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Infinity and Beyond: Space and National Security
Lt. Gen. Jeff Kruse, Director, Defense Intelligence Agency
Robert Lightfoot, President, Lockheed Martin Space; Former Associate Administrator, NASA
Gen. Stephen Whiting, Commander, U.S. Space Command
Moderator: **Loren Grush**, Space Reporter, Bloomberg
YouTube session:
https://www.youtube.com/watch?v=xqwtvg-_I98&list=PL7fuyfNu8jfPTKp6PJ2yJugSfxXEDyEqM&index=8

Loren Grush

Hi, thank you so much for being here. As she said, my name is Loren Crush. I'm the space reporter for Bloomberg. It's a great beat. And I would say that probably most in the general public, when they think of space, they think of civil space exploration. But you know, the truth is that space has increasingly become a war fighting domain, as we are often reminded and more and more unique threats in the space environment and around the world have been emerging in recent years, and I have a great panel of speakers to talk to me about this specific topic. So Lieutenant Kruse, I'd like to start with you. Can you start us off with maybe just kind of a higher view of what are the biggest concerns around the world right now when it comes to the space environment?

Lt. Gen. Jeff Kruse

Okay, well, let me start by saying it is really a thrill to be here on this topic. And to start you know, Aspen this year with this topic really does stay with us as a message of how important the topic is, but it is an area of just dramatic change, I think, perhaps only exceeded by artificial intelligence. I would say the technology that we see in space, the change in how space is being used, and the impact that space can have on ground and ground can have in space, is really in a new place that we all need to address. So thank you for letting us have this panel at the beginning of this week, this war this week. So a couple of high level trends I think that I would offer really, one would be and then I'm going to get into some specifics, if you don't mind. But at the high level, I think the two big trends that I would see as an intelligence professional, national security practitioner, would be the number of partnerships that we see in the space community, both formal and informal. That might be industry with government, that might be government to government, and some of the informal relationships that some countries are starting to work together in ways that we have not seen in the past. And what does that look like? So the partnerships, there's tremendous goodness. There's the only way we're going to be able to be as effective as we

need to be in space is through those partnerships. But with that comes, because of the threats in space, some additional considerations that we have to keep at the forefront. The other piece, I think, at the macro level, would be about the impacts that space can have. Our economies, our diplomatic capabilities, our military capabilities are all dependent to some degree, on space, and so this domain becomes more and more important every day, and I'll get into a couple of specifics, but I would say the from a military perspective, one of the trends that probably over the last couple of years is something I would highlight for this forum is the increasing amount in intent to use counter space capabilities to threaten space as we see it today. So I'll just touch on Russia and China very briefly. You can always come back to those so if I were to talk about China, I would say, if I were to describe it at a very sort of nice way, is that they absolutely intend to be a broad based, fully capable space power, both economically and militarily. And we see that in the amount of research and development that they're doing, we see that in the increase of launch capability to see that in what they're doing, we'll say lunar and other places, they're in multiple orbits that they did not used to be before for this crowd, though, I hope you don't mind me being very, very precise when you talk national security. China aims to displace the United States as the global leader in space, and to exploit space in a way that is to our detriment, and it counts on what they perceive as a US over reliance on space, and it intends to hold that capability at risk, and where we see that taking place is just a tremendous increase in directed energy weapons, in electronic warfare, in anti satellite capabilities, their unorbit technology demonstrators are demonstrating some capability and intent that really does have military applications. And so what I would offer is, as we talk about space, we need to really think about, how do we defend space? And I can't wait for General Whiting to tell us how he's going to solve that. The other piece on China that I would offer and why we're able to make those kind of assessments and those kinds of statements, is China is one country that more so, even than the United States, has a space doctrine, a space strategy, and they train and exercise the use of space and counter space capabilities in a way that we just don't see elsewhere, other than what we're trying to do in the United States to defend our own capabilities, quickly pivoting to Russia, just to get that on the table for you, I would offer you're all aware of Russia's lack of conventional superiority. We see that today play out on battlefield in Ukraine, and then we also see their work to reinvigorate their defense industrial base, and what that looks like for reconstitution. And vis a vis NATO, because of that lack of conventional superiority. They are very much focused on space capabilities as an asymmetric capability. They're focused on all opportunities for asymmetric opportunities, space being one of those. And very much so they consider space a warfighting domain. We see them active in the space domain in Ukraine today. And what I would offer is both Russia and China view the use of space early on, even ahead of conflict, as important capabilities to deter or to compel behaviors, and we just need to be ready for those. I don't want to make anyone 10 feet tall. I would certainly tell you that Russia, you're all aware, is probably having troubles with launch capabilities. They have trouble maintaining health of constellations in ways that we have not seen in the past, but they have reached out to others, and what I would offer is they've reached out to China. So just as we see in other

