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TRANSCRIPT

Event

What Are the Biggest Space Threats in 2026?

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FEATURING

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Kari A. Bingen: In recent months, space has moved from a supporting role to a centerpiece in how nations compete and fight. From Ukraine to the Middle East, governments are increasingly relying on satellites for communications, intelligence, navigation, targeting, and military operations, while also working to disrupt and degrade those same capabilities for their adversaries. At the same time, there has been growing concern around the expanding range of counterspace activities taking place both on orbit and on the ground. Chinese satellites have conducted increasingly sophisticated rendezvous and proximity operations in geosynchronous orbit, while Russia, Iran, and others have employed jamming, spoofing, and electronic warfare at scale. Commercial systems are also playing a larger role in conflict, prompting questions about whether commercial space assets may increasingly be viewed as legitimate military targets.

For eight years running, CSIS has produced an annual space threat assessment. In partnership with the Secure World Foundation, who publishes their own Global Counterspace Capabilities Report, we come together to discuss what are the biggest space threats from the past year, what are overarching trends in the space security environment, and what are their implications for policy operations, capability needs, and deterrence.

I'm Kari Bingen, director of the CSIS Aerospace Security Project. Today I'm joined by my colleague Clayton Swope, deputy director of the CSIS Aerospace Security Project; and from the Secure World Foundation Victoria Samson, chief director for space security and stability, and Kathleen Brett, program analyst for space security and stability, to help us work through these questions. We'll also open it up for audience questions, so please feel free to submit those online via the event page.

OK. I'd like to say that this is a fun annual gathering. (Laughter.) At least it's fun to see all three of you back together. But we're always here to talk about a really sober topic. And I think we all, and others that are engaging with us, I think, leave the conversation very sobered as a result. So I think maybe we'll start with top lines. Victoria, if I can kick it off to you, can you explain the report that Secure World Foundation puts together, including its purpose? What's new? And what are some of those key takeaways from your report?

Victoria Samson: Sure. Thank you, Kari. And thank you for CSIS for having us here. We really appreciate our partnership in promoting these analyses. So Secure World Foundation started our Global Counterspace Threat Assessment a few years ago because there was a lot of speculation going on in terms of what's happening in space. It gets classified very quickly. You know, it's hard to understand thoroughly or contextually what's going on. And so what we wanted to put down is, OK, what do we actually know is happening in orbit? And how does it compare to what else we know? And so we wanted to have a holistic examination of these counterspace capabilities.

So we look at five different categories of counterspace capabilities – co-orbital, direct descent, electric warfare, directed energy, cyber. We also look at space situational awareness. We look at policies and budget, when we have those capabilities – when we have that information. Right now we're at 13 countries in our counterspace report. And we have a lovely chart that kind of – like, we call it our stoplight chart.

Ms. Bingen: And let me pull that up as you're talking.

Ms. Samson: Yeah, that talks about that sort of thing. And so with this, you know, we have our 13 countries in this report. And we have it in two sections. The first section are countries that have conducted destructive antisatellite tests. And we have it in the chronological order at which those tests were held. So the first was the United States, 1959. Second was Russia/Soviet Union, 1963. Third, China, 2007. Fourth, India, 2019. And then the rest of the countries are just alphabetical. And so we have – in our stoplight chart, we have green circles, which mean, as far as we know, not a lot's going on. Yellow squares means some amount of activity is happening. And then red triangles means significant.

And so this is kind of a gut check. You know, I mean, you can have an argument of whether something's a yellow square or a red triangle, but, you know, big picture, OK, pretty much everyone has SSA capabilities. Pretty much everyone has some level of electronic warfare. When you look at the more active, you know, escalatory chemistry capabilities, it kind of winnows down to the left-hand side of the stage. So, I mean, we could probably spend the whole hour talking about that. I won't. But, you know, that kind of gives you a sense of where we're thinking on this. Of course, it's available on our website at swfound.org/counterspace.

But, you know, kind of, you know, some of the trends that jumped out at us as we were putting together this year's report. I talked a little about this, and then Kathleen, I think, is going to talk about it as well. You know, basically it seems like everyone wants a space plane. We have – you know, the United States and China both have space planes in orbit right now. India has been working on one for a couple years now. But, you know, France has expressed interest in that. I think Japan's expressed interest. The Germans are very interested in this. So that's something that's new. Also, four countries now have policies to put to look – to look at bodyguard satellites. Now, what that means I'm not clear, but I mean, I think it kind of ties into, you know, the interest in rendezvous and proximity operations, or RPO activities.

And the, you know, kind of leading into that, you know, dynamic space operations, I think, is the phrase of the year. You know, that's a Space Force terminology, but the idea of maneuver without regret. But a lot of countries

looking at those kind of capabilities. We include them in our report because, while they're used as term of military operations, but they do have a counterspace – co-orbital counterspace capability. So, you know, and then jamming, of course, that's not new, but I think it's, you know, stepping up. Starlink, again, not new in terms of military operations or capabilities, but we've seen it being very much a part of the war in the Ukraine and then also in Iran.

And then, yeah, one of the – and then the final thing, I'll stop, because, again, I want to have Kathleen talk. But, you know, six countries released updated or new military space documents last year – the United States, India, France, Germany, Japan, United Kingdom. So it's almost like you can see all the things positioning themselves, where a lot of countries looking at these kind of counterspace capabilities and saying, OK, how can we use these for our national security establishment precedent? And, you know, what does this mean in terms of how we view space? So, Kathleen, I think you want to jump in a little more about some of those activities

Kathleen Brett: Yeah, no, that's perfect. Thank you, Victoria. And thank you, Kari and Clayton, for having us.

I would say, going into that, just looking at France's, for example, the Stratégie Nationale Spatiale, which goes from 2025 to 2040, it's really interesting. They have a pillar of their six pillars dedicated to strengthening the resilience and responsiveness of military space architecture. It's a little longer than that, but this dedication to security is really significant, along with their budget. They're dedicating 4.2 billion euro specifically to French military space funding, along with Germany. We can get into a more – a greater discussion later, but looking at how they're dedicating around 35 billion euros, which is not insignificant.

And personally, my first year really doing this report, I found the interconnectedness between capabilities of countries we typically don't attribute – looking at Australia, Germany, France – to be really significant. And, you know, we don't have clear lines of how they're going to completely work together, but this is definitely – we'll talk about trends later – but that's definitely a trend to pay attention to. Also looking at space planes specifically. We focus on the X-37B within the U.S. And I think that's a really interesting thing to watch. The OTV-7 ended its time and space, and the OTV-8 was launched in August of 2025. So just important trends to keep in mind, and just different participation of countries. And Global Sentinel is really important to highlight. This past year there were 29 plus NATO, so growing. And we'll keep an eye on that into next year. So very exciting trends.

Ms. Bingen: That's great. And, actually, Victoria or Kathleen, if you want to hold that up. (Laughter.) That is a really thick report. I mean, and I'll look at ours from last

year, our Space Threat Assessment. You know, they're very complementary, right? You provide a tremendous amount of detail, country by country, system by system, including very technical details. And I think, you know, Clayton will talk about ours in a moment, but ours is, I'll say, a little bit more top level on trends. And so, you know, if someone really wants to get into this, maybe they start with ours and then dive into the details on yours – (laughter) – but I think they're both complementary.

You know, Kathleen, you said something interesting that just struck me. You know, even the European Space Agency, ESA, they for the first time – you know, highest budget this year. But for the first time, they now have this dual-purpose mandate, where they are mandated to also support security, and resilience, and defense, in addition to the civil space support. So maybe we'll talk about that in a bit here, but that's also a trend I think we're seeing on the international front.

OK, Clayton. We don't yet have the 2026 Space Threat Assessment. It is coming out very soon. But can you maybe give us a bit of a sneak peek on what we should see?

