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Todd Harrison: Hi. Good morning, everyone. I'm Todd Harrison. I'm senior fellow and director of the Aerospace Security Project here at the Center for Strategic and International Studies. It's my pleasure to welcome a number of guests, old friends, colleagues for this discussion today about counterspace weapons, threats to space systems, and the two reports that the team here at CSIS and our colleagues at the Secure World Foundation just recently released on these two important topics.

Before we get to the reports and the panel discussions, we've got some featured speakers that we want to go to first. I'm going to start with our government speakers: John Hill is the deputy assistant secretary of defense for space and missile defense policy and Eric Desautels is acting deputy assistant secretary for emerging security challenges at the State Department. And so, really, we're glad to have both of you to join us, as you guys were kind of a last-minute addition to the event. And we'd love to hear your thoughts and discussion about the announcement on Monday by Vice President Harris about the moratorium on kinetic ASAT testing. So, John and Eric, over to you.

John Hill: Well, good morning, Todd, and thank you for the introduction. My notes say I'm supposed to thank you and Kaitlyn Johnson and Brian Weeden and Victoria Samson, but I really want to thank Makena Young and Stefan Welsh for getting this all pulled together and making sure that everything works right and having us set up here.

This is really an important day for both of your organizations and it's a great week to do it because of the announcements that we had at the government level. As you know, on Monday evening the vice president did announce the United States commitment not to conduct destructive direct-ascent antisatellite missile testing, and that the United States seeks to establish this as a new international norm for responsible behavior in space. So what I'd like to do is explain some of the thinking and policy direction that led to this announcement before handing over to Eric, who will share thinking on the path forward to encouraging other nations to make similar commitments.

So, really, this has been a long time in coming, as people who have been around this field know. The president's March 2021 International Security Strategic Guidance directs that the United States, quote, "will lead in promoting shared norms and forge new agreements on emerging technologies in space," unquote. Now, that 2021 Space Priorities Framework that we issued in December at the National Space Council meeting, it echoed that language, citing that as space activities evolve the norms, rules, and principles that guide outer-space activities also must evolve. But those were just recent. This has been going on for – in national space policy for decades, and DOD has been responding because space-related rules and norms of

responsible behavior are in our interest as they are in – norms of responsible behavior are in our interest in every domain.

So developing a shared understanding among states of what constitutes safe and responsible space activities benefits all space operators, including DOD. And as a military organization, and as one of the world's most experienced space operators, we in the Department of Defense think that we have a special responsibility to indicate what we mean by responsible behavior and to reflect those values in our operations. More practically, given the increased tension with Russia and China, we hope that advancing shared understandings of norms and responsible behaviors can also enable risk-reduction measures and enhance stability and reduce uncertainty.

So, as a first step for us to outlining the norms – the types of norms and responsible behaviors that DOD would like to see, last July – July of 2021 – Secretary Austin issued clarifying guidance for DOD operators. The tenets of responsible behavior in space that he issued are five key tenets that describe our longstanding operational practices in space, but that was the first time that we had issued those as a secretary-of-defense level direction to the department. And although those tenets are meant for DOD space operators, our hope is really that we could also start a useful conversation among military space operators worldwide in order to build a shared understanding of responsible behaviors.

So the vice president's announcement on Monday goes a step further. She announced a U.S. commitment not to conduct destructive direct-ascent antisatellite missile testing. Following the global outcry about China and Russia's respective tests in 2007 for China and this past November – 2021 – for Russia, such a commitment by the United States would address one of the most pressing threats to the security and sustainability of space. The language that we used is intended to meet the following objectives: to meaningfully limit the deliberate creation of new orbital debris beyond what is generated through normal operations; to be easily understandable to the international community without requiring extensive new definitions; to be consistent with existing U.S. policy positions on space arms control; and to preserve the national security interests of the United States and our allies and partners, including the legitimate right of self-defense and our development, testing, and use of ballistic missile defense systems.

Now I also want to address some of the questions that we've been hearing and that people in your audience today might have.

First is: Why does the norm not reference debris? We recognize that all routine space operations generate some amount of debris. And moreover, quantifying or trying to add adjectives such as "harmful" or "dangerous" and so on, that starts to create subjectivity. Just for example, even in the recent

2021 test Russia has already claimed that the debris they created was not harmful despite astronauts and cosmonauts having to shelter and despite having – causing repeated risks to satellites in low Earth orbit, and that will continue for years to come.

So the next question that we get is: What do we mean by "destructive"? That term describes direct-ascent antisatellite missile testing that creates fragments from the breakup of satellites in orbit, and that approach leverages the very well-respected and -understood Interagency Space Debris Coordination Committee's definition for breakups.

The third question we get, as well, though, is: Will this norm put the United States at a disadvantage? And we would say distinctly no, it will not. We are – this is not disarming. We're not disarming. This norm is not focused on any technological capability, but on behavior that we want to dissuade and encourage people to not undertake. The recently-released ports by – reports by your two organizations, CSIS and Secure World Foundation – the reports on counterspace capabilities – both make very clear that the United States is facing an increasingly weaponized space environment. The norm that we're pursuing focuses only on testing. Testing this particular capability from the launch to destruction of a satellite can be seen and tracked by U.S. government capabilities and by non-U.S.-government assets, and that provides an additional objective evidence which is very important. This is not just about space security, but about underpinning the long-term ability to continue human exploration in space, to observe the Earth from space, to communicate around the world through space, and to expand new and novel economic uses of space such as in-orbit serving, assembly, and manufacturing. All of those things are in the interest of all space operators and all nations, and not having destructive direct-ascent antisatellite missile testing going on is very important to all of those things.

So, with that overview, I'd like now to turn it over to Eric and he'll talk about some of the way ahead.

Eric Desautels: Thanks, John. And let me add my thanks to Secure World and CSIS for allowing us to join at the last minute to talk about this commitment.

John has done an excellent job describing why we think this norm is in the United States' national security interest and why it will enhance stability and security in outer space. I am going to focus my remarks on how we plan to further this commitment to develop the shared understanding of the commitment that John has described by working with our international allies and partners using the tools available to the State Department.
First and most importantly related to this commitment, we have a U.N. open-ended working group on reducing space threats which will meet May 9th in

Geneva. This OEWG, as it is known, will meet over the next two years with a goal to, quote, "make recommendations on possible norms, rules, and principles of responsible behavior relating to threats by states to space systems, including as appropriate how they would contribute to the negotiation of legally binding instruments, including on the prevention of an arms race in outer space." The timing of our announcement is meant to spur a meaningful discussion in the open-ended working group in May. Having our own proposal at the OEWG of a norm of responsible behavior regarding destructive direct-ascent ASAT missile testing will allow the United States to demonstrate our leadership in this area and to drive the conversation in a way that supports our position and doesn't undermine U.S. national security in the face of what will surely be competing proposals.

The Conference on Disarmament will also hold discussion on the prevention of an arms race in outer space, or PAROS, over the course of its 2022 session. The Conference on Disarmament is the international body tasked with negotiating arms control agreements, which could be both nonbinding or binding. And for decades, the only proposal on the table at this body has been the Russian and Chinese Draft Treaty on the Prevention of the Placement of Weapons in Outer Space. The United States believes there are significant flaws with this draft treaty, especially related to definitions, scope, and verification, but up until this point we haven't offered any concrete counterproposals. Announcing this voluntary commitment will allow us to finally reshape the conversation beyond Russia and China's flawed draft treaty that has been specifically designed to constrain the United States.

Depending on the feedback we get from allies and partners over the next couple months, there are two approaches we may take to multilateralize this commitment that will complement the ongoing discussions in existing U.N. forum.

First, we could seek a non-legally-binding U.N. First Committee resolution which would call on all states to commit not to conducting such destructive ASAT tests. Such a U.N. resolution would allow countries to go on record regarding their support, creating that shared agreement among the majority of U.N. member states while increasing political pressure on plans for future destructive ASAT missile tests.

We could also consider making this into a legally-binding arms control agreement, though I view that as a much longer-term effort. Longstanding U.S. policy states that space arms control agreements must be equitable, verifiable, and in U.S. national security interests and those of our allies and partners. We believe the language of this commitment would allow activity contrary to it to be observed and attributed.

