Spacepower Security Forum 2023 | Lunch Keynote: Dr. Derek Tournear, Director, Space Development Agency

[00:00:00] **Dr. Derek Tournear:** Thank you. Thank you for- for the opportunity. I- I love this venue. It's great to talk at it, you know, and [laughs] I'm so thankful that I'm up here, able to tell you good news, 'cause I don't know what I would have done otherwise. But all's going well. You know, it's pretty exciting to go through the launch of Tranche 0. You see, we have these eight commemorative coins here, the lapel pins. This is the Tranche 0 launch one lapel pin, and you noticed it's I- when I first looked at it, I said you know, that's- a big lapel pin and- and it's pointed out to me, this is a big deal. [laughs]

I'm like, okay. You know, you're right. It is a big deal. It's exciting and thank you for the opportunity here, and it- it was- you know, it's been SDA's been an agency for- for four years, and and we just received our funding just over three years ago. It's pretty impressive. I will tell you that we went from orbit to launch, the number I give you is gonna be a little bit different than what what General Saltzman gave you today, and I'll explain the difference so you don't think that we're making up numbers.

I say we made orbit to launch in just over 30 months. That's accounting for when the transport contract was left to when the transport satellites were put on orbit from the York constellation. If you look at what General Saltzman says, he'll say it's 27 months. He's counting from when SpaceX tracking was actually put on contract, and then there was the pro-test, and then to- to launch. That actually is 27 months, from- order to orbit. That's pretty impressive, but I'll stick with with the more conservative value and say 30.

That's- what we're going with. I think there's- there's pictures up here, I was told, on the screens, there, I see it. That is- if it's the picture I think it is, it's a shipping crate with a satellite being put in it. Those are the York satellites being put in the shipping crate, and then the beautiful thing, obviously we have to show the- the beauty, though, on the next picture. Then we have the rocket that it was launched on.

I'll talk a little bit about that and about what we have- have coming up, and I'll be, you know, perfectly honest. This was so exciting that since- since they launched on Sunday then we've been going through test and checkout. I'm pleased to announce that we have communications, full duplex communications

with all 10 satellites. That's pretty amazing. We actually got communications within 12 hours for 9 out of the 10, and then took us a little longer to find the- 10th one, but we found it.

We have full duplex comm. All's going through there. We're going through debugging and test and checkout and, obviously, we'll be doing that for the next several weeks. Of course, that was a beautiful launch, and I think there's a nighttime picture of the rocket on the next one. That was taken the night, right before the first launch attempt. I flew out for that launch on, it was to go out on Thursday morning. It did not. There was you know, there was a, basically, a reading that was a little out of spec at T-minus three seconds.

And it was autonomously aborted to say, okay, we need to check this out before we go forward, and then you know, the launch, finally, then, eventually went perfectly on Sunday, but it's a running joke at the Space Development Agency, now. This is our first launch of what we call the Proliferated Warfighter Space Architecture, and it's the first launch that was solely dedicated to SDA. Everything on board that rocket was SDA, but it's not the first time we actually put something in orbit.

We went up on Transporter 2, where we had five experiments that went up on that mission, and, again, it was the same thing. I flew out for that for that launch out of the Cape, went down there all excited, and T-minus 12 seconds, at that point, it was aborted. It was a range foul. Somebody flew a helicopter into the range, and they aborted it. And I- I left. I had to fly back to get back to the Pentagon, and my deputy stayed and- launched the rocket.

This time, it's it was interesting. I went out there. We had you know, the- the press conference and the fanfare the day before, and my deputy did not go out because we are in the middle of getting ready for our Tranche 2 transport solicitations, which I'll talk about a little bit, but he had to stay back, because mission takes priority. He stood back to make sure that we could get that solicitation out. Semper citius, we're not messing around. He stood to stay back and said, "You know, I really wish I could be there for the launch, but I- you know, I just need to stay and finish this up."

I said, "Yeah, that makes a lot of sense." he didn't get to see the Thursday launch attempt, but then I flew back Friday afternoon, 'cause I had to get back, and he flew out Saturday morning, and he actually saw the launch go on Sunday, and he says, "You know, don't think we're gonna invite you to the launch anymore," is what he told me.