Clayton Swope: Sure. I don't know if anyone remembers the Segway in the early 2000s, when it was something that was going to change the world and we're just waiting for it. It was like another month, and it turned out to be a scooter. So I hope when our report does come out that everyone's waiting for, it does not turn out to just be a scooter. I think it will be more impactful than that. (Laughter.) But we are waiting for it still.

I think, you know, your report, kind of, to me, it represents where we are here. It's huge. (Laughter.) You know, this is a big piece of material. And I was trying to think, well, how do I capture that? And when we were writing the report this year, I was thinking, what's the, like, analogy that I could use. And I was thinking that pot with the frog, the boiling frog. And it turns out it's not a fable. I thought it was. It's actually called an apologue, which is another Greek phrase for making a statement, that often includes animal creatures, by the way. So the frog, if those that are familiar, it's in a pot of water that just warms up a little, a little more, then all of a sudden the frog, it's in a boiling pot of water and it didn't even realize it.

So to me, this has slowly growing to the point where you look at this now and you realize how much space has changed when it comes to, I think, the exploitation of it for military purposes. And it's not something that we could just capture very simply in a small amount of word. It's very sophisticated and complicated. We've got to this point very slowly over time. And if we looked back over the last year, I couldn't point to anything – I don't know if you could, Kari, when you've been working on our report too – that is very different than past years. It's just an evolution, again, where that water just

continued to get a little hotter, and change just slightly, when we're talking about activities in low Earth orbit, we're talking about activities in geostationary orbit, we're talking about jamming and spoofing, when we're talking about cyber.

It's essentially just what we've been seeing, but maybe a little more of, and just a little more sophisticated. So that's the first thing that I think folks will see in our report. That it's really just an evolution of what we've seen over time, but it is getting to the point where that water just keeps getting hotter and hotter. I think we realize it, as the frog, that that is happening. I don't know when we reach the point where it's essentially boiling. The second thing that I just think that you'll see in our report, I don't know – you know, we use a lot of the same words year after year. Things have gotten so nuanced and complicated that sometimes it's hard to put them in the categories that we've had for them in the past. And I think that does go to the diversification of the – how we use space for military purposes, and the dual use nature of satellites.

So I'm thinking – I know we talked about this a bit earlier in the week – you know, binning something as an inspector satellite, binning something as an RPO, that level of detail maybe isn't enough now to really understand what's going on. And I realize we don't always know what these satellites are doing. And we're only looking, particularly, from the outside in open source. But I'm hoping that we can at least try to, with our brains and analysis, and maybe even some speculation on what's actually happening, so that we can get a better sense of granularity of, like, what is actually a weapon, what is a threat, what is just for some type of intelligence or surveillance, or some other purpose, so that we can kind of separate the wheat from the chaff, if you will.

And I think the final thing that I would mention, I think you'll see in our report, is just this goes to the kind of that – the boiling – or the water getting warmer, and to boiling. Just a lot of things might relate – and, Kari, we were just talking about this – to development of a weapon or a technology that could be used for weapon, but it might just be a technology demonstrator. So to me, I think a lot of what we see, and a lot of – space plane is a good example. Maybe how that's going to be used isn't quite clear yet. And a lot of things I think we see China doing in space, particularly in LEO, and then Russia too, I don't know if there's a clear answer of why they're doing it. It's just testing things out and see how that – if that works, maybe let's develop that further into some type of weapon system. But maybe it's too early to say. Or, if that works to collect intelligence, let's look at that and maybe develop it later.

To me, it's kind of maybe, I don't know if this is a good analogy, but, you know, there's some Phoenicians fishing in the Mediterranean. And then

someone pulls – you know, let's build a Bireme. You know, let's see what we could do, exploit the Mediterranean for military purposes. There was a day when that happened. And there was no military vessel on the water, and there was just fishermen. So I guess we're in that phase, I think, where we're testing all these things to see what have military utility.

Maybe all things don't, but it's hard not for – at least in the United States, and maybe others – to look at what the U.S. is doing to say everything looks like a weapon, and everything that new technology is leading to something that could hurt me later, and I need to defend against. So I think we're in this very rapid evolution of technology that's creating new capabilities that maybe won't pan out into operationalized weapon systems, but when we see them they go into the reports that we're writing, because they look – they look concerning, at least on the surface.

Ms. Bingen: OK. So let me go through a couple of categories here, and ask you what stood out to you over the last year. So my first category is on-orbit activity. A lot of stuff happened over the last year in both LEO and GEO, particularly China and Russia. And a couple things made headlines. You know, the refueling, the dogfighting. So I ask any of you to jump in on this. What stood out to you in terms of on-orbit activity?

Ms. Brett: Yeah, I can start with the more positive side of that. Specifically, the rendezvous and proximity operations between the U.S. and the U.K. We were really excited, we have some diagrams this year in there, so really great way to visualize, even for people that are really trying to understand how RPOs work in space. And as we've talked, there's so much nuance to it. So I think this is a really good illustration. And they've also talked about how there's planning for future RPOs. Also with U.S. and France. There were two this past year. They're in talks. As we've said, open-source information so we don't have all the information, but I think those demonstrations have been on the more positive side, the exciting side of what could be done if we work together with our allies in space. So I'll start there.

Ms. Samson: Yeah, I'll build on it. Yeah. When we look at a couple things in counterspace capabilities, with your point, though, Clayton, that it's kind of hard to say, you know, what's what these days. So we're just, like, OK, well, we'll document everything and hopefully trends will emerge. So the U.S., the GSSAP, global SSA program, you know satellites to GEO, they launched GSSAP 7 and 8, so that's their coverage. But we document them. We also document the follow-up plans for RG-XX, which is going to – supposed to be maneuverable and refuellable. So I think that speaks into dynamic space operations as well. One of the things, you know, I don't think really got covered as much as I feel it should be, but Russia. They launched their Kosmos 2581, 2582, 2583, want to say, in February last year. And then they released an Object F month or two later.

Ms. Bingen: And this is low Earth orbit

Ms. Samson: In low Earth orbit, yeah. And they had a lot of, like, close approaches with each other, you know, kind of playing around. And it wasn't just like they launched – they released an object, and then the object stayed put. The object actually did, you know, these RPOs as well. So there's a sophistication there, I think we're seeing, as well. You know, you saw that the Chinese, they've got their series of close approaches they're doing the SY series, SY-12. And so, you know, they're doing those in pairs as well. And you see some consistency starting where the A satellite is more active and the B satellite is a target, you know, kind of iterating from there. So development there. So, yeah, there's quite a bit going on in there.

Mr. Swope: Yeah, I think something to me that has stood out is just what are the things that concern us in LEO, that's happening in low Earth orbit. So is it just that a satellite is nearby, or is it some other characteristic that when we would see it or, say, a national security professional would see that, this is something I should be worried about? So I do think we're getting the point where it's not just it's close, it's that other orbital parameters add up to say that's weird enough and alerting enough that that's where a threat is. I think we're looking at particularly two. We're looking at – of the six, really, orbital parameters, inclination, and then right ascension of the ascending node, I think it is, the RAAN, which is essentially like the orbital twist. When those line up, and it's a satellite is what we would call coplanar, I think that's when it's most concerning.

And we've seen a lot of that happen over time historically with Russia. So I think that builds up over time to the point where you start to say, what's that – what's that mean? Is that essentially signaling that I have the capability to do harm to your satellite, in a way that just when we see satellites from one nation flying around each other in very close proximity doing RPOs, that's weird. And you say that's testing. But that's less of an immediate threat than a satellite that's coplanar. So I think to me that is the aspect that really seems to be kind of the trip wire that's developing, especially in LEO. And we've seen that this year. We see that in past years as well.