As John mentioned, we have been consulting with our allies and partners about this commitment, both with foreign affairs and defense colleagues. In addition to the usual allies like Five Eyes, France, Germany, Israel, and Japan, we have also raised this with many non-aligned countries. Overall, the comments we have received to date have been supportive. Since Russia's destructive ASAT test in November 2021, there has been international interest in responding to this type of threat. There is a share concern among many countries regarding the indiscriminate nature of the debris created by this act, even if they won't publicly criticize Russia for having done it.

We also recognize that this commitment doesn't cover all ASAT threats, including space-based ASAT systems, but we believe it is important to focus on the most pressing threat while these other U.N. processes, such as the open ended working group, develop concepts to address some of the broader threats given some of the challenges in attribution and definitions.

So I will conclude by stating that the U.S. government believes that this commitment regarding destructive ASAT missile tests provides an excellent first step in providing security and stability to the outer-space environment, while recognizing that there is more to be done and that it is – it will take time for diplomacy to make progress on the broader issues related to preventing conflict from extending into outer space while enhancing global peace and security. Thank you for allowing us to address you today.

Mr. Harrison: Got to find my mute button here. (Laughs.) Thank you. Thank you both for joining us and delivering these remarks. I know you've got lots of other meetings going on today, but you know, really appreciate you taking some time out to help explain the policy and the rationale behind it. Really appreciate it.

And congratulations on getting something like this through the interagency process. (Laughs.) I know that there's been a lot of people working behind the scenes for a long time to get this through, so congratulations.

All right. So next up, I want to turn to another guest speaker here this morning. Michael Mineiro is vice president for legal, regulatory, and government affairs at HawkEye 360. They are one of the many commercial space companies that are playing an increasingly important role not just in space, but more specifically in the ongoing conflict in Ukraine by providing open-source intelligence and space support services that are, you know, helping, you know, the allied side in this conflict.
Mike, I know you've got some slides prepared, so I want to hand it over to you. And before you get started, though, I want to remind the audience that we are going to be taking questions after Mike speaks and there is a link on the main webpage, the event page that you came to to watch this video. Just below the video, there's a green button where you can click on it and you can

submit your questions. And we'll be reviewing those, and when we get to the Q&A portion we'll be happy to ask Mike some of those. So, without further ado, Mike, over to you.

Michael Mineiro: Wonderful. Thank you, Todd. And good morning, everyone. Thank you, also, to Secure World Foundation and CSIS for the invitation for HawkEye to present.

For context, I believe one of the reasons that we were invited was in March there was a fair amount of press coverage on HawkEye satellites detecting GPS interference, and my understanding is that within the report that you've released today, you know, one of the areas of interest is GPS interference. So in the short presentation I'm going to provide today, I'll make sure we cover some of that and the audience can understand HawkEye's capabilities and our – and the useful applications in detecting GPS interference.

But within that context, please provide me a few minutes to share a PowerPoint I'd like to just share with the audience about what HawkEye 360 is and give them a sense of the technology, and then some of the civilian applications – dual-use applications including the GPS interference. OK. Can everyone see my screen? Great. All right.

So what's interesting is, is if you look at the history of space remote sensing, for about 35 years we've had electrooptical on orbit. And for about, you know, 25 years we've had radar – 20, 25 years – from a commercial/private-sector perspective. But only recently did RF as a phenomenology come into the marketplace, and I'm proud to work at HawkEye 360, the world's first company to put satellites on orbit dedicated to providing this as a commercial service.

The company was founded in 2015, just for some context. It's based here in Virginia. We're a company that raises and develops technology with private capital. And so we've raised about $300 million in private capital to date, 200 (million dollars) of it last year. We recently launched another cluster of satellites – and I'll explain that in a minute – on April the 1st, and we're very excited to be – we've basically paid for our constellation in putting it up on orbit.

We collect the – we collect signals using our satellites, we process it, we analyze it, and we render it. We collaborate with other forms of remote sensing, including electrooptical and synthetic aperture radar providers. We fuse data, we deliver it, and we transform it. We really use it as a – data as a service at the highest level.

Here's an example up here in the top corner. This is identifying in the South China Sea various maritime RF emissions and MMSI identifiers.

So what do we do and how does this work? So we always launch our satellites in clusters of three. They oscillate about 250 kilometers apart. And that distance and that formation allows us to get accurate geolocations of terrestrial RF emitters that are of a certain energy level – so things like push-to-talk radios, radars, things of that nature.

To give you a sense of the collection swath of the satellite, it depends in part on the antenna and it depends in part on the angle of the satellite relative to the Earth. But this gives you a good sense – unlike something like a synthetic aperture radar or even electrooptical imagery camera, you get a much larger collection pattern, typically, with RF energy.

So the satellites are relatively small, like a dorm-room fridge. We're proud to say that we're now assembling and integrating those satellites here in Northern Virginia. We have a new facility we're opening up. And every quarter, we're scheduled to launch.

Here's examples so the audience has a context of the types of emitters that we geolocate. I know the one of great interest for this conversation is GPS interference, but we do geolocate a whole diversity of terrestrial emitters.

One thing that's special about the AIS is that we can independently geolocate it. So if someone's spoofing the AIS, we actually know where the AIS transmitted from.

OK. And you know, if you're thinking – you're saying, wow, there's a lot of ways you can use this information, there's a lot of application – and in fact, that's correct. This is not an exhaustive list; this is an illustrative list. And I'm going to show you three or four civilian dual-use applications, but – so, really, a great number of applications you can use with this sort of space-based remote-sensing data.

So let me give you one example here. We did some work with Garamba National Park in Africa. This is an example of using the technology to help address and support environmental sustainability and responsibility. In this case, the question was: Where are there L-band and VHF push-to-talk radio activities within the national park? There's not very many park rangers to cover the land of that size, and when they see anomalous push-to-talk activity on a VHF or on an L-band sat phone that may be an early indicator for them to direct their interdiction assets there, their rangers to go explore: Is that a poacher on that push-to-talk radio? Who's using the L-band sat phone?

Similarly, within the context of environmental sustainability and responsibility, two fishing seasons ago we collaborated and did some work

over the Galapagos. And the question was – is: Are we able to identify dark ship activity and what does that tell us? And what, in fact, we found – and it became the substance of an Economist article that was published – was there was a large fishing fleet, a Chinese fishing fleet, and in some instances we identified dark ship activity that seemed to go over the EEZ boundary and then return. So what's interesting is I've been told that last fishing season the behavior of the fleet changed. It was much farther off the EEZ. I don't know if that's because of the work we did. I'd like to think so, that people are aware that we can monitor the environment and call out, you know, questionable activities when appropriate.

Now, this is the last thing I'll show with you, and I know for the purposes of your report this is of particular interest. GPS interference – terrestrial GPS jamming – this is an increasing problem, and I anticipate your report will discuss why: the proliferation of the technologies, its ubiquitous nature; a diversity of folks who want to use that, everything from illegal drug smugglers to military applications, et cetera.

In this case, here's two examples of HawkEye satellites detecting GPS jamming and interference. In the top right, box A, what you see on the Belarusian side of the border just prior to the invasion of the Russian forces was a large uptick in GPS interference activity, which is an interesting early indication and warning of sort of combined military operations. Down here on the left, in box B, we were monitoring in the disputed regions of eastern Ukraine GPS interference across the entire region and able to detect and geolocate the interference locations.

So I'll stop there. I wanted to make sure I had time for questions with the audience.

Mr. Harrison: Thanks, Mike.

You know, I wanted to kick it off by asking a question myself. You know, your system, as you described it, it's able to detect and locate signals. Can you talk a little bit about the fact – I know you and I have discussed this before, but you're not actually listening to the content of the signal, the data that's being transmitted. Can you talk a little bit about that and the distinctions there in what you're doing?

Dr. Mineiro: Sure, sure. So HawkEye 360's satellites are geolocating those emitters. We follow very clear federal laws that prohibit listening to internal protected communications. There's rare exceptions in federal law – so public communications, no expectations of privacy. But what we do is externally related. So that's the geolocations and in some instances what folks would call electronics intelligence, the external nature of the emission.