[00:04:21] **Audience:** [laughing]

[00:04:21] **Dr. Derek Tournear:** And yeah, it's probably not. But it was funny. [laughs] He came out, "You guys have been messing around. Let's launch this thing," and then he got it done. That's exciting. It was you know, it was a beautiful Palm Sunday launch, and we're pretty excited, now, to have that. What that means, there were 10 satellites on there, eight transport satellites that will be able- those eight satellites are all from York Space Systems. They'll be able to demonstrate the mesh network. They'll be able to demonstrate the Link 16 from space. First time that'll ever be demonstrated.

They'll be able to demonstrate that we can tie the tracking satellites, which are missile tracking and transport together. Two of the 10, then, were the tracking satellites by SpaceX, and they're going through test and checkout. We hope that they start entering calibration on the wide field of view infrared sensor in May, be able to pass those data onto the transport satellites so we can demonstrate that we completely closed that kill chain.

Then, in June, we have the second launch. The Tranche 0 is made up of 28 total satellites. In June, we'll launch the remainder with the remaining 10 Lockheed transport satellites and two York transport satellites, and then we've got two more SpaceX tracking and four more L3Harris tracking satellites that make up the entire Tranche 0. What the whole idea is, that will demonstrate that we can form a mesh network with multiple vendors, we can take those tactical data, get them directly down to theater, and we can do advance missile detection of targets that we don't typically see and track and form targeting solutions on, and demonstrate that entire thing.

Now, that is demonstration. The whole idea, we actually call Tranche 0 or- or warfighter immersion tranche. The idea is that it will allow us to participate in exercises so that we can develop conops and techniques and procedures so that, when we launch the real Tranche 1, which is our first operational tranche, we can turn those data quickly and turn that into an operational capability and the warfighters have already been training on it. We're actually only 18 months away from our first Tranche 1 launch, which is pretty exciting.

Tranche 1 has about 150 satellites on it to be able to do the missile warning, missile tracking, and that tactical data link connectivity. That starts to launch next September, and then we essentially have 12 launches and they'll probably be about a month apart. We'll have, basically, launch, one a month for the next year on Tranche 1. Pretty excited about that.

Where we are on that program, the Tranche 1 transport satellites will all go through their critical design review by the end of this month, and then, at that point, we'll be in-build on those, and then we'll be in-build, and then assembly integration and test, and just continue to push forward until we get until we get to that launch. The tracking satellites are just following right behind that. They go through their critical design review a little later.

That's the whole idea, and that's the concept, and that's- that's pretty profound, and we're pushing pretty quickly on that. Tranche 2 is what's next. 2 is going to build up on what we've done on Tranche 1 to essentially make the entire architecture globally persistent. For Tranche 1, we have regional persistence. You might say wait a minute, that doesn't make any sense. The satellites orbit the earth. They go around the whole earth. They don't hover." Satellites don't hover, especially in Leo, but what they do is since we don't have enough satellites, we- power cycle the satellites.

We have to have a duty cycle. If I wanna concentrate this time over the Indo-PaCom region, I power on my satellites so that they can transmit while they're over Indo-PaCom, and then they charge their battery up the rest of the orbit, do those kind of things. That's when I talk about persistence over a region, that's what I'm talking about, and we can shift that on the fly. There's no reason- you know, we don't have to make that decision prior to launch.

Tranche 2 will have enough satellites up there to where we can do that duty cycling amongst the satellites, but then we'll still have global persistence anywhere we want. We don't have to start to- we don't have to really- really make those trades. Tranche 2 is broken up in transport into three different instantiations. We have a Tranche 2 Transport Layer Alpha, Beta, and Gamma solicitation that's going to be going out on the street, and just to make sure that we confuse you sufficiently, Beta is gonna come out before Alpha, because that's- that's how the Greek alphabet works in Kansas, so that's the way we're rolling it.

[00:08:33] **Audience:** [laughing]

[00:08:33] **Dr. Derek Tournear:** And Beta is- actually, we expect this to go out and be live next week, sometime next week. It will be very similar to what was our Tides - satellites, which was our Tranche 1 developmental and experimentation satellites, which we have 12 of those that are being built right now. These are what we call our TACSATCOM satellites. They'll have the laser comm cross-links to be able to talk to- to the rest of the constellation but instead

of having Link 16, they'll have a TACSATCOM payload that's UHFS fan- TACSATCOM payload to go down to tactical users.