And that's the one thing that I think that we probably want to kind of zero in on to say, well, what does that mean? You know, of all the other things that we're looking at, when a satellite is coplanar, is that one where we do need to be paying particular attention to that, where it doesn't need to expend that much fuel to do that? And really, most satellites in low Earth orbit, they would have no reason to be in that position with other satellites. Say, you know, a broadband satellite or remote sensing satellite, it just doesn't make any sense. So just kind of one other thing that – when you're trying to bend,

like I mentioned, kind of that hard – you have to categorize these satellites, doing that, that suggests to me it's not necessarily a remote sensing satellite. It's doing something else. So just maybe one other differentiator that we could use.

Ms. Samson: Yeah. Just reminded me as well, not just close approach but actually doing things. In one example that we saw a lot of last year, China's SJ-21, SJ-25 not only do close approach, but it looks like they did refueling in GEO.

Ms. Bingen: Yeah. Yeah. First time ever, right?

Ms. Samson: Yeah, right? And it wasn't just once or twice. It was repeatedly, you know, throughout the course of the year, from about June and through end of the – end of the year. And so that's, you know, something, because you're – if we're looking – if the United States is looking at maneuvering without regret, one of the things we're looking at is can we do refueling. And so is it possible that China is looking at this as well?

I will say that China is not good on transparency. This is not a hot take. And so they never really said what was going on there. And so it would be helpful to understand better their intentions. But, you know, in terms of, like, you know, anomalous behavior that you mentioned, they did a burn as part of that, that took, like, six years of fuel. I mean, it's just anomalous behavior. And so, you know, again, it's not just activities in orbit, but you know what's kind of the standard operating procedure, you know, what make sense from engineering and physics viewpoint, and then what's what other stuff – what are the other things happening that doesn't really consist with that sort of stuff?

Ms. Bingen: Well, and that's – I wanted to tackle the physics part of what's happening up on orbit, and then talk about, to your point, Clayton, the significance. You know, in low Earth orbit you mentioned the Russian satellites that all seemed to be maneuvering around each other, releasing some object. The Chinese – I think, Clayton, you mentioned it – the Chinese did this also last year. And there was a U.S. Space Force general that called it dogfighting. But this is where I'm going to go back to my one orbital mechanics class I took in college. (Laughter.) And that was – that's a while ago. But, you know, it's not like aircraft maneuvering and going in the afterburn, or ships, or something. And so trying to create an understanding of what's happening.

You know, you have these satellites, and in the Chinese case some of our partners in the commercial space situational awareness realm saw this cluster of five satellites moving together in low Earth orbit within less than a kilometer, I believe. In space, in the vastness of space, less than a kilometer is really big deal. And I think two of those five satellites actually got within meters of each other. So let's just think about that for a moment. These are

satellites hundreds of miles away from Earth, traveling – both of them traveling at over 17,000 miles per hour. You know, if you have Formula One racing, or you have, you know, the Blue Angels, when you're really close, you can see each other. You can communicate real time. You know, you have all your instrumentation.

Now let's think about what does that look like in space, when you're several hundred miles away? It's happening autonomously. You hope that you can see what's happening, but there's a couple milliseconds delay, right, with the communication. So the fact that we have satellites that are maneuvering within meters or kilometers of each other, that's a really big deal. And it's not just turn on the afterburners and go, to your point, I mean, you're burning a lot of fuel to make these moves. You're raising and lowering your orbits. It's just such a dance or an orchestration.

One of the things that we were trying to do at CSIS is, because, you know, you can't see what's happening in space, is we worked with the Bertelsmann Foundation and an animation studio to try to bring some of these things to life. So we now have on our website some animations you can go to, the Russia example, the refueling example, you can get online and look at and visualize what we think, you know, what those might look like to, you know, the average person that may not be – may not be steeped in space. But, you know, that the question that then, you know, I'm left with is, OK, so we're seeing this demonstration of these maneuvers. What's the so – what's the so-what? Like, how significant is that for war fighting? Is it just technology demonstration? Like, what do you think?

Ms. Samson:

Yeah. Well, I mean, first crack but happy to hear what the rest of the panel thinks about that. One of my pet peeves is that I think oftentimes people use sloppy language to discuss these issues. And since I have a degree in political science, I'm sure I've been guilty of that as well. But, you know, when we're talking about, you know, dogfighting in space, I think that's inappropriate language, both from a physics viewpoint and also from, you know, a language viewpoint. Because, you know, dogfighting implies – you think, like, you know, Star Wars, you know, going after each other, you know, airplanes chasing each other. They're doing RPOs. They're going around each other. They're doing orbits. So, you know, it's not – you know, it's an inaccurate description of what's happening. But also, it implies a military wartime intent. And we don't know for sure what's going on there. And, you know, I don't want to speak these sort of problems into existence. But I agree that there are some concerns about that.

The other issue that I think we run into, again, coming at it from an open-source perspective, is that a lot of our information comes from, you know, the United States, whether it's the U.S. government or U.S. commercial SSA companies. And so particularly U.S. commercial SSA companies are delighted

to talk about Russian and Chinese activities in orbit. You say, OK, what about U.S. stuff? Hmm, you know, they don't talk about that. And so when you're saying, like, the so-what, I'm not clear how much what that capabilities demonstrate are that different from what the U.S. can do, but just we may not know about what the U.S. can do because we don't have that sort of open-source information.

Mr. Swope: Yeah, I was – I mean, Victoria, kind of, I think to your point on where we get in our information, you know, it is LEO Labs, Slingshot, COMSPOC. I mean, another one, Integrity ISR and Greg Gillinger. I mean –

Ms. Samson: All great stuff. All great stuff.

Mr. Swope: Yeah, yeah. And, you know, one thing that popped into my head was something that I think he would have posted by now, but he shared this this morning. And I was thinking about, you know, how do we interpret what's happening in LEO? And can you ascribe hostile intent or not? And I think, you know, this example – I don't know if you're on his email distribution – said I could share this, he may have posted, but four or five Kosmos satellites that were launched in April, 2610 through (26)14, LEO satellites, they were put in an inclination similar to an ICEYE satellite. Now four of those five are coplanar, because – I'm sorry, they were put in a RAAN with the ICEYE satellite. Now they changed their inclination so they're coplanar with it. And that just happened in the last few days.

I feel like that's threatening, to me. Like, if you're putting – and it's a commercial satellite. So what's the message being sent there? Like, to me, I realize that's not – to your point, Victoria – what the U.S. is doing. But even not – you know, without knowing that, you know, that information that, you know, four Russian satellites that were launched in April were put in the same inclination, now we're at the same – they're coplanar because they have the same RAAN with asset that we know is supporting Ukraine. To me, all this pieces together. I'm like, hmm, that's interesting. And I don't know how to interpret that as not threatening. Just that example. I know you probably weren't familiar with that, because I know he hadn't – I don't think he's posted it yet. But to me, it was the, yes, there is some ambiguity, particularly if you're involving your own satellites. But, like, when it's two satellites – two nations that might essentially kind of have some level of, you know, hostilities, I'm like – I'm not getting it.

Ms. Bingen: I mean, space is – it's back to that basic principle of space is big, right? You can choose a lot of altitudes, a lot of inclinations, a lot of, you know, right ascension nodes. The coplanar piece, I just wonder, what is being signaled?

Mr. Swope: A lot of energy expended to get there.

