Andberg:

You really have to rely on the operators to do their best monitoring. As you get to availability and assurance of information...the question becomes to what degree of tolerance do they allow for anomalies in their network. Again, rewarding good behavior and encouraging the private sector to do their own monitoring and report out any anomalies.

**Q- How could we expand cyber security best practices to small satellite companies?**

Beames:

This relates to cybersecurity and STM. This gets into rewarding good behavior. It's not easy but just because they're a cubesat doesn't mean they have the right to operate the same as everybody. We have different rules for people who operate large watercraft and small watercraft. This applies for STM, collision avoidance. It's a touchy subject because we work hard to help companies grow but at the end of the day a company has its own responsibility to be profitable. If it needs to comply it needs to comply.

Penrose:

Manage detection and response companies, that's who small sat companies should be using. They will look after them and make sure nothing has occurred and monitor 24/7. You have to think if you're going to build that in or contract it out. I would say contract it out, go with a company that does that for a living.

Col. Felt:

We are not using all of the economic tools we can be using to avoid this. As industry becomes more mature, we should be thinking how to best implement these. If you create lots of space debris, you should maybe have a tax. [Anything that poses a risk we should be thinking about this.]

(end)