And we'll be going out with that solicitation, and you'll see that pretty early on. And then as soon as you all turn in your proposals for Beta, we're gonna go into source selection, but we're not gonna give you a chance to rest while we're doing source selection. We're going to, then, release our Alpha solicitation. Alpha going to be very similar to our Tranche 1 Transport Layer baseline, meaning that it'll have the optical cross links, it'll have the KA, it'll have the on-board battle management processing, and it'll have the Link 16 payload. That's the main mission payload for- for Alpha, is the Link 16 payload.

You'll see that come out, basically, as soon as the Beta proposals are due, and then, we'll go out with probably tracking, Tranche 2 tracking will go out after Alpha. And that will be for the next version of our wide field of view constellation to build that out and continue to be able to do that for the advance missile warning, missile tracking, so that we can provide those data to the warfighter.

And then, Gamma, Transport Layer Gamma will come out, then later, after tracking. Now, we're in- you know, really late in the year, or early next year is when Tranche 2 Gamma will come out, and that will look a lot like Beta, except it'll have advanced waveforms on there. We're working with some mission partners to develop advanced waveforms so that'll be a requirement on the Gamma solicitation.

That's pretty exciting. We've got that going on. There's also some activity that we're doing on our battle management side with our applications. A lot of those solicitations are closed. We're in source selection on those now, as far as what will be our application factory to be able to build out these new applications. And then you'll start to see some solicitations for specific apps, meaning some specific mission capabilities that would be hosted on-board the battle management processors on the satellites.

Some of those would be track data fusion for missile warning different kinds of communication networking, those kind of applications will have several solicitations going out, and we'll also look for industry to provide us feedback on what you think you could do with that BMCQ processor, and then we'll take that under advisement as we go forward on those.

That's what we've got looking forward. Now, one of the things when I gave this talk last time it was right as we were transferring into the Space Force. And the

question is, has that worked out okay, and I just will point to the success of what we've done on Tranche 0, with the launch, how well we're pushing forward on Tranche 1. We've gotten a lot of support from the Space Force.

The Space Force is 100 percent behind us on helping us be successful for this new proliferated architecture. This is the way of the future for the Space Force, looking at the two pillars that we are holding up. Pillar number one is proliferation. Hundreds and hundreds of satellites to be able to provide these missions, and number two, the spiral development. We've gotta get out of this model of where we do acquisition and it takes us 10 years to develop a program, and then we fly the program for 15 years.

The Department and the Space Force is leading that way now, saying, "No, we are completely behind this model where we do rapid prototyping and fielding, we operate that for a limited lifetime, say, five years, and we continue to build that up." That's the model. We've gotten a lot of support, and if anything, this launch has done, it has shown that it is a feasible model. One can actually build and launch these satellites on the timeframes that we've proposed.

We'll show that again, here in June, and we'll continue to show that as we build out and field Tranche 1, which will allow us to be able to bring the capability directly to the warfighter to support a fight in 2025. That's what we're excited about. We'll continue to push forward with this. We'll continue to follow the way this has enabled us by using Secretary Calvelli's tenants, which, if you read those tenants, they essentially codify everything SDA's doing, so you can tell we have a lot of support there.

I'm excited. I'm excited to continue to push this. We'll continue to have press releases out, as we hit those milestones through test and checkout of Tranche 0, and keep your eyes open for our Tranche 2 solicitations, 'cause we've got a lot of things pushing forward on that, and now, I'll open it up and give you guys plenty of time for questions. Thank you.

All right. Any questions? Oh, I can't see people behind the lights. So hard to see. Oh, I see you. Theresa. Theresa Hitchens, Breaking Defense, everybody. Again, a round of applause. Sure.

[00:13:49] **Theresa Hitchens:** ... Sorry. I have a question about how the wide field of view sensor payload, those satellites are going to integrate with the HT- HBT- I can't ever remember-

[00:13:59] **Dr. Derek Tournear:** HBTSS.

[00:14:00] **Theresa Hitchens:** That one. For the Missile Defense Agency.

[00:14:02] **Dr. Derek Tournear:** Hypersonic and ballistic tracking and space sensor.