- Ms. Bingen: Because that's very deliberate. A lot of energy is being expended. I mean, it's as if it's stalking. It's stalking in a way that you're not moving out of the way. You are constantly there behind –
- Mr. Swope: Are they going to do some EW activity? There's some rumor maybe these satellites were radar satellites. So is there a way that you could use your own radar – again, experimenting too – could I use my own radar to interfere with someone else's radar? I don't know, maybe. But again, trying things out.
- Ms. Bingen: Yeah. You know, the other thing we were talking about here as well is, you know, the way that we – back to your point, Victoria, on transparency – you know, the way that space situational awareness data is conveyed, you know, we all use Space-Track.org. The longstanding practice for decades has been to publish two line element sets, basically two lines that give a bunch of numbers that ascribe a position, you know, in time and space to an object. Is that good enough?
- Mr. Swope: I mean, I say, no. I mean, I say, flat out no. Too maneuverable. It's basically – I can't imagine if that's how we tracked airplanes at this point. Like, oh, an airplane took off from Dulles at 5:15 p.m., and then it was going in this general direction. And we just assumed it's going to go in that straight line for the next 45 minutes, 60 minutes, whatever. We just thought we'd pick it up again on the next radar. And, I grant you, we used to be able to do that with satellites. I just – I put forward, I don't think we can do that anymore.
- Ms. Brett: Yeah, it's, like, weather is a problem in space. Weather is also something to keep in mind. You never know what's going to happen. I think these two questions you've been asking really has brought up the question of intention versus interpretation. And that kind of highlights the big limit of open-source analysis. It's great, but there's always – even press releases from countries, you know, are being spun in a certain way. So it's a matter of – you know, we're all interpreting this information one way, even being as objective as possible.
- So I think your question about is the information being shown enough, as somebody that doesn't come from an initial STEM background, I would say no. I think our job is to contextualize it. And I think we do a really good job in both of these reports, really taking this information, making it understandable to, you know, all audiences. I think that, you know, I shared this report with my parents who don't have a space background. (Laughter.) And I think it's been really helpful to contextualize it and learn how to, you know, communicate it to people like ourselves, but also in other levels.
- Ms. Bingen: That's the test, if mom and dad understand it.

Ms. Brett: They're watching right now, so. (Laughter.)

Ms. Samson: Well, the age of dynamic space operation is now. I mean, I think TLEs are not going up because they did not incorporate maneuvers. And that's always been an issue. Like, this is not new information. But, as Clayton said, you know, used to not be that big a deal, you know, when there were only a thousand active satellites. But now we've got 15,000-plus active satellites, and they're moving all over the place, so.

Mr. Swope: But a lot of them probably aren't.

Ms. Samson: Yeah, that's a shift.

Mr. Swope: Yeah. I mean, another thing, just kind of, I think, too, on this interpret – I like this, like – I also used to work with the CIA, so, you know, I'll just tell you, you're always interpreting. (Laughter.) You never know intentions. You're always guessing, essentially. You know, when you think about kind of the way that the space domain works, you have free passage in space. There's really no other domain where you just can do whatever you want. You always have to kind of pay attention to national jurisdiction. I mean, the only thing kind of like that, I guess, is the high seas, and that's even has rules and space doesn't.

So I guess, you know, we're in this discussion of what does that mean, because there are less rules about, like, who is allowed to do what. So we're just – I hate to say wildly interpreting it – but we could look at it in a lot of different ways, depending on which viewpoint we're coming from.

Ms. Brett: The high seas, also I did my master – or, my undergraduate thesis on the Barbary Wars, which is, you know, the Navy's first time really navigating that situation. I think, you know, people often say space is the wild west. We move away from that, but I do think that's a fair comparison, looking at, you know, when the U.S. was entering the naval domain, and other countries were. So I really like that comparison there.

Ms. Bingen: Me too. So I feel like I'm going to – I'm going to plug a couple reports here. So I actually want to plug another report that a former visiting fellow of ours, Madeleine Chang, did. And it's called "New Rhythms in GEO." And what she was looking at is Chinese unusual behavior of satellites in geosynchronous orbit. And, Victoria, to your – and, Clayton, to your point, is she looked over a 10 year period of all Chinese satellites in GEO. Eighty-five percent of them stayed put. It was that 15 percent that are moving around. And then she did some great numerical quantitative analysis to understand how they move.

And it was interesting, because you had some Chinese systems that moved, like the Russian Luch that we've talked about before, where it just moves along the GEO belt, parks, maybe it's listening, inspecting, who knows. But it

parks for a while next to something, it moves, it parks for a while next to something else. So there's that kind of pattern. There was another pattern that she looked at, which was much more of a drifter, so certain – it's called SY 12 or Shijian 23. These are drifters that are just moving up and down the – or around the orbital belt. So, you know, they're not necessarily stopping to maybe listen or do something, but are they just constantly monitoring, you know, the belt? But, you know, to your point, Victoria, we have systems that do that as well. It is interesting, though, trying to better understand those classes of movement, and then what they might mean.

Mr. Swope: Yeah. And GEO, I mean, not to say – this sounds weird saying it – but it's a rather simple environment compared to LEO. (Laughter.) Every once in a while you hear discussions about is it coplanar or not. I mean, everyone is in a line. So it's really easy to see what most of them do, in a way that LEO is just very complicated and messy, and getting messier.

Ms. Bingen: OK. So I want to shift gears here. You know, another big storyline from the last year has just been – I'll say, it is the integration of certain counterspace weapons into battlefield military operations. So electronic warfare, satellite communications jamming, jamming of Starlink, jamming and spoofing of GPS. We've seen it in Ukraine, used both by the Ukrainians and the Russians. We're seeing it now in the Middle East. And then with the U.S., the chairman of the Joint Chiefs of Staff has talked about the U.S. bringing space effects into Venezuela, with Operation Absolute Resolve, and then into Iran, with Operation Epic Fury. So I want to take this in a couple of different ways and get your reaction. Maybe first I'll start with, you know, in Iran senior military officials have stated that the U.S. achieved space superiority over Iran. What do we think that means?

Ms. Samson: It's a very good question. And I will say, for the Secure World Report, we have an information cutoff of March 1. And so we do not include most of what's happened in Iran this spring.

Mr. Swope: But we can pontificate.

Ms. Samson: I am happy to wildly speculate. (Laughter.) No, I mean, when I saw those reports I had the same question. Like, what does this mean? Because they said, oh, we bombed Iran's space command. Like, they don't – they don't have a Space Force. You know, they have –

Ms. Bingen: They do have some satellites.

Ms. Samson: They have 14 – like, roughly, 14 satellites. And, yeah, I'm, like, did they bomb, like, their launch facilities, like, for satellite launch sort of thing? I still have not gotten a good answer on that. But what I think, when they're talking about space superiority, you know, the way the U.S. military talks about it is

the ability to act as we want in space and deny our adversaries the use of space. I would say that the U.S. did not accomplish that, because Iran is still able to use satellite imagery, not necessarily from its own satellites but, you know, the U.S. is not the only game in town anymore.

You know, Iran was able to get commercial – sorry – imagery from Russia and from China, and then even Chinese commercial imagery. So I think, you know, it's a complicated factor. It's not just as clean as it used to be, right? So I think that's part of the issue. But, you know, definitely I think we've seen jamming going on there, spoofing. And then also what's not – it's not mentioned a lot – but cyberattacks, I think, definitely are a part of the conversation.

Ms. Bingen: Yeah, we didn't talk about cyber at all. Is there anything from the last year that stuck out to you, cyber-wise?

Ms. Samson: Yeah. Well, we have a chapter in our report that we dedicate to that. You know, kind of things that jumped out, that, you know, there's analysis that came out looking at cyber in the Russia-Ukraine war. They said between 2022 to 2025 they're, like, 160 –

Ms. Brett: Hundred and sixty-one.

Ms. Samson: Yeah, 161. Thank you. Circumstances, both Russian and Ukrainian, you know, kind of targeting both sides. And one of the things that – kind of an anecdote that I find really interesting from that is that it's being expanded by hacktivists who are very used to attacking, you know, non-space targets, and they're learning on the fly. So, for example, going back to ICEYE, being – you know, their connection to Ukraine. After ICEYE and Ukraine signed an agreement to – for ICEYE to provide imagery to Ukraine, a Russian hacktivist group put basically hit out on ICEYE, and they said, OK, we need to, you know, rally the troops. We're going after them in cyberattack.