domains, as a result of the conflict in Ukraine, we see Russia working with others, and really, for the first time, some historical friction points between those two countries are being set aside in one of those areas space, we see some cooperation that we have not seen in the past. So with that of trends and threat, good luck.

Loren Grush

Yeah, I was going to say it's a shame we only have 40 minutes for this panel, because I'm sure we could go many, many hours talking about this topic. But I do want to transition to you now General. So yeah, you mentioned how you're going to help the DIA when it comes to addressing these threats operationally, I'd love to know what are the strategies that Space Command is using when it comes to addressing all the threats that Lieutenant Kruse just talked about.

Gen. Stephen Whiting

Yeah, thank you for the question, Loren. It's great to be here. Thank you to Aspen, and great to be here with Jeff and Robert. You know, this is how space has changed over the last, really, 15 years. Yeah, there were threats from the Soviet Union going back into the 70s and 80s, but now, since the Chinese asat test of 2007 where they put us on notice that they could shoot down a satellite it was their satellite it was a test, but at a relatively high altitude and low earth orbit, we have only seen their development of counter space weapons just rapidly, breathtakingly increase. So the nation in 2019 finally said, we can't stand that threat and how we're organized for it. And so in August of 2019 US Space Command, the 11th combatant command of the United States, was created to oversee military operations in the space area responsibility. And then in December of 2019 the nation stood up. US Space Force, an armed service solely focused on organizing, training and equipping forces for the space domain as well. And so now it's about having professionals laser focused on this problem. How do we defend against these threats? And to your question, Loren, it's a whole host of strategies. It's making our current constellations more resilient. You see now that the development of proliferated low Earth orbit constellations and the success that they've had in the Russian invasion of Ukraine, because those are more difficult to target, and we could talk about that, and we're seeing a whole host of our constellations now heading in a direction of being more disaggregated, more distributed, having having built in defensive capabilities against these threats. But resilience is not going to get us there solely by itself. We're going to continue to operate many of the legacy constellations that we operate today, which were either built or the requirements were laid down prior to this new threat. You know, era that we, that we live in, and so we've got to defend those constellations, because they're going to be with us for a much longer period, even as we replace them. And then we have to help the joint force be protected against the space enabled militaries of China and Russia. China is building a kill web, if you will, in space tailor built to find fixed track target,

and help provide, you know, engagement vectors for over the horizon fires against US and allied forces throughout the Indo Pacific Air responsibility. And so we have a role there to help defend those US, forces from from China's more precise, more lethal and more far ranging, terrestrial Army, Navy and Air Force. And then finally, we've got to build a test and training infrastructure in this country that convinces us that all these new capabilities will work. Because we're planning for, we're planning for and hoping to deter a war that has never happened. We don't want that war to happen. It's not inevitable. But unlike in the air, the maritime and the ground domains, where we have hundreds of years of history and we have very robust training infrastructures, we don't have that in space at the level that we need. So we need. So we got to do all four of those things I just mentioned to really ensure that America continue to access space against these threats we now see

Loren Grush

You mentioned making the constellations more resilient. I did want to touch on our launch procurement and our launch providers. At the moment, just last week, one of the main Space Force launch providers, SpaceX, suffered a very rare in flight failure of its Falcon nine rocket. I'm wondering if you can take a moment to comment on moment to comment on what you know about that issue. Do you feel confident that we have a resilient launch capability at the moment, and how quickly can we get get back to flying?