[00:14:03] **Theresa Hitchens:** And can you talk about how they are gonna work together and h- maybe how- I take it they have slightly different missions. So-

[00:14:10] **Dr. Derek Tournear:** Yes.

[00:14:10] **Theresa Hitchens:** ... if you could explain that would be great. Thanks.

[00:14:11] **Dr. Derek Tournear:** Sure. No, thank you. This is this is really important, and I'll take some time to clarify all of this. HBTSS is a sensor that is designed to have sensitivity that's better than our wide field of view system, and it also has resolution, spatial resolution that's better. The whole idea behind HBTSS is that it will allow you to actually calculate a fire control solution, meaning a solution that you could launch an interceptor on remote from the data feeds from that sensor, and be able to- to intercept and- and take it out.

What the HBTS sensor needs in order to do that mission because I call that a medium field of use sensor, 'cause it's designed to have global access, meaning that it should be able to see the entire globe if you tell it where to look on the globe. It doesn't have global coverage. The wide field of view sensor, which is what we're flying right now on Tranche 0, is a sensor that has sensitivity to detect these hypersonic glide vehicles, but it's full global coverage.

You know, the constellation sees the entire globe at all times, you know, the unblinking eye, as what they always used to say. We'll be able to detect it, track it, be able to say where that where- essentially where that hypersonic glide vehicles is going, but we may or may not be able to actually give a tight enough solution on its position so that you could launch an interceptor or engage an interceptor purely off of what we detect.

That's where the medium field of view sensor, which HBTSS is the design for the medium field of view sensor, that's where it comes in. The wide field of view sensor will tell the medium field of view sensor exactly where to look. It will look and give you a fire control solution, send that back to the transport layer, and the transport layer will, then, send that down to, you know, to a

weapon system. That could be down directly to an Aegis ship so that it could launch on remote.

The way we're kinda playing these out, Tranche 0 is going to launch eight of the wide field of view systems to demonstrate that out and- and prove that technology. HBTSS, the MDA HBTSS system, is going to launch two satellites that are demonstrating the medium field of view capabilities, and they'll- they'll launch that later this year, and then on Tranche 1, when we go operational, we SCA are going to have 35 wide field of view systems in operation and working, and we, SDA, are going to have four satellites that are flying medium field of view sensors that are essentially the HBTSS sensor copies of those sensors.

We're gonna build four of those and fly those to demonstrate in an operational system, how one would employ the wide field of view, tipping the medium field of view, feeding all those data to the transport layer, and sending that down to the warfighter. That's how all that's working, and up till now, you know, the wide field of view and the medium field of view, or the SDA and the MDA teams have been in close collaboration. In fact, HBTSS had a phase 2A program and a phase 2B.

Phase 2B is what they're doing now. That's actually building the flight unit. Phase 2A demonstrated the signal chain processing demo, which was a flight-like hardware that took photons in a synthetic scene in, went through on-board processing, and pulled out a two-dimensional missile track out of this scene. That's critical, and we're actually taking those algorithms and flying those both on HBTSS and on on our wide field of view Tranche 0 tracking satellites.

That's so critical because there are so many people that don't believe that we'll be able to do that mission from low earth orbit in a manner that we can do that all on board, and the reason being, is historically, it was done from higher orbits, geosynchronous or highly-elliptical orbits. And the background looks significantly different, because your satellite has much larger pixels and it's moving much slower, relative to the- to the background of the earth. It's easy to pull out the background.

When you're at LEO , it's actually difficult to do, because the background is changing so quickly because you're moving over the globe so quickly, rela- you know, you're- you're closer to- to the earth. And HBTSS has demonstrated all that as part of their Phase 20 with flight-like hardware. That's what gives us the confidence to move forward. I'll say that, you know, we've learned a lot from what MDA did there. We're incorporating all of that, and the system works the

architecture should work well together with the wide field of view queuing the medium field of view closing on an actual fire control solution.

Did that answer that, Theresa? Okay. All right. Sandra. Sandra Erwin, Space News, everybody. Another round of applause. Yeah. Good.