But the information that they released was for the European Space Agency. And you're like, OK, do you guys know that ICEYE is not part of the European Space Agency? So they're learning on the job. But, and then also going back to European Space Agency, you know, and their increased interest in defense issues, they had a series of cyberattacks from 2024 through beginning of January 2026. And increased – you know, they said they fixed it, and they didn't. They have a lot of issues. So I think we're seeing counterspace effects expanding outward as counterspace capabilities are expanding outward as well. But what do you guys think?

Mr. Swope: No, that's good.

Ms. Brett: No, I was just going to highlight, from your first point, I think a lot of people, even in this industry, don't really make the distinction. They view the space industry in other countries the way the U.S. is. And that's not the case. So, you know, within, like, Russia and China, yes, China is developing, you know, commercial to an extent, but there's a lot more of a blurred line. And so I think that, you know, different perspectives can be influenced by that – whether the U.S. is claiming something or looking at how another country approaches something. So I think that's just an important point to hit on.

Ms. Bingen: Well, I think, you know, on the space superiority point too, is, you know, I look at other domains. So let's think about air superiority. I mean, in Iran today, we don't have total air superiority over the country. You know, we've rolled back their IADS a bit, but there are still places where we don't necessarily fly. And so in space I think we need to think a bit more nuanced about these concepts. So it's not like we're talking space superiority over everything space, right? It's an ability to control or to dominate at a certain time and place, or time and space, to be able to achieve whatever effect or outcome on the battlefield that you want. And so can we – can we get those kind of localized bubbles or whatnot? I think, for me, that's probably how I look at space superiority.

The other thing, and I know you and I have been quoted in the press on this, too, is for me what I thought was interesting with the use of space effects in these campaigns – and, frankly, well, one is just the Pentagon being public about it, which we used to never hear. But it showed for me a level of maturity of really Space Command and U.S. Space Force. I mean, I kept thinking, is Space Command, like, knocking on the door to get in with the joint staff to sit down and develop – and the commands – to develop plans and options? Or were they invited in the table, and there they put their capabilities on the table like every other component, and that was integrated into the plan? And I think we're seeing more of the latter start to happen, which it is important. We're going to have to work classification issues as always, but I think that kind of true joint force integration is, for me, a mark of maturity.

I don't know, Clayton, do you have anything you wanted to add on this?

Mr. Swope: No. I don't think so.

Ms. Bingen: OK. OK. Well, you know, the other piece, too, that is striking, maybe particularly with, you know, Russia-Ukraine, you could say Israel, is it – you know, we are seeing the application of certain counterspace weapons on the tactical battlefield. So we mentioned SATCOM jamming, GPS jamming. So is this just now normal? I mean, are we starting to see a tiering of, you know, these kind of counterspace weapons we just expect to see as part of the future of warfare? And there's this other class of maybe more strategic effect

weapons, or more strategic targets, obviously things like NC3, that, you know, still we hold in a separate tier or separate level?

Mr. Swope: See, I actually think that's dangerous, though, to think there's a separate level.

Ms. Bingen: So, yeah.

Mr. Swope: So I think a lot of counterspace, this developed out of the mindset of the Cold War, where space was very closely tied to nuclear forces and strategic doctrine. I think slowly everyone has started to realize, oh, wait a minute, it's actually not. Meaning, like, oh, they left the door opened and we can actually go in and ransack the house and we could do all this, and actually no one's going to stop us, there are no consequences. So what I think what we're seeing is this, like, creeping – I guess this goes back to my frog and the water is getting hotter. It's like, creep, creep, creep, creep, creep. Let's try this. Let's try this. So all of these things that we're seeing now as these conflicts kind of heat up and it's tested, I guess you could say it's normalizing.

But to me, it's more like people are trying out these things that they probably wouldn't have dared to try during the Cold War because they worried it would have hit that, oh my goodness, you're interfering with our satellite, and that is NTM or NC3, or some strategic reason why we just wouldn't want to try that with the Soviets. But now, if it's like, you know, Iran trying it, or Israel trying it, or Russia trying it against Ukraine, there's like less of that, like, fear of that strategic consequence. So we're willing to try more. And again, we've realized the door to the house is unlocking, you know, we're just ransacking the place. So I feel like we're going in that direction. And now I don't know where that line is. You know, it just feels like we just keep pushing, pushing, pushing, and I don't think there is a clear NTM NC3 distinction like we – like we think it is. And the boundary just keeps getting pushed out.

Ms. Samson: Yeah, two things just on that. You know, one, I think the reason why there's an expansion is just because space is increasingly important as a national security enabler. And it's not just the United States incorporating it, and how it functions as a military. It's a lot of different countries, you know. Starlink was being used by the Ukrainians and the Russians in terms of, you know, drone warfare and that sort of thing. You know, that's just how it's done. You know, and it's – you know, jamming is – pretty much everyone jams, you know? And then even spoofing. You know, that's becoming increasingly more common. That, you know, used to be considered a fairly sophisticated capability. Now, you know.

One of the things we saw in January was that Iran was able to spoof the Starlink GPS terminals so they couldn't figure out where they were and speak

to the GPS allies. And that basically took Starlink offline for Iranian citizens during January. Now, there was a fix that came out pretty quickly, but, I mean, you know, again, that's something you wouldn't have thought, you know, would have been able to be done. So I think there's part of that of that as well. But I think, in terms of Clayton's point about, you know, where's the line, that's why it's really important – we don't go over this in our report – but one of the things that Secure World has talked about a lot is the need for having a common understanding was responsible behavior in space and what is irresponsible behavior in space. And that way, maybe not necessarily draw red lines, but you have an understanding, like where's the bad point, and where you're going to go, the point of no return, that sort of thing.

Mr. Swope: Yeah. I guess the – so I don't – I don't know if the U.S. would ever agree to that. Or the Pentagon would say, you can attack these systems and it's OK, but if you attack these that's really bad. You know, drawing that line is kind of right detrimental too. And then same time, I don't know if the U.S. wants to say, well, we're just not going to consider attacking those Chinese satellites unless we think they're going to launch nuclear-armed ballistic missiles at us. I mean, maybe it's possible. It just feels – it feels hard to get there.

Ms. Bingen: Yeah. Well, and we want to deter. I mean, fundamentally, we want to deter attacks against our space system capabilities to begin with.

Mr. Swope: Yeah, so you don't want to give a green to certain ones and not the others.

Ms. Bingen: But, I mean, let's be real here too, are we seeing any counterspace actions be deterred?

Mr. Swope: Yeah.

Ms. Samson: Well, I think right now, you know, I think there's – the idea that no one's done, like, destructive counterspace capabilities in orbit, because the idea of you creating debris in orbit that's going to sully the environment that you want to operate in, I think that has been a deterrent, just because, you know, if I'm China and I want to use space further on, I'm not going to do, you know, a destructive counterspace capability, because that's going to really affect my ability to utilize that. So I'd say, in terms of that, you know, which is maybe a low bar, but I'll take the win where I can get it.

But, I mean, you know, going back to the Cold War, there were, you know, parts of the treaties between the United States and Soviet Union that talked about not interfering with national technical means of verification. You say, you are not going to touch these things. So I think we do have historical precedent on that. We do have historical precedent of the United States saying, OK, incidence at sea, we're not going to do these sort of activities. So, you know, we have precedents of countries acting in their own self-interest

to self-restrict what sort of actions they deem to be responsible, and that they want to see, out – you know, be the change you want to be in the world. So I think that there is a possibility of that. But I think it's important to talk about what end goals do we want to see, and how do we get there. So opposed to just kind of knee-jerk responses to implied threats and concerns about that.