Mr. Harrison: OK. And you know, also, you're a commercially oriented company. You've got a commercial business model, right? And on one of your slides you talked about the private equity that HawkEye has raised, you know, and has invested in building these capabilities. So, you know, how do you view your business model where you are, you know, internally with, you know, private equity paying to develop these capabilities – paying to buy the satellites, buy the launches, put them on orbit, and operate them – and then sell it as a service to the government? Can you talk a little bit about that business model and, you know, challenges you've encountered with trying to work with the government, and a model that the government is, quite frankly, not used to?

Dr. Mineiro: Mmm hmm. Well, that's a great question.

First, I would start by saying that there's a place for all sorts of business models to support comprehensive national power. HawkEye 360 is a dual-use, private company that is commercially oriented. We don't just sell to the U.S. government, nor is that our intent. That being said, the ability of the private sector to run hard, to run fast, to innovate is very impressive when you have the incentive structure of private capital. And part of it is the pressure, right? You've got to succeed. You don't have time to fail. You got to figure it out, and if you fail, fail quickly and pivot.

And that's good for the nation because, you know, HawkEye's launching a satellite now every quarter, right? And those are not static satellites. We're doing generation block upgrades. We're changing them all the time. We're improving the software. And so that provides an augmentation, a resiliency, a supplementation, a complement to U.S. national means. And in some cases, it's the only option for friendly governments that the U.S. government wants us and allows us to sell to.

Mr. Harrison: I've got some questions coming in here from the audience. So one is, can you discuss a little about how HawkEye has seen GPS jamming change, or maybe stay consistent, throughout the Russian invasion with Ukraine? I know in some of the images you were showing, and one of the images that we used from HawkEye in our report, was actually back from November, before the invasion started. There was already pretty extensive GPS jamming going on. So can you talk a little bit about how that's evolved, or have you seen it evolve?

Dr. Mineiro: Hmm, that's a wonderful question. I think what I can say, and what's appropriate, is that the use of GPS jammers is impressive. I mean, that's really happening. There's a lot of it. And I think there's a lesson that's going to be learned when the analysts and the policymakers reflect upon what's happening now. And one of the things they'll likely say is, electronic warfare, that's going to be a big problem. And it's going to be a big problem not just for the operators in that region, but the secondary effects – whether it's

civilian aviation, whether it's maritime, whether it's civilian UAV applications.

And, you now, in my mind, thinking like a futurist, it's only a few years away when the reliance we have on GPS is exponentially more, right? When we have autonomous boats, and autonomous planes, and autonomous things. So for me, that's the takeaway on the lesson learned from the past months.

Mr. Harrison: Another question here is about – you know, and directly related to the subject of this discussion today – is the risk of counterspace attacks against a commercial system like HawkEye. You know, how does HawkEye consider that risk? And what types of counterspace threats are you, you know, particularly worried about? What do you need to be prepared for in the event that Russia decided to, you know, escalate horizontally to start attacking commercial space systems?

Dr. Mineiro: That's an interesting question as well. I think I would answer it by first delineating the threat typology. So you have – in my mind, you would have cyber, right, and you would have physical kinetic which you could delineate thrust rovers on orbit, and then you would have electronic, you know, jamming and warfare sorts of things. Now, as a private company, we take great, great, great investment and focus on ensuring our cybersecurity is at top notch. And I have to applaud the U.S. government because over the past few years that I've worked at HawkEye I've seen their outreach levels increase. And I think they're aware of the threats across the space industry on the cyber side. And I think the U.S. government's trying to help industry understand and address those threats. So I do need to applaud the U.S. government for that.

On the physical and the electronic side, that's a much harder nut for a private operator to crack, right? In a way, not specifically for HawkEye, but I think generally the way to think about it is how we rely on the Navy and the Coast Guard to protect civilian ships. I think right now generally in space when you're a civilian operator or private operator, that's basically for physical, kinetic, and, to some extent, electric. That's where we're at, you know? The ability of a private operator, whether it's HawkEye or someone else, to deal with a state-level kinetic threat, don't really know how to answer that one.

Mr. Harrison: OK. Another question here from the audience. If you could talk a little bit about regulatory and licensing requirements and, you know, where does, you know, this RF-sensing capability that HawkEye 360 offers – where does that fit into the regulatory framework as it exists today? You know, where do you have to get approval from the U.S. government for your activities?

Dr. Mineiro: No, that's a wonderful question. I think most people start by looking at the electrical, optical, and the SAR providers. And so let me start there and

differentiate. So electrical, optical and SAR providers go to NOAA for a land remote sensing license. So under the 1992 Land Remote Sensing Act, if the satellite's capable of remotely sensing the land, they're captured by that licensing regime. So passive RF receipt isn't so it's excluded from that statutory authority. So we do not receive a NOAA license.

However, we are subject to any number of laws that those electrical, optical and SAR operators aren't. So, for example, the wiretap act, the Pen Register Act, all right? (Laughs.) There's a number of electronic privacy and communication acts that we're subject to. In addition, we do receive FCC licenses. When we launch on a U.S. vehicle there's a payload review process. And then whenever we export a product it is subject to, as appropriate, U.S. export controls.

Mr. Harrison: OK. So that's important there. Every time – the data that you generate, the products, the analysis, if it's going to some entity outside the United States, that has to go through ITAR review. Is that each and every time?

Dr. Mineiro: You know, I think it depends on the government's position. So right now for the vast majority of our products, right now we're treating them as ITAR.

Mr. Harrison: OK. Another question from the audience here is where can HawkEye 360 data be found? (Laughs.)

Dr. Mineiro: (Laughs.) That's an interesting question. I think if I take a step back and take my HawkEye hat off, I think historically in the electro-optical world, particularly between Landsat as well as commercial imagery, there tend to be available in the university settings a real voluminous amount of historical data. And that's a good observation from the audience, that that's actually not out there yet. To my knowledge, there isn't, like, a university repository or a secondary public repository.

What we do have, number one, is we do release on our website examples of how our data is used and can be used. Number two, if there is someone interested in getting access to historical data, I would – I would encourage them to reach out through the website. You know, we have a product. We can offer historical data, and all of that. And so that's how it's procured right now, is the way you would get it.

Mr. Harrison: But otherwise, if a paying customer comes to you, they set up a – you know, a subscription service of some kind, is that the way it works?

Dr. Mineiro: Yeah, so standard customer would come to us, and primarily we sell subscription-based services. We have different ways we can do that. One standard way is called a regional area subscription. So there's certain areas of the world that are of particular interest to people. Another can be a

tailored one. So a customer might want to understand for the purposes of protecting their fleet. So let's say an insurance provider or shipper wants to understand what's happening around their shipping fleet. They might ask us to sort of geolocate emitter as the ship moves through the water, to protect that vessel.

Mr. Harrison: OK. Another question here is specifically about GPS interference observed in Ukraine. So, you know, the map that you showed me earlier showed me interference in Belarus, and in the separatist regions of Ukraine. Can you tell from the data if these were actually being conducted by Russians or by Ukrainians? And can you infer from the way it was being used what the targets and the intended effects were?

Dr. Mineiro: Hmm, that's a very interesting question. I'm going to have to defer on that to the – to my colleagues that work on the program side. As you know, when you get the RF initially, the RF is the RF. And it's possible, depending on the RF's energy, that there's additional information in there which helps inform the application or the source. But as you see in those – the PowerPoint I presented, it's overlayed with other things, including imagery. And so RF is a very powerful phenomenology when it's also complemented with other sources of information. So by overlaying the terrestrial location, just looking at that map, you get a sense. And I know that for certain, but I can't really answer the rest of that question. I'm not the right person to answer that.

Mr. Harrison: Yeah. Yeah, so I guess it kind of gets to sensor fusion and merging this data with other data that you can start to figure out who's doing what and what their intent might be. But that's a more complicated intel problem. Final question to you before we move onto the panel discussion. And I don't know how much you can say about this, but who is HawkEye working with in the U.S. government? You know, are you talking to the Space Force, U.S. Space Command? How does it work and kind of what are your entry points? And, in particular, you know, to the conflict in Ukraine, you know, how are you providing support and who's that going through?