[00:18:44] **Sandra Erwin:** Thank you Derek. Sandra Erwin, Space News. I wanted to ask about trying to, you said, you're about to go out for proposals. How many- it's a two-part question. How many satellites will there be in Tranche 2 and now that you started working with a bunch of providers, you know, some of them, pretty much now have won, you know, two contracts in a row how do you envision that potentially you could select somebody else? Would that be disruptive if you bring another supplier by Tranche 2 and do you expect that there will be more competition, at that point? Thanks.

[00:19:20] **Dr. Derek Tournear:** No, those are good questions, and I'm gonna answer them in reverse order because I'm gonna have to refresh my memory on the numbers while I'm answering the question. But there's a profound piece to that question that I have to emphasize to everybody, 'cause I think it is one of the main tenants of what we're doing at SDA that we need to get everybody on board with, and that is I am strongly opposed to any kind of vendor lock .

I don't think it helps the government, I don't think it helps industry, and it's just bad all around. You know, I came from large aerospace and defense corporations where we won programs and that essentially gave you guaranteed employment for 15 years. If you lost the contract, you were in trouble for the next 15 years, 'cause there wouldn't be a new program. That is not good for industry and it's certainly not good for government.

In order to combat that, what we have done is we have enforced some certain standards, and we publish these standards. One of them is completely published- is completely unclassified and it's on our website, and that is the optical communications standard. you develop a laser communication terminal and it matches our standard, then you can feel empowered that you can proliferate whatever's behind that I don't care if it's a black box, there can be as much proprietary stuff in there as possible, but I know that you can tie into our network and there's there's no vendor lock.

And in fact, we have a government reference test bed set up at the Naval Research Laboratory where people can bring their optical communication terminals and demonstrate that they meet that standard. That's critically important to make sure that we do allow new entrants to come in. We will

compete full and open every Tranche, every layer, to make sure that we keep an actual market, not- not a pseudo market. We have the optical communication standard is one, and then the networking standard is the other.

The networking standard was developed by Naval Research Laboratory, NEBULA, Networking-Enabled Beyond the Upper Limits of the Atmosphere, obviously, and, [

[00:21:13] **Audience:** laughing]

[00:21:14] **Dr. Derek Tournear:** ... That standard is also published, but it's CUI, so we can't put that on the website, but people that can look at it and build to that. And those are the key things, 'cause I want people to make sure that they feel empowered, that this is a market. As you put business cases together, SDA is going to be investing essentially, you know, a rough order of magnitude, $2 billion a year per layer. 2 billion dollars a year going into transport every year, $2 billion a year going into tracking every year. As we do more missions, that's the cost of the service, if you will.

And that's the market, and then you make your business case based on, look, I think we'll win 10 percent of this market, 20 percent of this market, whatever, and then you make your internal investments accordingly. In fact, I'm counting on internal investments in industry to help push this forward. My goal is just like the cell phone model, we will keep, essentially, the price of the satellites to the government, essentially, the same, flat.

For- for the- for the transport satellites, it's on the order of sub $15 million, is what we plan on- on that price being, just like your cell phone has a certain fixed price, you know, $500, 700, whatever the cell phones run nowadays. I buy mine at the Dollar General store, we won't talk about that. But the capabilities will continue to advance. For that same price, every Tranche will give you more and more capabilities for the same price.

That's the model, just like the cell phones. Basically, the price is flat, but each new model has more and more capabilities. And that's what I need industry to invest in, and I welcome you to team with other DOD entities that are more aligned with doing R&D, such as DARPA, such as AFRL , et cetera, so that you can come up with an offering that gives you a differentiator so that you can- but you're still convinced you can deliver an operational system in two years and bid that. And put that into your business case, assuming you're gonna win a certain percentage of the market share, and that's kinda how I want you to view on it.

Now people can hear me say that, and then they can look at the data and they can say do we know we can trust that," because on Tranche 0 transport satellites, I had two vendors. I have York and Lockheed Martin on Tranche 0. All right? And on Tranche 1 transport layer, I have three vendors. I have York, Lockheed Martin, and Northrop Grumman. People can look and they say, "Okay, yeah, we hear you say a lot of things, but we also saw that you gave the two incumbents awards on Tranche 0- or 1 can we really believe you?"