Ms. Brett: And I know you're probably looking, like, for big deterrents, but I also think deterrence with a lowercase-D is important, because through different policies I think you can see, maybe not explicit deterrence, but I'm thinking the EU Space Act, the draft that came out, you know, that is limiting, you know, countries like U.S., particularly, acting in Europe, and how that would – you know, that could eventually have a chain reaction as something to watch in coming years. How does that impact, you know, even working together to create something, and could be, like, the lowercase deterrence threads that are woven through. So I think that's just something to keep in mind there.

Ms. Bingen: And, you know, I don't know to what degree this is deterrence, but because of the tactical utility of space, of certain space capabilities – GPS, SATCOM, et cetera – is it is going to be a part of warfare going forward. I mean, period. I think it's going to be hard to deter jamming because of the – I mean, the tactical necessity of it. But that's where you start looking in. And, I mean, we're seeing the department come along here too, is, you know, investing in these resilient architectures.

I mean, I have to believe the SpaceX Starlink folks, I mean, there was a level of speed and adaptability that they have where I'm sure their software coders and their operators are sitting side by side, probably in somebody's basement with a laptop or something. But, I mean, just the adaptability and the speed that we are going to have to move at. Being able to hop from a space network to an air or terrestrial network, those are the kind of things that enhance resiliency against jamming and other kinds of EW and threats.

OK. I'm going to shift again here. And I know – so our Space Threat Assessment focuses more on foreign counterspace capabilities. Secure World, you cover both. You cover foreign and you cover U.S. So I'm going to turn it over to maybe you, Victoria. Tell us what you're seeing with the U.S. counterspace landscape, because there were some big developments this year.

Ms. Samson: Sure. There were.

Ms. Bingen: And I'll keep quiet.

Ms. Samson: No, no, that's fine. You know, we include the United States because we wanted to be able to compare what's going on. And we felt we couldn't, you

know, get a really strong assessment without that. So, you know, one of the – I think the U.S. had a lot of documents that came out over the past year. You have the Space War Fighting Framework, you have the SFDD, the Force Doctrine one, you have Space Vector, you know, all sorts of stuff coming out. So basically, there's a lot of positioning going in place in terms of how the Space Force envisions its future operations look in space. And so they're looking at orbital warfare, electronic warfare, and cyber warfare, kind of those three categories. So I think there's that as well.

And I keep bringing up dynamic space operations, but that's really just – again, it is one of the biggest features that we're seeing. And so there is almost a whole-of-government approach, you know, throwing a ton of money and resources at developing these sort of capabilities, whether, you know, it's meant for refueling, or looking at you know the possibility of, you know, debris removal, or things like that. But really seeing that happening. You know, there's discussions about, you know, the future of the Space Force. You know, how big does it need to be? You know, right now there's arguments that need to be double the – twice the size. So curious about that. And then I think the other big topic that we have not discussed, I'm amazed we got this far in the hour without doing it, of course, is Golden Dome – the idea of a missile defense architecture system of systems that would protect the United States against a whole host of threats, ballistic missile, cruise missile, hypersonic, even drones, from near-peer competitors.

And so that is not – I don't think a lot of that's going to be new. I think maybe the architecture weaving it together would be. But, you know, missile defense already exists. Missile defense sensors already exist. There's already space-based sensors being built. The new part, of course, is the space-based interceptor layer, which is unclear, you know, exactly what it's going to entail. In our report, we talk, you know, about there's not a real sense of the architecture. That's still the case, since the report has been published. And we've since learned there have been 12 contracts released for SBIs. And so it looks like there's some sort of – you know, definitely the United States may be thinking of going ahead with it. So that's something to keep an eye on, because, you know, these space-based interceptors ostensibly are there for boost phase intercept for missile defense. Kind of whole discussion about, you know, the effectiveness, or, you know, how expensive that could be.

It's a real question mark in terms of, you know, what can be done for cost. I know the Space Forces says, well, we're going to investigate it, but if we can't do it at a cheap price, we're not going to do it. Which I think they're not going to do it. But, you know, the concern I have, you know, as an analyst looking at that, is that these space-based interceptors can point up as well as point down. And so if the United States does indeed, you know, put it out there by 2028, I think they're saying initial operating capability, we will have actually

put weapons up in space, actually designed weapons in space. So that's kind of the big picture discussion for the U.S.

Mr. Swope: I mean, to me, you know, without passing a moral judgment on Golden Dome, the questions that it raises are – you know, especially if they're endo-atmospheric interceptors. So, you know, that's essentially a satellite with missiles on it, that's interesting, you know, that could go through the atmosphere. So you'd have conceivably a constellation of satellites that is, you know, passing over a lot of parts of Earth all the time. So kind of like having, you know, a bomber always kind of above you. Even if the system isn't designed to do that, I think that's, you know, potentially something that I guess we would just have to think about what that means.

But even before we get there, I guess, the testing part, I'm like, OK, so we test an exo-atmospheric space-based interceptor. I'm assuming that creates debris? I mean, I guess the U.S. would say that doesn't violate the direct descent ASAT testing moratorium, but part of me is, like, oh, that's some really, you know, wordsmithing to get to that point. So what does that mean? I'm not – again, not passing a moral judgement, just things that, I guess, popped into my head.

Ms. Samson: Right. Letter of the law, not the spirit for that last one, right?

Ms. Bingen: I mean, I guess I'd say, but you know, China's already demonstrated a fractional orbital bombardment system that could easily become a MOB. So they have demonstrated, I guess, I'll say some degree of a weapon in orbit, although in that case it actually goes down through the atmosphere and targets, you know, something on the ground. What I also think – I guess two other pieces here that I'd want to pull the thread on is, you know, Golden Dome, the space-based interceptor piece, you know, it's focused on intercepting, you know, incoming missiles or other advanced threats largely through space, although it could be endo. But it also has a latent counterspace capability. And so I don't want to discount that piece there, the dual utility or the dual mission application.

But then the other piece in this discussion on the U.S. is, you know, you've had U.S. military leaders much more public and forward-leaning over the last year, talking about, I guess I'll say offense, but talking about weapons and war fighting in space. I mean, I'll just offer – and I know you all may disagree or have a different perspective – but, you know, I do think we've gotten to the point where – and, you know, you mentioned, Victoria, with China and MizarVision, that AI company, that they're using Chinese remote sensing, you know, imagery satellites. They're pairing it with their communications networks, with artificial intelligence to be able to target our forces on the ground.

I mean, we would never let air – in a combat zone, we would never let the other side's aircraft fly overhead with impunity. So now we're starting to think about, well, why would we let satellites do that? I mean, are there ways – and it doesn't necessarily have to be kinetic – but are there ways to also hold those assets at risk so that we – you know, they're not being used to target our forces? So, you know, I think that discussion is really evolving right now in ways that just we've never seen talked about publicly.

Ms. Samson: Yeah. Definitely, the pendulum has swung, right? You need to go from not talking about it at all to being, like, more comfortable doing it, now saying, well, we need to do it. Yeah, I don't think anyone denies that there – you know, space has a role in national security, and that we want to make sure that the military is able to continue to use space. The question is, you know, to what order and what end, and are you creating the situation that you're trying to prevent? You know, if you're using inflammatory language and ascribing threats where there may not necessarily be that, you might be setting yourself up for a situation where you're putting resources against a threat that may not exist, or you're putting too much resources against a threat that doesn't merit it.

You know, like, going back to Golden Dome, we have – we're looking at roughly how much it costs. Latest assessment by CBO is like \$1-point-something trillion. Is that the biggest threat? You know, when I've heard Space Force officials say cyber is a soft underbelly of space systems, where's the Golden Dome for that? Where's the \$1 trillion for that? And why is this the bigger threat? So that's the concern I have. It's not necessarily, you know, what they're – you know, that they're spending money on space capabilities, but are they identifying the actual threat and responding accordingly?