Gen. Stephen Whiting

It just so happened that last Friday morning, I was in Seattle, Washington, visiting SpaceX Starling. And so, you know, we showed up, and some of their senior leaders were there, and they were very transparent, giving us insight into what had happened. So I personally have full confidence in SpaceX, working with the FAA, working with NASA, working with the Space Force, to figure out what happened and continue launching. They've launched the Falcon nine hundreds of times, and I'm sure they'll figure this out quickly. But it also speaks to the wisdom of our national space transportation policy, that says we as a nation need two independent families of launch rockets to get to all of our overall regimes. And certainly, SpaceX is providing one of those. And we have another one through United Launch Alliance. And you know, that's a great thing for the nation, that we can continue to launch even while these investigations go forward.

Loren Grush

Robert, I'd like to turn to you now. So as I mentioned, you know, when it comes to civil space, you have quite a great deal of experience there, but now you're on the contracting side of things. I'd love to learn more about how Lockheed is working with the various agencies to help, you know, provide the technologies that they are looking for. And then

also, you know, when it comes to launch as well, you are on the board for Ula, which provides a really important service for the Space Force. I'm curious how Lockheed, you know, goes about strategizing and making sure that you are addressing all the ways that the government needs these technologies and to address these threats. Yeah,

Robert Lightfoot

thanks, Loren. Appreciate the opportunity to be here. I'm going to start at a little bit higher level and work my way down to your question. I think, from my civil background, what I see now that I'm on the industry side, but also supporting these two gentlemen and their missions, it's really an interesting situation where space has become, I think, you know, one of our strategic sectors that we need to talk about. Anya and Eric Schmidt talked last night about strategic sectors. I think space is one of those. I think we take it for granted. I think we take a lot of things for granted when it comes to space, when especially associated with, you know, when you flew here, I bet you had Wi Fi on your plane. When you drove here, I bet you used GPS. And last night, when the storms came through, I bet you looked at the radar all on your phone. And I don't want anybody in this room to be those people that I've had people tell me, Hey, why do I need those satellites? I get it all on my phone. So, so I'm glad I got laughter. If you didn't laugh, see me afterwards, and we'll talk about that. But, but our daily reliance, if you did an ATM transaction yesterday, or any time last week, right? That is all based on space assets, not just what these gentlemen are trying to protect, from a national security perspective, militarily, but financially. Economically, space is absolutely critical to the day to day things that we're doing. So from my civil perspective, when I was at NASA, we also have an opportunity in space. Sometimes to maybe the word used last night, I thought it was very important, was the word engage. Space gives us an opportunity to engage some of our adversaries at times, go back to the Cold War, 1970s Apollo Soyuz, right? We use that opportunity to come together in space. I personally experienced when Russia invaded Crimea. We had all the sanctions against each other. The Space teams were the only ones that were allowed to be in Russia because of the shared capability on the International Space Station. So, so we got all of that going on, there's opportunity. But to your question, Loren, I think what we're doing, what we're seeing, because of the threat that these two gentlemen talked about, is it's speed. It's about speed. How can we get there faster? And so what we what we're doing, from a Lockheed Martin perspective, and I think a lot of our partners are doing this too, is, I have no doubt my team can develop every capability we need. The question is to have time for them to develop that. And so what we're doing is we're looking there's so many people in this in this country, developing and innovating and bringing things forward, and we're part of that. We're doing it as well with some of the things we're doing. But there's also opportunity for us to leverage those folks, partner with them in a way that we can bring mission kit to our warfighters faster, right? And then protect, you know, our ability to use space, right? If you look at history, just a quick history lesson, I gotta look as history starts with exploration, right? Or any, any big event