I'll tell you, had we awarded two instead of three on Tranche 1, one of the incumbents would not have gotten an award. It just tells you, no, just because you get an award, doesn't mean that doesn't mean that you're guaranteed for the next Tranche, and that's just the way it goes. You develop offerings, we do our evaluations based on schedule, number one, price, number two, and then performance, number three, which is completely changed the paradigm from where you know, historical DOD acquisition.

And one of the key things that we're also incorporating is we're putting a high value on past performance. You know, we're going to past performance of SDA is going to take even a higher precedence. If you do well for us, that's good, if you do poorly for us, that's not good, and if you've- you know, if you've essentially don't have past performance, it comes in neutral. That's how we're gonna be going.

Now to answer your question to make sure I get the numbers correct on Tranche 2, so Tranche 2 Beta, first one out the chute, it's not in here, so I'm gonna make up the numbers as we go. I believe it's 72 satellites on Tranche 2 Beta, is what we're looking at. On Tranche 2 Alpha, 100, and then on Tranche 2 Gamma, it's 44. Those are the numbers that stick in my head, and then on the tracking satellites, we have not gone through Warfighter Council on that yet, so the Warfighter Council is how we get our requirements.

We went through the Tranche 2 transport Warfighter Council 22 March. Those requirements are blessed. That's why we're able to push forward and put out the solicitation next week. Those numbers you know, unless I'm misremembering, those are the numbers, 100, 72, and 44, and then on the tracking satellites, since we have gone through Warfighter Council, can't give you the exact number, but it's gonna be on the order of 54, is what we're looking at for Tranche 2 tracking.

And the awards, likely, you know, this is TBD, based on what the proposals come in, but we assume that there will be three awards on Beta, two awards on Alpha, and two awards on Gamma. All right. I think that's the question. Okay. Any other questions? I can't- it's hard for me to see hands, 'cause the lights.

Somebody over there? Oh, there you are. Okay. Please say your name and where you're from.

[00:25:52] **Tim Ryan:** Thank you. Tim Ryan with Partners in Air and Space and the other Tim Ryan, not to be confused with the Tim Ryan Mitchell. We get each other's emails all the time, congratulations on your Tranche 0 launch. That was awesome. I had a question on integration. You know, capabilities is one thing. Integrating it into the existing architecture is obviously a huge challenge.

Just wanted to hear your thoughts on have you put you know, what thoughts you guys have put into that, who's responsibility is it, that sort of passed on to SSC to integrate or how is the integration into the, you know, different various architectures? What are your plans there? And will you be ready to have some capabilities for the 2026 fight?

[00:26:33] **Dr. Derek Tournear:** Yes. Tranche 1 will be operationally capable for fight in 2025. That's what we're pushing for. Integration is a complicated but well orchestrated dance that we're doing with the other organizations inside the Space Force. I'll walk through the plan. It is you know, it's not poured in concrete, but this is the main framework.

SDA will develop everything we need from our ground operation centers to all of our networking and all of the infrastructure to support, fly, operate satellites, maintain the mission the networks, maintain the constellations, and to get those data into the existing warfighter's hands, via Link 16 or via the- the joint OPIR ground, and then out via laser comm and- and KA. We will build that backbone and maintain that so that it is all operational and ready to go, and we will go through the standard Space Force operational test and evaluation to bless that as operational.

Is SDA going to be a warfighting operation center? No. This is how we're planning on doing it. We will own and operate the operation centers. An operation center for satellites is composed of three main functions. You've got mission management. Those are the folks that do, you know, the prioritization of if I have to do load shedding between network over Indo-PaCom or a Link 16 network versus a KA network versus a network over EUCOM, that's mission management, and they basically take direction from SPOC, who gets their prioritization from the combatant commanders.

That's mission management. That's the first function, the highest level function that happens at an op center. Second is network management. Network management is making sure that actually the network is all green, everything's

up and operational and everything's working properly the cross links are talking to one another, we're passing IP data it's the same way that you would have your IT service provider making sure your internet is working.

SDA is responsible for all of that and we're going to run that on a government-owned, contractor-operated model. That's what our operations and integration contractor will be responsible for. Then there's even a lower level below that, and that's satellite operations. Those are the three parts of the network- of an operation center: mission, network, and satellite operations. Satellite operations is health and status of the satellites, making sure that, you know, you actually have the commands in place and primarily, it's all automated so that if I need to point a Link 16 antenna I go through the satellite.