Dr. Mineiro: Yeah. I don't believe I can speak specifically to that last one for certain. And then, you know, we have had publicly recognized press releases that we've done work with the NRO and the NGA on the national security side – some public press releases. And we continue to support a variety of agencies, civilian and national security agencies, for the U.S. government.

Mr. Harrison: All right. I understand it's probably all you can say. (Laughs.) You know, Mike, thank you so much for providing this update on what you're doing and especially, you know, looking at what's going on in Ukraine now. Really appreciate it. Thank you for joining us and, you know, we'll look forward to more updates in the future.

So now I want to switch to our panel discussion, where we are going to discuss what we found in the Counterspace and Space Threat Assessments this year. So I want to welcome to our event Victoria Samson. She is the Washington office director of the Secure World Foundation. And also want to welcome her colleague Brian Weeden, who is director of program planning at the Secure World Foundation. And of course, my two colleagues here at CSIS, Kaitlyn Johnson as well as Makena Young, who were the key authors on this year's Space Threat Assessment for CSIS.

So, you know, I'm just going to open it up to the group before we actually get to the content of the reports. You know, there was this breaking news this week about the ASAT testing moratorium. I wanted to get reactions from you all on, you know, this policy, how significant is it, and, you know, your own personal views. Is this a good move on the part of the U.S. government? And do you think, you know, other countries are actually going to join us and, you know, kind of rally around this as a new de facto norm of behavior in space? So, you know, I don't know who wants to go first. Maybe, Victoria, I'll go to you and just get your thoughts quickly on the new policy.

Victoria Samson: OK, great. Thank you, Todd. Thank you to CSIS for coordinating this event. Thank you all in attendance and thanks to our earlier speakers. It was great to hear from U.S. government representatives and, of course, to hear from Mike Mineiro from a commercial perspective about some of these issues.

So, hello. My name is Victoria Samson. I'm the Washington Office director of the Secure World Foundation. We're a private organization that focuses on the long-term sustainable use of outer space. Along with my colleague, Brian Weeden, we're the co-editors of this year's Global Counterspace Threat Assessment.

And so we've been following a lot of these discussions internationally at the multilateral level, at the United Nations specifically, to look at, you know, how space security and stability issues have been progressing. And frankly, they've just been stopped. You know, they've been stuck by going about the same proposed treaty for the past 15 years has gone nowhere. In the meantime, the space environment is getting increasingly complicated. And so it's been – it was really encouraging to me to see the U.S. put forward a feasible, workable option that actually affects space security and stability as it exists right now, not some theoretical construct that could happen down the line.

And I think it actually – it's a suggestion that from what we hear, many countries actually may get on board and say, OK, we understand. You know, it's bad form to create a large amount of debris in the space environment because everyone on this planet is a user of space data, whether they know it or not. And so they have the incentive to make sure the domain is not ruined

by deliberately creating debris. So I am optimistic. We'll see what ends up happening at these international discussions.

But, you know, I think – you know, the last point I'd like to make, and I'll turn it over – I could probably talk for the next hour about this – but, you know, I think one of the positive things about the U.S. making this kind of unilateral, you know, assertion is that we don't have – it doesn't have to be negotiated, you know? The U.S. is going to do it. Other countries can join them in this effort, but they don't have to. I hope that they will but, you know, I think we're going to see progress just from the U.S. showing leadership on this issue, no matter what comes out of these international discussions this May. So, yeah. Very excited. Congratulations to the U.S. for suggesting this.

Mr. Harrison: Brian, do you want to go next?

Brian Weeden: Yes. Yeah, sure. Thank you. And, again, thanks for having us on the event today. Echo everything that Victoria said, and I'll just add a couple of points here. One, you know, part of the reason that the international discussions on space weapons and counterspace have been so stagnant for the last few decades is they've been stuck on how do you define what a space weapon is and how do you track, and monitor, and verify an agreement based around things, right? Trying to prevent things.

This is a very different tack, right? This is focusing on behaviors. And as we've seen over the last several years, behaviors – like deliberately destroying satellites with missiles launched from the surface of the Earth at them, is really easy to see and verify. So if you're going to pick something that is not only – hopefully we can all agree is wrong and bad to do, but also is relatively easy to verify and monitor, this is what you pick. So I think this is sort of a very pragmatic starting point, not only for the reasons that Victoria laid out, but also for that ability to verify and monitor.
I will add, though, that I was also heartened to hear this morning from Eric and John that, you know, this is not the end point. This is the, as they said, the starting point of a broader conversation where they hope other countries follow along. And then maybe this then turns into a broader set of pledges or even a legally binding agreement down the road, because that's really, I think, where we need to head on this topic.

And finally, I'll say I think from a diplomatic standpoint this really puts a lot of pressure on Russia and China, who have been saying for the last, you know, decade-plus that they are, you know, against an arms race in outer space, they're against weaponization, they're for protecting space. And if they really do, you know, believe in that, then it should be easy for them to sign up to this and put up their own pledges, because they're also using space, right? They're also deploying capabilities. So I think it's a positive step.

You know, but it's not – it's just the first step. And there's going to be a lot more discussion and focus on this over the next few years.

Mr. Harrison: Yeah. Kaitlyn, do you have any thoughts?

Kaitlyn Johnson: Yeah. I have a lot of thoughts. Obviously – (laughs) – our panel is very supportive of this measure. I think it's something that both of our teams have been talking about for a very long time. You know, from the perspective of our work and research, we have seen kind of this self-imposed ban already. You know, both the U.S. and China have not tested kinetically a direct descent ASAT since 2007/2008. And so this is really just reaffirming that we value – that the United States values the sustainability of the domain.

I think we've seen a couple reactions from some congressional leaders and others who are not so supportive of this declaration. And I think a lot of what they've said has been based on the fact that it limits our capability, or our ability to signal. And I really just don't think that's true, because technologically, like, we have demonstrated this very successfully both, you know, back in the '50s and '60s, but also now. This is not a new technology. And you also don't need to have that kinetic impact in space to showcase that you have this capability.

And that's exactly, I think, what the United States is saying with this, is that we agree not to pollute the environment. But they still hold the capability active, and they will still be able if they would like to test at basically an empty point in space. We saw China as well change their behavior after their 2007 test, which was incredibly destructive. Since then, you know, they have not kinetically impacted another satellite in space. And yet, they test that capability almost every year.

And so I'm hopeful that this could be picked up by other nations. The 2021 Chinese national space white paper that they released, the biggest difference to me was that they want to become an international leader in space. And I think this would be a great way to double down on that pledge, as well as to commit to something they're already doing. This is already, you know, behavior that at least these two countries are following, and maybe it will spur others to follow, so we don't have such disruptive ASAT tests, like the Russian 2021 test or even the Indian test in 2019, '20? What is time with COVID? (Laughter.)

So I just think that this is obviously a great step forward for the United States, and I think obviously the five of us really hope that there is momentum building to continue this on. And I would ask the naysayers to look at the technology itself and really see that it's not impacting – the technology is impacting, as Brian said, the behavior.

Mr. Harrison: Makena, is there anything you want to add?

Makena Young: Yeah, I mean, they – the three of them covered this wonderfully, I think. So the only thing I'd add is that I think, you know, again, agreeing with them, this is a wonderful step forward and the U.S. officials have been some of the most outspoken about the 2018 Indian ASAT test and about this 2021 Russian ASAT test. I think this is a great way to just back up what we've already been saying, that we don't support other countries doing it. And so I think it's just as important we say we, you know, publicly, will not do this again. This is bad for everyone. It's bad business for everyone operating in space. And so I think this is, you know, a very welcome, public announcement that, again, as they've said, it's just built up what we've already been doing in space. So I think it's a wonderful step forward and hopefully a decently easy first step for other countries to sign onto as well to start building some of these more important norms, you know, for state sustainability specifically. And we can go from there.