starts with exploration. We explore right, whether it's when it came, when people came to United States, when we went from the East Coast to the West Coast, all of a sudden, you find some economic benefit. So there's a commercial application, which we're now starting to see in space. It's a little slower, because space is a little bit harder to get into. As soon as you find that economic, economic or business application, you got conflict, and that's what these two gentlemen are trying to help us, and we're trying to help them with our systems to really, really allow us to still have the commercial applications in space, as well as protect our nation and protect our warfighters who are beyond line of sight in that battle. As far as ULA goes, we're obviously, we co chair that the ULA board. Lockheed and Boeing is a joint venture between us. From several years ago, we were building a vault in rocket. Right now he's got one more flight. It'll be certified to be part of the part of the kit that these you don't have to get the satellites on orbit. And I think we made that investment several years ago to go to this particular rocket. I think first mission was right down the middle. We expect the second one because second one to be the same way. So pretty excited about the opportunity there.

Loren Grush

Just to follow up on that real quickly. There has been concern about ULA being able to ramp up the Vulcan rocket and, you know, being able to, you know, meet the needs of the Space Force. I also wanted to ask about Lockheed, you know, commitment to Ula as well. There's been rumors of a potential sale. Just wanted to give you a moment to comment on that and whether Lockheed is still very committed to United Launch Alliance moving forward.

Robert Lightfoot

Yeah, we won't comment on any of those rumors that you've heard. That's not our policy to do that. But we're committed. I mean, I'm I hold a board meeting every every quarter I'm at the launches when they have them, and so definitely committed all in. I need them to be successful too, because I build the satellites to fly on top of that, just like everybody else

Loren Grush

says, speaking of satellites, you mentioned earlier that you were at Starlink when the news of the Falcon nine failure reached you. And obviously, you know, low Earth orbit has become a very enticing place for satellite operators. I'd love to talk about, you know, how you guys view this domain, especially with the rise of mega constellations, is that something that the Space Force and the Pentagon are eager to capitalize on as well? Maybe we could start with you. Lieutenant Kruse,

Lt. Gen. Jeff Kruse

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I would say low Earth orbit is probably one of the most important orbits that we have for some of our capabilities that we need for war, fighting, but it is also just absolutely instrumental to the economic engine that is the United States. Our strength actually is our economic base, our innovation as a nation, and we need to protect that as much as possible. And a lot of that resides in low Earth orbit. It's also where a lot of the partnerships are. And so as we think through what are the threats in low Earth orbit, it is about defending the broad swath of us capability, the US economic engine. There needs to be a profit model for our company to stay in business. And so how do we ensure that there is a foreseeable, predictable risk, acceptable path forward? Then would we think about the threat regimes and the orbital regimes that some of our adversaries are looking at? They started in low Earth orbit, which is where it's easiest to reach, easiest to create effects several of our potential future adversaries, competitors today, you know, are certainly looking at, how do they reach into other domains, other orbital structures, as well, and we'll see what they're able to produce in each of those. But I would offer the ability to maintain operations in Leo is a crucial thing for all of us to focus on, whether that's resiliency, whether that's defense. You know, for our commercial partners, in the only way we're going to be where we need to be is with our industry and commercial partners. You know, we need to think through how do you respond? As Starlink did when a nation state such as Russia is not targeting me or General Whiting's assets, but but actually targeting those kind of capabilities that are provided directly. How do you respond in Starlink has just been fabulous, and how it has responded, and it's been interesting to watch. I would offer to before I hand it over. I think one of the lessons learned out of the entire Ukraine conflict, and there are many, and we'll see what really survives over time, is applicable in other theaters, but one of them is Russia actively targeting through electronic warfare, the low Earth orbit domain, and, you know, having minimal repercussions so it you know, in this conflict, we're not escalatory actions, and we need to make sure we understand what lessons Russia might be drawing from that. And then how do we want to change the environment so that we understand and can message that there may be repercussions for those kind of activities going forward,