The satellite asks to talk to the payload, and I don't put any command in that would harm the satellite. Those kind of things. That is, essentially, going to be all automated. That's also going to be government-owned, contractor-operated SDA's responsibility and that will be a mixture of our operations and integration contractor and the space vehicle vendors who are on contract to be able to do that operation.

All right. SDA will set up that entire construct, and then what we do is when it- when that is blessed as operational and through the OT&E process, then the the folks that were the- the folks that were the uniform wear wearing warfighters that are doing the mission operations will switch their badge from Space Force SDA to Space Force SPOC, and they will now be resident on the SDA op centers, but their reporting chain and authority will all run through SPOC, because they will have the functional responsibility to make sure that the prioritization of the constellation is done in conjunction with what the combatant commanders are giving them.

That's how we have that set up, and, you know, our plan is to have that all done through and- and have portions of Tranche 1 operational for the fight in 2025 Lord willing and the creek don't rise, that won't happen because this capability will deter anyone from ever attempting a threat on the US. Hope that answers the question.

Back in the back, there. I can't see.

[00:30:25] **John Kohut:** Kohut from GALT Aerospace. I'm interested in the interaction between the Tranches and the commercial highly populated Leo constellations that are going up. Two aspects that I'd really like to hear about is the government leveraging those capabilities like Starlink and others? And the

other thing is what Mark Dankberg talks about a lot is the vulnerability with putting that many satellites in a row in a relatively small orbital space?

[00:30:50] **Dr. Derek Tournear:** Sure. Last time at this forum, when the question was asked about the vulnerability of LEO satellites, I challenged Vladimir Putin to shoot something down or something, so I won't do that this time, because I-

[00:31:04] **Audience:** [laughing]

[00:31:04] **Dr. Derek Tournear:** ... got some- got some press. But commercial satellites, commercial constellations, there's two basic kinds. There's the commercial ISR providers, your electro-optical imagery providers, your SAR providers, you know, your radar imagery providers, and then there's your actual networking constellations, your Starlinks, your OneWebs, your you know, future, those kind of things.

We at SDA, want to leverage all of the commercial ISR immediately. The idea there would be, and we're working with Capella as a test case to see how they could get their data directly from their satellites onto our transport layer with the idea that is the quickest way that we could get the data from the sensor directly down, then we could send it directly down to a shooter via Link 16. That's one of the first things that we're working on to be able to demonstrate that.

For a lot of the ISR providers, that's not possible for a couple reasons. Number one, their satellite's already on orbit, so they can't put an optical cross link on there to talk to us, number one, and number two, you know, some of them, like Planet, they fly a lot of satellites that are smaller, much more affordable, and they really couldn't host our optical cross links without changing their design significantly.

For those, the plan is we would go down to a ground and then have some way to rapidly bent pipe their data in some way up to a terminal that could come up and then get on our transport layer and get to the troops. For the networking side, we and this is where the SWAC Space Warfighting Analysis Cell is is working to come up with what the overall data transport force design for the Space Force and the DOD at large would look like, and the preview of that is we- we certainly want there to be connectivity between the DOD tactical transport layer and kind of a commercial, high bandwidth data data transport backbone layers.

And the way we do that is still TBD. Likely, we will have to have some kind of translator sats, where we would have satellites that would have capabilities to be

able to talk directly to the commercial constellation and our constellation that would act as a VPN so that we could make sure that we protect the cyber aspects between the two. 'Cause the way we look at it, if you call the internet in space the outernet, we are the sopernet in space or the SIPRNet in space. We're the sopernet. We can't just plug back and forth a commercial NIPERNET, unclassified network, to our SIPRNET and make that easy. We have to have some kind of a VPN that allows us a trusted gateway to do that. That's where the translator sats come in, 'cause we know that some companies have already said they are going to put optical cross links on their networks of satellites to talk directly to ours, which is great. We encourage that, but we'll have to make sure we have some specific satellites set up to do that trusted connectivity.

That brings me to your final question about the resiliency and kind of what threats we're worried about. I'll tell you, I'm not worried about any threats, physical threats to the satellites themselves. I'm just not. The way we get around that is by proliferation. We'll have hundreds and hundreds of these satellites up there. It will cost more to shoot down a single satellite than it cost to build and launch that single satellite. We just completely changed that equation. That's not a big threat vector.