Mr. Harrison: Yeah. You know, the one thing I would add is, you know, I've seen comments by folks in Congress that, you know, are skeptical of this policy. I guess, you know, what I would say is I hear the concern. You don't want to limit our military capabilities. But if you look at what is being limited here, it's a capability that we don't really need, that's not that useful to us, quite frankly. A direct descent kinetic ASAT capability – well, first of all, we don't need to test it. We already know we have it. We know it works. You know, there's no need to conduct a destructive test anymore. But also even in a conflict, I think this is something that we would rarely, if ever, consider using. Just because of the debris creation, and it's going to hurt us likely more than it would help in any kind of military conflict.
And the benefit here, the potential benefit of retaking the leadership role in the international stage when it comes to, you know, advancing responsible behavior in space, responsible norms of behavior, and really putting pressure and putting China and Russia in particular on the defensive to justify why they won't, you know, implement a moratorium themselves, and why would they want to continue testing in this irresponsible way? I think that that is really powerful, and the benefit certainly exceeds any risk or cost involved here. You know, I also applaud the administration for finally taking this step. I wish we had done it years ago. (Laughs.)

But let's move on and talk a bit more about the content of the reports. You know, I want to hear from all of you about, you know, Ukraine and what we're seeing, you know, now that we have a major conflict going on with a major space power, Russia, that has the full suite of counterspace capabilities. What are we seeing Russia use, versus what you might have expected to see them use in a conflict like this?

Brian, why don't I start with you on this one?

Dr. Weeden: So I think we're seeing what we expected, at least what I expected, going into this. As you talked about in an early discussion with Mike, you know, the biggest thing we're seeing is the electronic warfare, right? The GPS jamming but also, you know, jamming, interference with satellite communication signals, and a cyberattack. At least one we know about, against Viasat, that has – you know, there's quite a bit of circumstantial evidence to link that to the invasion.

So we're seeing those. And some of those things started before this. You know, both of our reports have been talking about Russia's operational use of electronic warfare, GPS, satcom jamming in Syria, in the campaign in the Donbas region since 2014. So it's not really that new, in terms they've already been doing it. But also, it continues this trend we're seeing where the operational – the – kind of things the military used operationally are the non-destructive ones. They're the temporary versus the – well, I'll take that back – one step – in cyber. But they're not blowing up satellites, right? (Laughs.) They're going after the interference, denial, degrading of the service to the end users. They're not going after the satellites. And even in the case of the cyberattack against Viasat, where they did, you know, destroy thousands – or, basically, tens of thousands of end-user modems, the satellites are working just fine, right? That was a – that was a terrestrial cyberattack.

So I think that is in line with what we saw and what we expected, what the trends are so far. I think, you know, some people were concerned that – you know, because Russia, of course, tested a direct descent ASAT weapon last November, that that may have been a – you know, a harbinger of what they might be doing. Honestly, the fact of the matter is that capability is not all that useful when you're talking about dozens to hundreds of satellites you might have to target, right? You know, if you're talking about one or two, OK, that might be useful. But if you're talking about hundreds of satellites, it's just not useful.

Mr. Harrison: Anyone else want to comment on what we're seeing in Ukraine?

Ms. Johnson: I would just jump in, Todd, that this is, like Brian said, a trend that we've been tracking for years. You know, both of us have been doing this report for five years now. And we have seen Russia test these capabilities both in, you know, its own military exercises, but also in areas of, you know, what we kind of classify as gray zone conflict. And so, like Brian said, I don't think, unfortunately, any of us were surprised that this was the case.

I think it's just bringing this technology into an active conflict. That's what is kind of new and novel in this case. And as Brian said, like, the attack is on the end-user equipment, not on the satellite itself. And so that is really where

we're seeing the vulnerabilities in our own infrastructure, in our, you know, commercial company infrastructure. And maybe will cause us to rethink how we design and build those technologies in the future, knowing that it's likely to be attacked in or by electronic warfare.

Mr. Harrison: Yeah. One thing I would add is we ought to be looking at this conflict in Ukraine from a space perspective. From, you know, a thought of what lessons is China learning from this? And, you know, I think one of the big things that China's got to learn from this is, first of all, space capabilities and commercial space capabilities in particular played an important role not in deterring Russia. This was not deterrence by detection. But it was – commercial space capabilities played an important role in solidifying and unifying allies against Russia. Which made possible much more crippling sanctions and much more aggressive support for Ukraine in terms of providing equipment, supplies, and things. As well as the direct support Ukraine was able to get, you know, in terms of intelligence to help them beat back the Russian invasion.

So, you know, China's got to be looking at that and learning some lessons here as well. And thinking about what might they need to do to counter this advantage in space, in some conflict in the future that might involve the United States and our allies and partners in the INDOPACOM region. You know, that's an interesting way of looking at this. And I think there's still more to learn as this conflict continues to evolve.

Victoria, I want to go to you next. And in the Secure World Foundation report, you guys added more countries this year. I wanted to see if you could elaborate on that. Why did you add these countries? And what kind of activities do you see them conducting, related to counterspace?

Ms. Samson: Thanks, Todd. So, you know – I'll explain – the first year Secure World started doing this report we covered – 2018 – we covered six countries – U.S., Russia, China, Iran, India, and North Korea. In 2020, we added two more, France and Japan. And then this year, as Todd said, we added three more – Australia, South Korea, and United Kingdom. So that's a total of 11 countries. So over the course of about five years, we've doubled pretty much the number of countries that we've been following on this.

And so looking at this, generally speaking, you can see some trends emerging in national security space when we examine the newer editions to the Secure World Counterspace Threat Report. These countries by and large are countries with civil space programs, who are laying the groundwork for more indigenous space capabilities. And that includes the military. They all have some sort of – they've established some sort of military space organization.

They're building out a framework – a policy framework for their military space priorities. Whether that's the creation of a space defense strategy, some sort of doctrine for military space operations, or even, you know, doing legislation to allow their ministry of defense to have access to their space capabilities. They're putting concerted efforts and resources in their indigenously built space situational awareness capabilities, largely. In some cases they're building out longer ballistic missiles or space launch vehicles. And generally speaking, they've expressed some sort of interest in a counterspace capability. Usually they've focused on reversible. And this is often done concurrently with investment – with increased investment in their civil space programs.

And so the priorities for their space security programs, you know, they sound a lot like what we hear here in the United States. They want mission resilience. They want assured access to space. They want – you know, they mention the idea of having some sort of space control capability to counter what they deem to be threats to the space environment in general, and their space assets in particular. So that's kind of just, you know, the big picture trends that we see.

Just really quickly, for the newcomers, you know, we have – let's go with Australia. They're a relative newcomer in space. They have a relatively new civil space agency, although they've long played an important role in hosting ground infrastructure for satellite communications. They've been looking at increasing indigenous space capabilities, including the military, and started a military space organization. And is putting concerted efforts in building its own SSA capabilities. And it's even examining some sort of electronic warfare capability for its department of defense.

South Korea has also increased numbers of some military space capabilities. We're seeing it trying to enhance the space capabilities of its air force through the establishment of some sort of space operation center, cooperating more with the United States in ensuring SSA capabilities, focusing more on its space launch vehicles, and even expressed interest in some sort of reversible counterspace capabilities.

And then finally, the U.K. Long played a supporting role in military space activities through its participation in NATO, and its relationship with the United States. Over the past few years, it's begun to add elements to increase its indigenous military space capabilities, primarily in SSA and policy, organization, and doctrine. To date, the United Kingdom has not publicly announced any specific plans to develop weapons of counterspace capabilities, but it's exploring the issue.

So in the grand scheme of things, it's been interesting watching these countries, you know, grow. And frankly, and I'll be honest, probably next

year we'll be adding a couple more. And it just speaks to how the international community is looking at how important space is, but also concerns about competition on Earth extending up through space. Thank you.

Mr. Harrison: Great. And, Makena, I want to go to you next. And I know this is one of the sections of the report you worked on for us was looking at the Russian ASAT test from back in November. You know, can you kind of give us an update on that, and put that in the context of, you know, what we've seen in recent years in terms of, you know, direct descent kinetic ASAT testing?

Ms. Young: Yeah. Thank you. So this kind of brings us back to both questions that we have talked about a bit in the beginning. You know, this was a test in November of 2021, where they hit one of their older satellites, and it created, I think, more debris than they initially were expecting, I think. It was a huge shock to a lot of us in the space community. They have tested this same weapon system, the Nudol system, you know, 10 times since 2015. Eight of those were successful, even though they did not hit a kinetic – they did not make a kinetic impact.