Loren Grush

giving your chance to comment on that,

Gen. Stephen Whiting

Yeah, your question about the importance of low earth orbit, let me first start by giving kudos to US commercial space industry. If you were to make a list of what our advantages are in the United States right now, as we sit here in July of 2024 looking forward, on that list, I would include the US commercial space industry, period. Dot not just for the space community, but for the nation writ large. It is a it is a massive strategic advantage for us, and it is an advantage that has widened over the last few years. Now, I don't want to sit on our

laurels. Certainly, the Chinese are investing a lot to their commercial sectors, which is always due to a use sector, it seems to us, but, but we want to make sure on the defense side that we are leveraging the innovation that we see in the US commercial defense sector and P Leo proliferated lower Thor, but that's really been driven by commercial industry creating whole new form factors of satellites, figuring out how to produce satellites At volume, where you're producing dozens, if not hundreds, a week, which is a very different model than we've had in the past. And so we want to make sure that we're leveraging onto that. Of course, we're starting to see that now in in satellite communications, we're seeing that in ISR, we're even seeing with the space development agency that we're going to start using those kind of orbits and those kind of technologies for a missile warning and missile track. So we think there's a host of constellations and missions that can that can be moved into low Earth orbit. Now we want to be smart about it, and there is still value in being a medium or orbit and geosynchronous orbit and and then when we start to distribute our missions across all of those orbits that really starts to build in resiliency for us across our mission sets.

Robert Lightfoot

If I could come in, I think the last point is really important. Low Earth orbit is critical to what we're trying to do, and all of us, even in industry, have adapted to that. As opposed to the one satellite every seven years. You're going to multiple per year that we have to do. The real key to the multiple pathology, the low earth orbit, medium Earth orbit, Geo and even cislunar, is interoperability. And we didn't build these, as General White said. We didn't build these things thinking interoperability when we built some of them. And now we're trying to make sure everything we fly can somehow be interoperable with all the others. So you can hope data custody can go from low Earth orbit to medium Earth orbit. How can we make sure we've got that so that if anything does occur, we can handle that threat?

Loren Grush

I wonder if we could be slightly more specific. You mentioned leverage, leveraging the commercial capabilities that are out there right now. I know there's been a lot of buzz around things like Starlink, Star Shield. I'm curious what kinds of capabilities do these, these constellations? What are you specifically looking for, and how is the Space Force leveraging them?

Gen. Stephen Whiting

Yeah, and of course, it's how the whole Joint Force leverages them to enable all of our capabilities. But for example, in satellite communications, the ability to get, you know, fiber quality throughput with rates anywhere on the planet at any time. Well, that's incredible for a

global military superpower who wants to operate untethered from terrestrial networks, because we don't know where we might need to operate, in any ocean, potentially in any on any continent. And so that gives us incredible capability with that kind of satellite communications. Additionally, we've seen value in in the ISR arena as well. Certainly, that's more Jeff's remit than mine, although I am a consumer of that intelligence, but the ability to constantly be watching what's happening around the world and do change detection so you can see, oh, you know that that airfield has gotten way more active in the last 12 hours. Why is that? That can be an indication and warning to some activity that becomes very important to our geographic combatant commanders around the world, or US Space Command. So I think there's a host of missionaries, and we could walk each of them through maybe I'll mention missile warning, missile missile track. You know, we've we traditionally think of ballistic missiles is exactly that they launch. You can once they're through their boost phase, you can very precisely measure exactly where they're going to hit. Well, now that's not the that's not the threat we really face anymore. Yes, they they're ballistic and boost, but then they're maneuvering and highly dynamic, as they're now entering into their, you know, their descent phase, and so going to a lower orbit with a proliferated missile warning. Missile track architecture is going to allow us to track those warheads much better, to give better attack indications and attack warning, which will be important for our terrestrial forces.

Lt. Gen. Jeff Kruse

And just let me double down on a couple of those pieces, because data is the coin to the realm and the ability to push in future modern conflict. But even in just today's business environment, large volumes of data around the globe, the low Earth orbit communication strategy is absolutely crucial, just because of the vulnerability of the small numbers of communication satellites and other regimes. So that's one on the ISR side, I would also focus different phenomenology. I would often think of it as I'm going to have this electro optical image or this IR image, but as commercial gets into synthetic aperture radar, so radar imaging, hyperspectral imaging, so we can understand, not only visually, what's going on, but is there chemical warfare activities ongoing? Is there chemical weapons use, those kinds of phenomenal technologies in low Earth orbit become absolutely crucial to what we're thinking about are the needs of the future.