Ms. Bingen: OK. Man, that's a whole 'nother – we'll have to do – we'll have come back together again. There's so much I want to tackle on that. (Laughter.) Because I think it'd be a good debate too. But I'll table it for now.

Kathleen, I'm going to put you on the spot, because I want to talk international a bit. And you mentioned it at the outset, and I'm going to pull in a question here. So a question from the audience is, how much of our NATO allies' participation is determined by policy versus capability? And where are we likely to see the biggest change within the next decade, on the policy front or on the capability front?

Ms. Samson: That's a good question.

Ms. Brett: Oh boy. (Laughs.)

Ms. Bingen: And, you know, I'd say, you know, expand upon that. You know, talked a little bit more about trends that you're seeing amongst our particular European allies.

Ms. Brett: Yeah. I'd say France and Germany are the most interesting case studies for this. Just to highlight, Germany was our new chapter this year. So we've really seen – I don't want to be that person to say both, but we've really seen a lot of funding go towards activities and topics that have been, like, socialized within the country. So, you know, it's not completely new. At Secure World we tend to keep an eye on other countries' emerging trends, even if they're not in the report. So it's definitely been something Victoria's told me to keep an eye on since I started. But I'd say it's really interesting to look at, you know, their federal government space strategy and their defensive policy guidelines on space safety they've created in 2023. And just planned – I think, looking at SSA too, we haven't really touched on a bunch, but in our report we analyzed SSA looking at – I wanted to highlight the DARC, the Deep Space Advanced Radar Capabilities, that the U.K., U.S., and Australia work on.

And I think this is a really important geographically spread set of radars that are put in place to detect and identify objects in deep space. But I think, you know, even if policy is really going forward, there's also financial strain on capabilities. So, you know, no matter how much money a government, or NATO, or anybody puts towards something, even within this DARC example, there is delays due to – like, the first site is in Australia, the second site in the U.K., then U.S. It keeps getting pushed and pushed. So I think – you know, I think policy might move a little faster than capability, but there is a drive we're seeing, especially within some European countries – France and Germany, mostly – on this front.

Ms. Bingen: Yeah, I mean, in all my travels to Europe there's such attention on space right now. And they are. They are putting resources towards it. You know, and we want to see that go towards fielded capability, as opposed to just, you know, building out the infrastructure. You know, the other international piece here that I think would be interesting – maybe, Victoria, I'll turn to you – is you participate a lot in different international forums and multilateral forums. What are you seeing there? What issues are you engaged on and watching? And, I mean, I'll be honest, I'm pessimistic – (laughs) – but, you know, what progress do you see being made in these forums?

Ms. Samson: Yeah. I mean, OK, so diplomatic discussions are the long game, OK? (Laughter.) Let me just say that right at the forefront. But that's a feature. That's not a bug, because, you know, there's no world cop that's going to come by and make you do things. Basically these discussions at the United Nations and multilateral fora are important because you generate support. And when you generate support and common understanding of these issues, that's when countries are most likely to actually carry them out. So at the

United Nations they've had a series of discussions looking at whether the biggest threat to space are weapons in space or they're actions in space, and how do you deal with it with legally binding treaty or non-linear binding approaches.

Right now, the United Nations is undergoing a discussion, year two of – this is such a U.N. thing – an open-ended working group, an OEWG, on Prevention of an Arms Race in Outer Space and all its Aspects. And it's very wordy, but it's important because it includes legally binding and non-legally binding approaches. So they just started last year. They're meeting twice a year. They're going to go through 2028. And the goal is to have, you know, recommendations in terms of, you know, different types of concerns. How do you do verification, legally binding and non-legally binding? How do you look at what's considered responsible behavior, legally binding, non-legally binding? You know, that sort of thing, to kind of build up a cadre of information and understanding about this sort of thing, you know?

And last thing I'll say, because, again, I could talk all the time about this, but, you know, oftentimes we tend to look at, well, they had these discussions and there wasn't a signed document at the end, so it was a failure. I would disagree. I think these discussions are helpful in identifying where countries are different, to identify commonalities of thinking, and to get maybe a core group of saying, OK, this is sort of behavior we think is important and responsible, and we're going to carry it out no matter what. I think you can see a benefit coming out of that, even if there isn't a final document.

Ms. Bingen: So you had a challenge a few years ago where Russia and China wouldn't even agree to the notes.

Ms. Samson: Yes. (Laughs.) So we're –

Ms. Bingen: Are we seeing any progress on that front?

Ms. Samson: Yes. Well, you know what? These discussions, they're done by consensus. And so there have been times where, you know, Russia, in particular, has thrown a lot of roadblocks up, and saying they wouldn't let the agenda go ahead. And so they had two meetings last year, and April 1, a washout. But the July one, you know, after day one, there was some stalling, but they actually started having substantive discussions. So I think, you know, China, in particular, you know, they have so much investment in space, and so they have an interest in, you know, seeing these conversations move ahead, if nothing else. So I think I'm cautiously optimistic.

Ms. Bingen: OK. Well, there's another question here from our friends up north, from somebody in the government of Canada, who mentions that, you know, we talk a lot about threats and behaviors on orbit, but there's a lot that could

happen on the ground terrestrially. You know, are we putting as much attention to threats against terrestrial space infrastructure, ground stations, mission control, the command, the data links? And do we see those discussions happening in international forums?

Ms. Samson: Well, I will say – and, again, I don't mean to hog the conversation, but they make a very good point. I mean, when we've seen counterspace capability using active military conflict, what we're seeing are the non, you know, kinetic. Like, you know, when Russia invaded Ukraine in February 2022, there was a cyberattack against Viasat's ground terminals, you know? And, again, the ground terminals are right there. You know, they're easier to get at than something that's hundreds or thousands of kilometers up in space. So I think, you know, that's where the discussion of, you know, cybersecurity, that's going to be really important, and those are things. And, to a lesser extent, I think that international discussions, they kind of have space here in cyber here, so trying to mix the two together, but I think it is important to have a common understanding what's responsible behavior, whether it's towards space capabilities or actions in orbit.

Ms. Bingen: OK. So I'm going to – there was a comment from somebody watching online that I'm going to convey here, and then I'll get to our last question. But it's from a good friend of ours, so, hello, Dana Goward with the Resilient Navigation and Timing Foundation.

Ms. Samson: I know exactly what it's going to be about.

Ms. Bingen: But, you know, we did – you know, we talked a little bit about resiliency as a measure of deterrence. And so he just conveyed that for GPS, you know, part of our ability to deter attacks is by – or, at least it to be more resilient to attacks – is to have alternative PNT systems with different failure modes, not just in space but, you know, terrestrial. LORAN is a great example that, you know, the Brits have. So those terrestrial backups, those complementary systems will make attacks much less impactful. And I would absolutely agree with you, Dana. So thanks very much for providing that input. I think that's important.

OK, so let's close out here. I want to close on what to watch. And, Kathleen, I'll start with you, and we'll work our way backward here. But as you look at the year ahead, what are you looking at?

Ms. Brett: I tend to focus on Europe mostly, with my region of interest. So I'm just keeping an eye on Europe and their capabilities. Also the countries – I get really intrigued by the countries that people overlook. So I think that's something else. Also multilateral fora, and how things are discussed. Like, we didn't get to touch on this completely, but there was a close encounter, I'll say, between a North Korean and Malaysian satellite that was brought up at the

Committee on the Peaceful Uses of Outer Space last year. So, you know, these are real issues, and figuring out is communication increasing between countries, between commercial actors on these issues, is something, in my opinion, to watch – or, is it moving further away?