But this was clearly a successful program. They tested it many times. We all knew that they had this capability. So the fact that they felt the need to actually destroy a satellite and, you know, create this debris was pretty surprising since I think we've all – we've all been saying since the first editions of our reports that this is a capability that Russia has. So it was pretty surprising to most of us in the community.

And now seeing, you know, how everything has played out in Ukraine, I think it is, you know, maybe easier to say that this was some, you know, show of force that they had in their military. They wanted the world to say, oh, wow, Russia is capable of doing, you know, what looks like a really major counterspace attack. Even though, as we've discussed, you know, it's not quite the capability that it might look on the outside. So it's easy to see that they were just kind of posturing for this, you know, invasion of Ukraine, and that they were just trying to kind of show their capabilities in a grand way.

Again, you know, a lot of countries are outspoken about this because of the debris it created. Astronauts and cosmonauts on the ISS had to shelter in place because of debris that was in the similar orbit. So it really, you know, had a lot of implications that went much further than just showing that they have this capability. And I think, you know, that's another great thing about this U.S.-ASAT test ban. It proves that not only, you know, do we condemn it just because it's from Russia or, in the past, just because it's from China. But because it really is dangerous to what we're doing in space. And, you know, the few human lives that we have in space, it's a huge danger to them as well.

China has also spoken out that – not about the test itself, but that debris has come close to their space station too. You know, they have their own sordid history with debris and ASAT tests in 2007, but the fact that they did speak about the debris coming close to their assets I think was a pretty strong statement as well. So I don't know if we'll see another test like this from Russia in the future. It seems like, you know, this kind of got what they wanted to get across, and, you know, they have their hands pretty full with what they're working on now. But it was a pretty shocking – pretty shocking event.

Mr. Harrison: Yeah. Yeah, so maybe that is one of the silver linings that will come out of it, is that it might push China, you know, to adopt a moratorium – a similar moratorium of their own. And maybe China will put some additional pressure on Russia to not do this again because now China's got a lot at stake in space, including human lives.

Kaitlyn, I want to go to you next, speaking of China, and talk a little bit about the SJ-21 space tug, let's call it, which interestingly we all found out about for the first time about last time we got together for an event when ExoAnalytic kind of surprised us with showing the data they had collected from their telescopes that saw the SJ-21 space tug make an interesting maneuver. So, you know, Kaitlyn, tell us a little bit more about that. And do you really think that it is a weapons test, or not?

Ms. Johnson: Sure. Thanks, Todd. This was something that I was really excited to dive into in the research. If you have our report it's on page 24. We structured the report where we dove into a couple of these counterspace incidents, like this SJ-21 satellite. It was launched in late October. And the Chinese government stated up front that this satellite's mission is to test technologies to mitigate space debris. SJ-21 was launched into geo, and after it was launched and entered the geo orbit, it quickly separated with its rumored apogee kick – apogee kick motor, AKM, which is what Space Track, if you want to go dig into their data, named it as well, is the SJ-21 AKM.

It performed an RPO, a rendezvous in proximity, operation with this satellite that it kind of kicked out. And then, after that, it moved on to go into grab and tug, which was, you know, part of I think the uproar, that it rendezvoused and it docked with the Compass G2 Satellite, which was an inactive satellite, formerly part of the BeiDou constellation which is, of course, China's version of GPS. It's their position navigation and timing. Compass G2 was in graveyard orbit. So it was in the orbit that we use to dispose of geo satellites so that they don't interfere with active satellites in geo, since it's such a precious orbit. And SJ-21 was successful in its docking, and the able to move that satellite.

What I think is really important, Todd, is that kind of second question that you asked, of what did this activity look like? Is it a counterspace weapon? Why do we talk about it in these reports? If you're looking at our report on page 24, I'm going to just plug real quick, I pulled this data straight from the Satellite Dashboard, which is another joint CSIS-Secure World-and UT Austin project. It shows activities in geo just like this. And we are releasing videos to teach people how to use this site. And I just went in and I pulled the data straight out and was able to show it to you in the report, of what those orbits look like and this interaction looked like in geo.

And so really, I think with China's announcement that this was testing space debris mitigation technologies, the activities that we've seen this satellite do thus far is really in line with that. So while I would not classify this as a counterspace weapons test, we include it, of course, in this report because the technologies and skills of performing these maneuvers are the same technologies and skills needed to perform co-orbital anti-satellite weapons tests. This is something that I think both of us at CSIS and SWF have been very clear about, that there is a difference between the technology itself, the skillset that is needed to conduct operations such as this, and then the behavior and the intent behind the attack.
And that's what makes it so – or, the incident. That's what makes it so hard for these discussions on norms to happen, for these, like, different international agreements that have been proposed to get headway, it's because it is very hard to track and detect. It's very hard to verify. And then we are – really what we're trying to do is not limit the technology itself, because the technology can be used for, you know, incredible advancements on orbit surfacing, for example, or active debris removal, which is what this test was demonstration. But also, you know, that behavior side of things, of limiting debris or of maybe coming close to another country's satellite without announcement or warning. You know, there are a lot of steps there that I think we can take.

And so I think the primary reason we track these objects is to make those distinctions and to be clear that while these are not counterspace tests, they are demonstrating the technological capability that is also needed for these counterspace tests. And I anticipate to continue watching this satellite. You know, given other satellites in geo, it could be on orbit for 10 to 15 years. And I imagine China has kind of a slew of missions planned for SJ-21.

Mr. Harrison: Yeah. So, yeah, I mean, I think that's a great point this this is – that we're going to see more and more of these dual use capabilities, as on orbit surfacing, on orbit logistics, and active debris removal capabilities continue to progress. So there'll be more of this for sure.

Brian, I want to go to you next. You know, both of our organizations have been doing these reports for five years now. I was hoping you could

comment a little bit about how the open-source intelligence available about counterspace activities has changed over the past five years.

Dr. Weeden: Yeah, it's been really interesting. Honestly, one of the questions I know we get a lot – and I'm sure you guys do – is: How do you guys find all this stuff, right? How do you, like, you know, get all this data? Because when we first started doing this report, one of the justifications or one of the rationales we had was there was a lot of kind of hype and a lot of concern about counterspace threats and space weapons, but there was very little public data on it, right? Everything was classified. All these discussions were happening in SCIFs. And so from the Secure World side, we really wanted to see, could we put together a product that was publicly available based on open-source information that could help further the public discussion on these issues.

And it turns out, if you look, there's actually a lot of information out there. We've already talked about a couple of them. So, for example, there's a lot of data on where objects are in orbit. A big chunk of that comes from the U.S. military with the Space-Track website, but over the last five years there's been a growth in the commercial sources of data. The satellite dashboard that Kaitlyn mentioned, you know, that is pulling data not only from the public stuff the U.S. military has available, but also some commercial data behind the scenes. And you know, he mentioned earlier the SJ-21, right? You know, obviously, there's more than that – more than just their data, but the LeoLabs data – I'm sorry, the ExoAnalytic data was really useful, and they have all kinds of fascinating videos and things.

So on the data side of where objects are, that has just grown tremendously over the last few years. And now there's multiple sources that you can compare and contrast against, so if the U.S. government happened not to catch something or maybe didn't include it in their dataset we now have the possibility to find it in other datasets, which is – which is really, really interesting. That's one big one.

The other is we talked about – we led this off with HawkEye 360. You know, there are other types of phenomenologies that are now becoming available, most of them commercial but also some sort of scientific/academic, that sort of can fill in some of the picture. So instead of, you know, relying on reports from, you know, a ship or from a pilot that, oh, we experienced some GPS jamming, companies like HawkEye 360 can now directly sense that interference, which kind of adds another whole level of being able to see what's going on.

So, you know, from our perspective, the amount of data out there has grown quite a bit. Of course, that leads to a whole other challenge of how do you sort through all that data, how do you find it, how do you organize it, how do

you know what's what. Because, you know, also, I think all of us have seen, you know, a growth in, you know, stories and reports online that are just not right, either because they didn't understand the data or there was very little data to work from or they're just trying to push a certain, you know, perspective and they don't really care about getting the data right. And so while there's more and more data, there's also – (laughs) – becoming a little bit harder to sort through, OK, this was reported or somebody claimed this happened, now let's dig into it and actually see what actually happened. In some cases, you know, there's – we can figure that out and say, yes, there's good support. In other cases, there's still areas where there's not a whole lot of data, and that makes it really hard.