Robert Lightfoot

I think the only thing I would like to add is, because we talked about it a little bit last night, is we're going from a regime a time where we had wound to the moon, we had less power, less compute power, than we then you have on your iPhone, right? That's the story here.

Now, instead of gigabytes of data coming down to these guys, there's flops, right? And so we're going to have to leverage AI to help the decision makers understand the difference and process that data in a way, not not human out of the loop, human in the loop, but give them some some good intel before they have to go through themes and reams of data. And that's that's where I think AI is going to make a big difference when we're doing some things there with Nvidia. We talked about them last night, some some ways we can actually help from a joint all the main operations kind of situation, help the decision maker take that reams and reams of data, and what in there is important, right? What in there is really important.

Loren Grush

Let's talk about Russia. You mentioned it earlier, but I think it's worth diving into. There was a recent op ed in the Wall Street Journal accusing Russia of being a space bully. And just a few of the things that you know that have come out about their space capability, they've been accused of GPS spoofing, satellite jamming. There was a much criticized anti satellite test a few years ago, and now there is this mysterious nuke capability that they are supposedly developing. I'm curious from all of you you know, what is the biggest threat that you guys are tracking from Russia, and how do you plan to respond to those moving forward? Maybe Lieutenant Kruse.

Lt. Gen. Jeff Kruse

I'll start there to say for the first dimension, the answer is just Yes, they're doing all of those things and don't intend to slow down, and until there's repercussions, will not slow down. You mentioned the sort of media coverage a little bit earlier in the year about a potential for nuclear weapons in space. I think I'd just offer a couple of pieces. None of this is news breaking. It's really just cross level to everybody, which is we have been tracking for almost a decade, Russia's intent to design the ability to put a nuclear weapon in space. They have progressed down to a point where we we think they're getting close. And so that was a lot of the discussion that you saw in the media to the specific question on, what is the threat of that if they were to detonate a nuclear weapon in space, it is not just going to affect military targets. The issue is, everything that's in line of sight at low Earth orbit is going to have immediate effects. And because, you know, orbital mechanics rule everything else that's going to within 90 minutes, it goes through some of those radiation belts. If it is not radiation hardened, it will have effects going down that path we understand, again, back to their lack of conventional superiority drives them to asymmetric solutions. They see this as a potential pathway that they might want to pursue. The exposure of it will potentially change their path. I am not sure that we know that yet, and that is worth the dialog going forward.

Gen. Stephen Whiting

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You know, it's just so disappointing what Russia is doing. Russia is the original space superpower. They launched the first object, the first animal, the first man, the first woman. You know, the young people would say they were the OG space superpower and and look at what they're doing. As you noted, Loren, three months before the Russian invasion of Ukraine, they did the hit to kill ASAT test, leaving 1500 pieces of long lived debris on the opening night of the of the invasion, did cyber attack against a commercial SATCOM provider, knocking off 10s of 1000s of users across Europe, expanding beyond Ukraine, and now we hear about a nuclear weapon potentially being put on orbit. The Soviet Union was the original signer of the Outer Space Treaty, which was signed the year I was born, 1967 my entire life, it has been an expectation for mankind that we will not put a nuclear weapon or weapons of mass destruction on space, in space, and now they're doing that potentially. And if that were to happen, as as Jeff noted, it's a completely indiscriminate weapon, it would, it would affect United States satellites, Chinese satellites, Russian satellites, European satellites, Indian satellites, Japanese satellites. And so it's really holding at risk the entire modern way of life. And it's it's just an incredibly reckless decision. It is not the action of a responsible space actor and and we hope that Russia returns to its roots as a responsible space actor and living up to its to its treaty obligations.

Loren Grush

Specifically, I want to know, what is the Space Force and Space Command doing to counteract these threats. What kind of capabilities do we have? For instance, what steps are being taken to, you know, stop civilian GPS spoofing, or, you know, what are the specific capabilities that we have to address these specific targets that you're talking about?