I worry about common mode failures 'cause you can't proliferate your way out of common mode failures. The two common mode failures that I'm worried about are cyber, obviously, is a big one, which is why we wanna put all of these constraints in place to protect against that. Dr. Costa, here, is, you know, is helping with that on the Space Force to make sure that, you know, it all fits together in a robust cyber-secure architecture, and that's why we have a lot of protections and constraints in place on our contracts that you know, that are typical on what you would say a commercial commoditized procurement. Those are- we put some requirements in there.

And then, the second big common mode failure is supply chain with two threats. One is just your- your benign supply chain problems that can we really build these satellites this quickly? And we're building up industries yes, we can. We're kinda beating down that- that supply chain threat, that supply chain risk. The second one is more the nefarious supply chain, and that's the actual interdiction by a- an- a, you know, a- a nefarious actor into a supply chain. And we actually put a lot of protections in place in our contracts so that we can- we can evaluate and make sure that we have non-destructive testing in place to detect that.

'Cause those are- those are the big threat- threats I'm worried about. Cyber, supply chain, can we actually build them in time, and then, two, can we trust

our supply chain. That's... Okay. One- one more question. Ladies, make it a good one. Courtney?

[00:35:44] **Courtney Albon:** Hey Courtney Albon with C4ISRNET. I had a lot-

[00:35:46] **Dr. Derek Tournear:** And- and her claim to fame, she also flew out for the Thursday launch and- and didn't see it.

[00:35:53] **Audience:** [laughing]

[00:35:54] **Courtney Albon:** Yeah, a little anticlimactic there, but, [

[00:35:56] **Dr. Derek Tournear:** laughs]

[00:35:56] **Courtney Albon:** ... I want to ask about launch. The Space Force just put out its phase- phase 3 R- RFP for NSSL. I'm curious what inputs you offered, what feedback you gave as they were developing that acquisition strategy and then what your take is on how that shaped up, and then also yes, do you expect that SDA will primarily use the- the lane one part of that or do you think that you'll also be able to utilize the lane two element of that,

[00:36:17] **Dr. Derek Tournear:** Certainly. The NSSL phase 3 acquisition, we actually worked pretty closely with the NSSL team and- and General Purdy to- to make sure our requirements were fed in, based on the lessons learned that we had from- from NSSL phase 2. We bought our Tranche 0 launches on the commercial marketplace, and then we bought our Tranche 1 launches through the NSSL phase 2. We have- we have a really good dataset on what, you know, what is a commercial launch process versus what is the NSSL launch process, and we brought those lessons learned in to the NSSL team as they crafted- as they crafted phase For phase 3, lane one does have what SDA says, "This is what- this is what we want to use to buy our to buy our launches going forward." You know, it's got some of the- some of the things with- with phase 2 that will be fixed, that the commercial industry, we didn't have that problem with the commercial launches. Paying for launches two years ahead of time, making sure that they're- that's- that's something that that in phase 3 is a- is a little different in lane one.

Being able to make changes to your manifest much more closely to- to the launch date than than- than what was previously allowed on phase 2. Phase 3, lane one will allow that. And, of course, it will allow new entrants to come in demonstrate a- a launch, and then you can- you can win- win one of the launches. I- I do think that the phase 3 is- is organized pretty well, but I- it's in

the it's in the draft stage now, so please s- continue to send your inputs in, 'cause the NSSL team is genuinely interested in- in what inputs you have. But, for us, for SDA, right now, we think that our requirements are well suited in- in phase 3, lane one.

[00:37:59] **Gen Kevin Chilton, USAF (Ret.):** Dr. Tournear, thank you.

[00:38:00] **Dr. Derek Tournear:** Thank you.

[00:38:01] **Gen Kevin Chilton, USAF (Ret.):** Great job. It's- it- you know, it's- it's really nice to- to see to have a vision for something of the future, but what's even nicer is to have someone up here on stage who's executing that vision, bringing proliferated constellations to reality, and, Derek, we just wish you all the best, 'cause it's so important to national security. Appreciate your leadership and I hope you'll come back and join us again next year and give us another update.