I think, you know, Todd, you may want to comment on that when it comes to, you know, the – so the claimed hypersonic FOBS test that China had, because I think that's a case where we don't have a lot of data to be able to say what really happened there.

Mr. Harrison: Yeah. Yeah, no, that's a good one to go to next, the so-called Chinese hypersonic FOBS – fractional orbital bombardment system – test. Yes, put it in air quotes there. That came out – I think it came out publicly back in October, but the test – well, initially the leaked report said the test was in August, then they came back and said, no, actually, it was in July. So there's a lot of confusion about it. But that's a really interesting one, and we all had a vigorous discussion, the five of us, as we were getting our reports ready about whether or not to include it in these – in our counterspace reports. And so we actually had division among us, competing perspectives.

Victoria and I were on team FOBS, that we should include it, and all the rest of you guys were on the losing side – (laughs) – no – that it should not be included. But you know, I think the one thing that we all agreed on, though, is regardless of what exactly happened, it's not actually a counterspace weapon that was being demonstrated. We all agreed on that. But you know, why include it in the report? Well, you know, my thinking – and Victoria, you can say if you agree with this or not – but my thinking was it was the significant space story of the year and it got reported in a way that I think might have led people to think it was some sort of a space weapon or counterspace weapon, and I think it was important to help clarify that. Because what we actually know – and more has come out since we published our reports. The Defense Intelligence Agency actually published their own report where they talked about it, and then in follow-up questions from a reporter they clarified a little more, you know, was it actually a weapons test or why does the government think it was a weapons tests.

Well, so, first of all, what we know – what they have said publicly is it was something that was launched – it was launched on an ICBM. And by the way, we launch satellites on ICBMs. So did the Russians. And U.S. satellites have

launched on Russian ICBMs, so that's a whole other story. But it was launched on a Chinese ICBM. It traveled just over one orbit around the Earth, they say 40,000 kilometers. The flight lasted about 100 minutes. It was a hypersonic glide vehicle, so it must have been flying faster than Mach 5 in the atmosphere producing lift. That's a glide vehicle. So it was not just a capsule, warhead, or something like that. And they did not say this, but implied in that if it's a hypersonic glide vehicle it would have maneuver capabilities of some sort. So it went just over one orbit around the Earth, launched on an ICBM. It glided at hypersonic speeds.

Well, there are a lot of things that would fit that description. You know, take the U.S. X-37B reusable space plane. It can launch on something like an Atlas V. Orbits the Earth, reenters, glides. It's a hypersonic glide vehicle. It lands successfully and then can be reused. Well, you know, China has ben developing and testing a reusable space plane, and China has said that they tested their reusable space plane in July. The dates don't quite match up to the leaked intelligence reporting to this – on this, but who knows, you know.

So, you know, what was it? Why was it a weapons test? Well, what DIA has said in response to reporter questions is, well, it was launched on an ICBM and ICBMs are generally associated with weapons. If that's all there is to back it up, I think that's pretty – (laughs) – pretty weak, quite frankly. And one of the things we pointed out in our report is there are other bits of intelligence that came out around this. I think General Hyten – or, no, it was a second Financial Times article reported leaked intelligence that whatever this hypersonic glide vehicle was, it appeared to deploy countermeasures of some sort, which is interesting. You know, if you're actually, you know, testing a hypersonic weapon, first of all, why would you go all the way around the Earth? You have to get it at a higher altitude and you're in orbit much longer. You're much easier to detect when you do that. And by the way, it takes a hundred minutes. That's not exactly getting to your target fast. Hypersonic weapons go at a lower altitude so that they're more difficult to detect, and they go straight to their target; they don't do a full lap around the Earth before they go to their target, you know, because the whole reason to use them is to be fast. So, you know, it doesn't really pan out.

I wonder if, in the leaked intelligence – so this is probably a telephone game of someone who had access to the raw data of what was observed; you know, assessed that; you know, briefed it to someone who briefed it to someone who briefed it to someone; and then five people leaked it to the same reporter at the same time. That's interesting in itself. But I wonder if somehow the intelligence got conflated and there were two different tests observed, and one was a(n) actual hypersonic weapons test that deployed countermeasures, which would be an advancement in hypersonic weapons capabilities if they could do that, and then separately there was this other test where it actually went around the globe, reentered, which was just a

glide vehicle of some sort that they were testing. Maybe it was the reusable space plane. Who knows? But you know, I wonder if the wires got crossed here and these things got conflated together, and not all of the details that came out were about the same test.

But you know, I wanted to, you know, ask you guys, you know, what are your thoughts. Victoria, you know, you were team FOBS. Did you have any other thoughts you wanted to share about, you know, whether it should be included?

Ms. Samson: Now, when you say team FOBS, I'm not supporting the development of this, I'd like to go on the record as saying. Just more in terms of the reason why I argued – and you'll notice in the Secure World Threat Assessment we did not include it, so I was outvoted on that one. But you know, for me it's more the idea, as you said, Todd, that people have the idea that, you know, it's a counterspace capability. And for me it's more – just it shapes the threat environment, and that I think it shapes a lot of people in the West, their perceptions of China and China's capabilities.

Now, of course, it doesn't take much for some people in the U.S. national security establishment to have concerns about China. I mean, we saw – you mentioned the DIA report that came out I think it was just last week. And you know, one of the things they included was, you know, China's efforts on the Moon and Mars in their civil space program as part of the threat assessment. Like, OK, that's – let's not go down that road because a lot of countries, as Kaitlyn can tell you I'm sure, have plans for the Moon. We do not look at all those Moon programs as threats.

So, but you know, again, you know, I would point to, if anyone wants to read more about it, obviously, you know, the CSIS report does a great job, you know, going into it. But I think it also does speak, as you said, Todd, to the need to really, you know, take these reports – these news reports where there's multiple conflicting efforts and kind of say, OK, what do we actually know versus what is implied, what is inferred, what is imagined. What do we actually know? And what do we – how does that, you know, line up to what we know of that country's policy, their budgetary decisions, that sort of thing? And that was really the goal that Secure World and I think CSIS had in putting together these reports, is kind of dampen out the flame, you know? Obviously, we want to identify threats or concerns where they exist, but you cannot make good policy if you're bringing in bad information. And that's really our goal with these threat assessments.

Thank you.

Mr. Harrison: Yeah. That's an excellent point.

Brian, I know you've got some thoughts about the FOBS fiasco.

Dr. Weeden: Yeah, just a couple of things. I've heard, for example, people say that, you know, well, you know, it went – it, you know, went all the way around the Earth, it completed an orbit. Well, then it's not a fractional-orbit system, right? If it completes a whole orbit, it's actually just a satellite. Or that it was a hypersonic glide vehicle. Well, if it's gilding in the upper atmosphere, it's not a satellite either; it's not actually in orbit. So just to your point about the confusion, you know, in the – sort of the pundit sphere we've latched onto this thing about FOBS, right, as this, you know, mythical, cool weapon system from the – from the Cold War era that the Soviets tested and had deployed for a little while. I'm just not convinced it was even that at all.

So to reinforce your point, we really don't know a lot about this. Yet, it seems, you know, there's a rush to make a lot of decisions or try and make some policy prescriptions or, you know, even policy decisions where I just – it's hard to say whether those are good or not because I don't know what the heck actually happened. (Laughs.)

Mr. Harrison: Yeah. Yeah. Well, and you know, the intelligence on these things is always going to be lacking. I thought it was interesting people calling it a nuclear-armed or could be nuclear-armed. How on earth would you know that from observing a test? But – and it also begs the point: If it was, what difference does that actually make? It scares people. It gets people excited. But you know, China already has nuclear-armed ICBMs that can reach the United States and they've got a large enough arsenal already that we in no way could defeat it with our missile defense systems if they're launching directly against the United States. So that vulnerability already exists, so let's not pretend that this would be some new capability that China suddenly developed.