Gen. Stephen Whiting

You know, I'll, I'll talk at a high level. I'm not going to get into operational planning details. But over time, for example, in GPS jamming, we have, we have put better capability on board our newest generations of GPS satellites. So now we fly with something called M code, which which is available to military users. It's a military specific satellite that that improves our anti jam capability with our in our SATCOM regime, we're working to move toward hybridized modems, where one user out there with their SATCOM terminal, their SATCOM modem, will be able to leverage multiple constellations across multiple regimes to be able to quickly move we are constantly working to optimize our ability to to to respond to jamming and to move users as needed. And then there's always planning within the joint force about, how do we respond? And it's not always a space based solution. It might be a ground based solution, but it is, again, irresponsible when we read reports of Russian GPS,

GM that's affecting commercial aviation, you know, in Eastern Europe. And again, we want, we want Russia to be a responsible space actor and not do those kind of actions.

Loren Grush

Let's move on to the other big elephant in the room, which is also China. Something you brought up as well. I am curious. You know, it's often said that China is kind of the pacing actor when it comes to space. It's definitely invoked a lot when it comes to the civilian space or the civil space program, you know, for NASA's Artemis missions, that we need to get to the moon, because China is also Iron Moon. How much of that plays a role into how you guys address the threats from China? What is the biggest concern about their move as they, you know, become more dominant in the space arena? Mr. Kruse.

Lt. Gen. Jeff Kruse

I guess. Let me start with again, as we talk about engagement, as we talk about what areas of national security topics are okay to talk to China about. You know, space might be one of those. You know, they are a space faring nation. They want to bring power and prestige and pride and profit to the PRC, and they want to do that through this space program. So to some degree, they're going to be very, very active. And we, you know, to some degree, should partner with them, or at least understand what they're doing. I think what I would offer on the partnership side is because of the dual use nature for general as General Whiting mentioned, you know what they in their commercial sector, will go to PLA and so that is just really for us to understand. The People's Liberation Army. There is no such thing as purely commercial. So the things that we're doing and the things that we're seeing them do, I believe for them, it is about applications and all orbital regimes for what may be peaceful space bearing reasons, but then move into, you know, potential uses that we could envision going forward. I probably won't get too much more specific than that, and wish you the best of luck in trying to do that in an unclassified environment.

Robert Lightfoot

Yeah. I think you know, as I said earlier, if you you do see opportunities for us to have cooperation. Okay, they just brought a sample back from the backside of the moon, and that scientific community will share that sample, right? And so they, at least they've expressed it there, we're going to share it. So the question isn't, I personally don't see it as a quote race as much as it is because of the things these gentlemen are talking about. Why are they there? What are they learning that we don't, that we're not doing permit I kind of call it the space domain awareness, right? What? Where is the high ground? Right? We talk about cislunar. Everybody thinks that's around the moon. Really. Cislunars As soon as you get out of soon as you get out of geo, it's the whole space between Geo and the moon. So for us,

what we're doing is we're helping with the technologies we think we need to get there quicker, right? That's the first thing. And then the second thing is, we're supporting NASA on their Artemis missions, whether it's the lander that we're working on, Blue Origin, or whether we're working Orion that goes with SLS. So we're trying to help this country get back there from from that perspective, but I don't necessarily think it's a race as much as an understanding of what's going on there and recognizing the difference between, say, a NASA mission, which is dictated by the 1958 Space Act Agreement, to be for peaceful purposes, right? Versus, as you said, their purposes are dual period right from that standpoint,