Mr. Swope:

First thing that comes to mind is, I know we talk a lot about China. You know, CSIS in general, and the Aerospace Security Project. But when it comes to space and what seems to be most concerning to me is still Russia. I look at the Russian satellites in LEO that have gone – we say, are stalking high-value satellites, they're coplanar. I think three to four historically, probably some happening right now as we speak. I look at the evolution of potentially that capability to GEO, with Kosmos 2589.

This goes to my earlier point, though, sometimes it's important to, like, really make a distinction. And I'm just using what I just read in open source. So I really have no idea sometimes what I'm talking about. (Laughter.) But we're talking about a Nivelir-type capability, which is probably more of an inspector satellite that's launched from another satellite; or something like the Burevestnik, which is probably more of an ASAT weapon, which could be launched – air launched, too. So that's a really – that matters, that distinction. And it's hard to really know with something like Kosmos 2589, which maybe has more fingerprints associated with Nivelir, could it also be holding a satellite, though, that's more like the ASAT weapon, and now that's in GEO, and it's already launched sub satellites? So it just makes you think, well, what kind of capabilities are on orbit right now?

And then I mentioned the ICEYE coplanar too, with four or five Kosmos satellites. Just things like that, that I'm like, hmm, you know, it feels very threatening to me. Not to say things that I don't see the PRC doing a study, but this – the Russian ones to me just really stand out. And I just feel like they have less invested in space today. They will wreck space for everyone. And they might be willing to rip the Band-Aid off, if you will, and do something that is really – no one's done before. And so that worries me.

And I guess, you know, kind of the second thing is, how do we see things like – you know, we talk about the space superiority in Iran. Well, to me, one thing that I thought of, well, there's global infrastructure right now when it comes to space. So ground stations around the world. There was talk of remote sensing satellite that China sold to Iran. And they sold essentially access to the infrastructure around the world too. We don't even know where that satellite would have been command and control. It might have been in the cloud, you know? There might have been someone that literally just pulls a laptop open, and they're sitting, who knows where, you know, the Bahamas, and they're command and controlling a satellite that Iran is using for intelligence collection purposes and targeting.

Like, how does that shift this notion of addressing space threats? Like, to me, that is different than something that you can easily identify as that's coming from Iran, this country. What does that mean? I think it's also represented, too – and when we saw the Iranians, they targeted a lot of infrastructure in the Middle East, like datacenters, like, I think, an SES ground station, and things that weren't – you know, they weren't in the country that was in conflict, but they were supporting essentially, like, the U.S. and allies' use of not just space but broader technology. So to me, like, that's something I want to see, like, how does that develop – that international footprint of space?

So really, to me, I'm really watching Russia. I think we really should still be watching Russia. We should definitely be watching China, so don't take that as a take your eyes off China. And then also this international piece – oh, I'm sorry, there was a third thing. I'll be really quick on this. So I think as we talk about dynamic space operations, that will influence how we do space domain awareness, space situational awareness. The U.S., I think, and allies will try to have more sensors. You talked about DARC. I think we'll have a lot of emphasis on building that up, both government capabilities and company-owned and -operated capabilities. What's the counter to that?

So that's what I'm wondering. Is there more efforts to deceive and deception campaigns in space, where you're making your signature look different, hiding what you're doing? Do you look like one object or five objects on radar just to mess with that? So it's kind of that cat and mask game that I think we will see play out in that tracking. I guess you could see kind of the development of stealth technology and radar on Earth. So I think you'll see something like that in space. In the next year, I don't know. But to me, I think that's bound to happen when countries are going to want to try to hide what they're doing in space more than they felt like they needed to do today.

Ms. Samson: I think, for me, I got a couple. We haven't talked about it yet, but there are reports two years ago that Russia reportedly is working a nuclear warhead that, in theory, could be placed into space, that would detonate and be a very crude, but extremely effective, antisatellite capability. As far as we know, there was no news on that. And so in this case, no news is good news. And the only thing that we updated in our report for them this past year was that there's a test satellite that's thought to be part of that program that's tumbling. And so, OK, that's about it. So it's good that we don't have any more information, they haven't tested it. But that's definitely, you know, low probability but extremely high impact. So definitely a concern to think about.

Mr. Swope: But another example of Russia specifically, too.

Ms. Samson: Very specifically. And, you know, to go to your point about how Russia has a lot less to lose than China, so definitely there's – I don't think they would use it except for an end of day situation, but who knows, right? So that's

something I'd be keeping an eye on, in addition, you know, to the dynamic space operations.

You know, the blurring of line between commercial and military space, that is not new but I think it's progressed. And, you know, when we're having, you know, a lot of companies going out and building military capabilities that they hope a government will buy. You know, they're kind of getting out ahead of the game there. And so it's a challenge because, you know, the laws are very clear in terms of how you deal with actors in combat and, you know, government capabilities. But, you know, if commercial capabilities are being used in active military conflict, legally they're concerned lawful targets. And what does that mean exactly? So I think we'll continue to see that evolve, as, you know, NATO has as a commercial space strategy, the Space Force has a commercial space strategy, try to figure that out and see it become more formal and finalized.

Ms. Bingen: Yeah. So I'll just add too. And I'll be the China person, so we're covered.
(Laughter.)

Ms. Samson: Take it away.

Ms. Bingen: But, you know, and I'll plug another report. We're working on a report that will come out next month looking at China's space industrial base. But as an element of strategic competition, in many respects seeing China launch rockets, put satellites in orbit, that could often be a lagging indicator. The leading indicator is seeing what is happening in country right now, in terms of the facilitation that they are doing. They are building industrial capacity for space, rockets and satellites, at such a tremendous scale, at such a speed. I mean, it really is – I mean, it really is eye-watering there. And so we'll have a report that comes out on this, but it's everything from, you know, aerospace cities, new launch facilities, these giga-factories and mega-factories. They have a startup ecosystem as well. And, you know, they're – I guess, they're quasi-commercial, but they have venture capital, but they're all still very heavily driven by the state. There's a lot of state investment.

So these are capabilities, you know, they're moving fast, that will benefit the military, but that also are going to have significant economic consequences if they can get, those services, that imagery, that's their versions of Starlink, their navigation, weather, et cetera, embedded across the world in global infrastructure. So that's something I'm watching, watching for as well. And then just the second one that we've hit on already, but I would just come back to it, is, I mean, space is such a key part of the changing character of war that we're seeing. And there is such – it is – for us, it's always been integrated. Space capabilities has been integrated into our military operations. But we're seeing others now integrated it into their tactical military operations. And

that changes the equation. So, you know, the incentive on all sides now to erode the other side's space capabilities, you know that is an early objective.

And then I think about that in terms of, like, an Indo-Pacific scenario where we are so dependent on space because of the distances, for our intelligence and targeting, for our precision munitions, for our communications across distributive forces. We are going to be heavily reliant on space. You know, the Chinese know that and it is clearly a vulnerability. At the same point in time, though, we know that they also are increasing their dependence on it. And so, you know, for us it may be a target as well. And then also, underlying all of that, and, Victoria, you said this earlier on, is the battlefield is just becoming more transparent as more and more actors are in space. And so we're fooling ourselves if we believe we have the market cornered on that high ground. Others are also pursuing that. And that just should cause us to think, you know, how does the joint force on the ground need to operate differently? What kind of denial, deception do we need to bring back? You know, do we need to be investing more in hangars and shelters across the world? But, you know, there is just such a greater proliferation of space capabilities that will have battlefield impact for us.

So with that, thank you, once again. We do this annual gathering, but it is – I do – I don't want – again, I don't want to say it's enjoyable, but it is – I mean, it is just – I really appreciate being able to have these candid discussions with you, and to be able to highlight the great work that you all are doing with your Global Counterspace Report, and then our Space Threat Assessment every year. And I want to thank our audience for joining us, and for asking some great questions. Thank you.

(END.)