All right. So I want to go here to questions from the audience. So, you know, one question is: What can we do – the United States and maybe our allies and partners – to make China a more responsible actor in space and maybe be more responsible in the types of counterspace weapons they're developing and testing? Thoughts here from the group? Who wants to chime in? What can we do to pressure China? I don't know, Kaitlyn, do you want – or Makena, do you want to go?

Ms. Young: I'm just going to start us off with some kind of blanket statements that I'm sure everyone will add many more ideas to.

You know, I think that the ASAT test ban, as we've mentioned, is a wonderful place to start. There are a lot of these kind of low-hanging fruit policy choices that we can, you know, say ourselves and get some attention on. I think also China is becoming much more of an actor in space with their own space

station that they're launching. They have many more missions planned. So, you know, I think that that makes them kind of a larger stakeholder, in their own minds, of the space environment and so, you know, I think that they're more aware of at least, you know, the kinetic implications in debris and knowing that, you know, the U.S. has a menu of the same capabilities. So does Russia.

So they want to steer away for an eye for an eye situation. If they take out our GPS satellites we can take out their GPS satellites. And so I think that the more that they have going on in space the more – you know, they're also a bit aware that their assets are also vulnerable.

Mr. Harrison: Any other thoughts? Victoria?

Ms. Samson: Yeah. I'd jump in really quickly. You know, I think the U.S. policymaking process has really suffered because we tend to look at China and Russia – China and Russia, you know, like Tweedle Dee and Tweedle Dum – you know, the same team, and they're not. They have their own interests. They have their own relationship. They have their own complicated history of sharing technology and they have, you know, a partnership that was of uneven partners that's kind of shifting balance right now as China is ascending in terms of its space capabilities and, frankly, Russia is descending.

So I think that's been harmful and that we look at it, and we haven't taken the opportunity to really focus on what sort of efforts can we push forward in terms of, you know, China is a major space power. One of the things Secure World has called for is for the U.S. to engage with China in space and we use that verb very carefully – engage – recognizing that, you know, some things we will need to deconflict.

You know, I think it was brought up earlier the Tiangong space station had a close approach with Starlink satellites and, you know, that was something that came up. As we do more on the moon there's going to be stuff coming up there. So I think it's going to be important.

We have had some space dialogue, some bilateral space dialogue with the U.S. and China in the past. I think it's been a while. Something like that might be helpful in the future. So I think just kind of rejigger our approach, particularly, now that Russia has become so toxic in terms of becoming a pariah state and not acting in good faith in a lot of circumstances, not just space. Maybe we need to readjust how we approach this and have discussions and see what we can get out of separating the two. Thank you.

Mr. Harrison: So another – oh, Brian, did you have something to add?

Dr. Weeden: I was just going to, quickly, reinforce a point that Victoria made. China now has people in space on a space station and they're looking to expand that cooperation. I think that is going to, fundamentally, change their approach to space sustainability and the creation of space debris. And, additionally, of course, they're also putting up a lot more capability – space-based ISR, the BeiDou constellation. That basing is essential for their strategic, economic, military capabilities.

So I think that that is going to change over time and I think there – so I think there are some ways we can probably create some incentives for them to not do things we consider to be irresponsible. Now, of course, that's not going to totally, you know, compel them to go against their national interest, which is very difficult to do for any country. But I do think there's some room here to at least get some of the big things, you know, agreement on.

Mr. Harrison: I see we're running low on time here. I want to combine two questions here from the audience and get people's thoughts.

So what kind of counterspace capabilities do you expect to see developed or tested in the coming years and, more specifically, do you think there are any other countries that might try to conduct a direct ascent ASAT test or kinetic test – destructive test – so that they could get grandfathered into, you know, whatever agreement might eventually be achieved through the U.N. or through some of multilateral negotiating process?

So, Kaitlyn, why don't I go to you on that one? What are you expecting to see in the coming years?

Ms. Johnson: Yeah. Well, you know, I think we say in our last section that, unfortunately, a lot of our predictions and, I think, from both teams over the past five years have kind of come true, especially when we talk about electronic warfare and how important and critical this weapons technology has become in current and future warfare.

So I think we will continue to see that expanded and developed, not just attacking GPS but also, again, further communications satellites, attacking the ground stations, not just the satellites themselves. I think when we think of future advanced counterspace technologies we also maybe think of on-orbit capabilities. Obviously, this is something that, I think, personally, I would not like to see this happen. You know, I don't want to see space further weaponized. I think it would be very destabilizing. But it is highly possible.

We are seeing many countries test capabilities to make this a possibility, and so when we're looking very into the future that is, I think, what I'm worried

about. And then, of course, I think we're all worried about cyber at all times for a lot of reasons but also just because it's so hard to track, monitor, and know where capabilities are for countries in the cyber domain.

Mr. Harrison: Victoria, do you think there's a chance India might conduct a second destructive ASAT test?

Ms. Samson: You know, I mean, never say never. But I will say that they have kind of checked the box, right. They have demonstrated they can do it. They've been able to get themselves in a relatively elite group of countries, you know, only four countries that have anti-satellite weapons in space – U.S., Russia, China, India. So I don't know if they need to.

I will say I think if there's some sort of legally binding agreement coming down the road, no matter what it looks like, I don't know if it's going to be the same as what we saw in the nuclear Non-Proliferation Treaty, you know, which, basically, enshrined two types of countries, right. You had the nuclear weapon states – i.e., those who had tested nuclear weapons – and then you have the non-nuclear weapon states, those who have not. And so, you know, the grandfathered in allowed countries that had tested nuclear weapons to remain nuclear weapon states.

I don't – I mean, I haven't seen treaty language, but I don't know if there's, like, some sort of, you know, anti-satellite test ban where they say, OK, countries that have tested anti-satellite weapons can continue to test them whereas the rest of you cannot. I mean, that's – I don't see that happening just because, as we heard earlier from my U.S. government representatives on the panel, you know, there's a tremendous disincentive to test these weapons just because of the debris that's created. And, you know, that affects you whether or not you are officially an anti-satellite weapon testing state or what have you.

So I'm hoping that – (inaudible, technical difficulties) – and countries will be able to look at the big picture perspective in terms of how this debris affects their ability to utilize space and how it affects the stability and security of the regime for them as well as the global community. Thank you.

Mr. Harrison: Yeah. No, that's an excellent point. You can test them without producing debris.

Brian, what are your thoughts?

Dr. Weeden: So on the issue of, you know, are we going to see another test, you know, I don't think we're going to see, you know, the countries that have already tested do another one. Then the question is might one that have that

capability, as you pointed out, Todd, try to sort of get it under the wire or whatever.

That list is not zero but it's, basically, who has medium- or longer-range ballistic missiles, who has hit-to-kill interceptor technology, and that list is, you know, several countries – you know, France, Japan, a handful of others, Israel.

So, you know, I think those are the countries that we keep an eye out for if there's any kind of signals that they may be moving down that path.

But that said, there are other ways to do counterspace, you know, capabilities. I certainly expect to hear, even though – so it's hard for us to get open verification, but I expect to hear more announcement or more rumors about laser-directed energy testing, certainly, you know, cyberattacks, probably. And then there's an interesting case where a year or two ago France announced they were developing these, you know, bodyguard satellites that would be small satellites armed with maybe some sort of a directed energy system that would be in a geostationary belt. So that's something to keep an eye out for. I think they said, you know, 2024 or 2025, somewhere around there, they might, you know, do a test.

So that's sort of what I expect is maybe more of the how do we detect and protect close approaches, RPOs, maybe directed energy, and cyber. That's what I would keep an eye out for.

Mr. Harrison: All right. Thank you. Any final thoughts? Anyone else?

All right. Yeah. Well, thank you all for this great discussion. I want to thank our earlier speakers as well from the U.S. government, from HawkEye 360, for joining us and, you know, thank again to the Secure World Foundation for this ongoing partnership among our think tanks to help, you know, address this important issue in space policy.

So thanks to each of you, and thanks to the audience. Lots of great questions. We're never able to get to all of the great questions, but it was great having everyone join us for this discussion, and I hope everyone has a great day, and stay well.