Gen. Stephen Whiting

I'll just note two additional items about the Republic of China since we've been talking about that threat. Number one is, you know, I have to watch their capabilities. And in the last six years, they've tripled the number of intelligence, surveillance and reconnaissance satellites they have on orbit hundreds and hundreds of satellites, again, purpose built and designed to find fixed track target and, yes, potentially engage us and allied forces across the Indo Pacific AOR so. We've got to we've got to understand that. We've got to know what it means for our forces. And just spent a week or a few days last week, out at Monterey, California with our Navy and Marine Corps teams talking about that problem, and they fully understand that problem. Secondly, I would note, we want China to continue to incorporate responsible behaviors. Just in the last month, we've seen video of one of their space launches putting a satellite on orbit, and then the whole rocket body coming back with propellant, you know, flying out of it, just landing on their on their territory. You know, that's that's not how we operate. We want to, we want to be safe for our citizens, safe for the rest of the world and and the Chinese, you know, we want to have a way to talk to them about space safety as they put more satellites on orbit, and as we do so that we can, we can operate effectively and don't have any miscommunication or or unintended actions that cause a misunderstanding. And so those would be just the two additional items I'd highlight about the PRC.

Loren Grush

So I think we have time for probably one more question. And I did want to get to this, and it's probably not answers longer than three minutes, but I wanted to talk about in what ways that the Space Force, and you know, our military are leveraging space capabilities and international crises on the ground. We have two major wars going on, both in Gaza, the war in Ukraine. There have also been recent attacks by Houthi rebels on ships in the Red Sea. I want to know what role does the Space Force play in these international conflicts?

Gen. Stephen Whiting

Yeah, for US Space Command, I talk in terms of our three moral responsibilities. Moral responsibility is to support the rest of the joint force with the space capabilities that they need. So in all the areas you just noted, Loren, we are, we are supporting us and allied forces in those areas with with solid communications, with missile warning information, and making sure that those geographic combatant commanders who are responsible for US operations in those areas have all that they need to be able to operate effectively. And that takes deep integration. And so at US Space Command, we've put forward deployed liaison teams that sit in the headquarters of the other combatant commands to do that integration as CENTCOM or UCOM or indopacom, or doing their planning that space is right there, making sure that it's fully embedded from the beginning, and then taking whatever actions we need to respond to the needs of Those combatant commands given the circumstances on the ground.

Lt. Gen. Jeff Kruse

I think the only thing I would sort of close on to wrap that up is the very specific example you mentioned, Gaza. What I would offer is that when we saw the exchange in early April of more than 300 Iranian ballistic missiles, UAVs and cruise missiles being launched from the territory of Iran to the territory of Israel, which is a first and only seven of those getting through based on a combination of good pre planning, good international partnerships, and good capabilities, the interception of all of those that were intercepted would not have been possible without the space layer. The integration that General Whiting talks about is mature, and it is only getting better. And as we continue to develop capabilities in all the regimes, all the orbits and all the phenomenalogies we're talking about, that integration becomes just as important. And I think where we would continue to focus with our industry partners.

Loren Grush

Robert, I feel bad. I want to give you one last chance to just say, you know how Lockheed can, you know, feels like they can leverage capabilities and help with earthly crises.

Robert Lightfoot

Well, we help with everything they just talked about. I was actually, well, anyway, okay, it is hard to go. It's hard to stay in class anyway, but yeah, no. I mean, we're part of the team. We take the requirements, and what we're trying to do is get ahead of things for these forum with the speed and the technologies we're bringing to bear. And that's why we're trying to

work with as many people as we can, because sometimes we can move faster than the government can. I know that from my NASA days. And if we can make a deal with somebody have them on our team, it's quicker than these folks trying to get them, and we and we can really leverage the capability that we have tied up for a full mission activity. But all the things they talked about, where we build, most of the hardware that they talked about, that they're using, so it's a great partnership. And I think, you know, the one thing that I would close with, from my perspective, is for all of you, is we still have to get the workforce to do this. This is a challenge for all of us. We all have this challenge to bring the right workforce to this threat to this sector as we call it. And it's tough, right? The whole STEM workforce activity is hard sometimes, but if you give them the right mission and you give them an exciting thing, we can usually get folks in, but it is still we all have the same challenge. Everybody out here is the same challenge in attracting the right tech, the right folks to do the right tech that we need.

Loren Grush

Well, we are out of time. Thank you so much. This was a fascinating discussion. Thank you all for joining and enjoy the rest of the conference.