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TRANSCRIPT

Event

"Nukes in Space: Myths, Realities, and Consequences"

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CSIS EXPERTS

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Heather Williams: Welcome to the HTK Series, where we discuss strategic forces issues of the day. HTK stands for "Heather, Tom and Kari." But for defense wonks out there, it also stands for "Hit To Kill."

In 2024, the United States revealed that Russia is developing a space-based anti-satellite capability suspected of being a space-based nuclear weapon. (Begin video clip).

Rear Admiral John Kirby (Ret): I can confirm that it is related to an anti-satellite capability that Russia is developing.

This is not an active capability that's been deployed. (End video clip).

Dr. Williams: Though this is not a capability being actively deployed, the development of such technology nonetheless has major implications for the security of American assets based in space and norms governing the use of the space domain. A recent CSIS publication – this one – by Scott Pence, who is a former military fellow here at CSIS, and Adam Reynolds, a former PONI nuclear scholar, analyzed the impact of high-altitude nuclear explosions, or HANEs. The paper addressed prevailing myths about the use of HANEs and provides realities rooted in existing research on the subject.

So, what would nuclear weapons in space mean for space-based assets in orbit? How might HANEs and space-based nuclear weapons reshape deterrence and crisis stability? What are the implications of a space-based nuclear weapon on the Outer Space Treaty? How should NATO and allied nations coordinate their responses to emerging space-based nuclear threats?

I'm Heather Williams, director of the Project on Nuclear Issues here at CSIS. Here to unpack these questions and more I'm joined by Kari Bingen, director of the Aerospace Security Project, and Tom Karako, director of the Missile Defense Project. This is our eighth episode, and we'll be making this a regular series.

So, turning it over to Kari to get us started, space-based nuclear weapons, anti-satellite capabilities. There's a lot of complicated terms getting thrown around out here. So, to get us started, can you help demystify a lot of these conversations, and talk a bit about the risks of space-based anti-satellite capabilities and the potential of a space-based nuclear weapon?

Kari A. Bingen: Well, first, Heather, Tom, it's great to see you both. Everyone's so busy that this is a great forum for us to actually get together and talk about

these strategic issues, and to be here today to formally launch the HTK Series.

You know, it's – the past discussions that we have been very much focused on what's in the headlines. This Russian high-altitude nuclear threat, anti-satellite threat, was a headline last year, and we haven't heard much about it lately. So I'm glad that we could I'll say brush it off and bring it back to the front burner because I think it is an important and strategically significant development with widespread implications.

So I thought I'd start out, though, by explaining what a high-altitude nuclear explosion is, what the different effects are that we care about, and why it matters. And I want to credit both Colonel Scott Pence and Adam Reynolds for putting out that piece to help demystify some of this.

So I'm going to go through a few different charts here, but I think of three basic effects that a nuclear detonation in the upper atmosphere or in space will cause. One is on Earth and two are space-bound.

The first one is that when you have a nuclear detonation go off in the high atmosphere or in space, that energy starts to transmit through the atmosphere, and it excites the electrons in the atmosphere and basically creates an electromagnetic pulse. So think of it as a power surge. This can travel for hundreds of miles. A lot of this just depends on the altitude of the burst, the yield of the device, the devices on the ground that would be impacted. But it would have widespread damage to electronics.

Just to give an example, looking at a device that would be detonated at an altitude of, say, you know, 300 miles, you cover most of North – almost all of North America; 120 miles, a little bit less. What's interesting is we've seen these effects before. 1962, you had the Starfish Prime test. So we detonated a nuclear device in the upper atmosphere, 400 kilometers altitude, 1.4-megaton warhead. So that would be about 250 miles here, so in between the dark blue and the medium blue. But those electric surges were seen hundreds of miles away from Johnson Atoll in the South Pacific to Hawaii. Power grids were disrupted. Radio communications were disrupted.

But then there was also an effect in space. And so the two other effects that we would see from a high-altitude nuclear explosion would be what happens in space. So you have to get above the atmosphere.

But you would see something called a prompt effect. So if satellites are within line of sight of this nuclear detonation, they would feel pretty close to instantaneous effect depending on how close you are, and that

radiation would affect the electronic components within a satellite. So there's a prompt line-of-sight effect. And here is an example here where that prompt effect – this is from a 400-kilometer burst, so the same one as I mentioned in 1962.

And then the second phenomenon in space would be a delayed effect. So if you think about – if you look at – think about the Earth for a moment, our Earth is surrounded by these radiation belts called the Van Allen Belts. These are the magnetic fields that surround the Earth. Radiation gets trapped within these magnetic fields.

I thought I'd show a prop. We had a wonderful young scholar leave us today, Chase Harward, so we were just celebrating his departure. But we brought doughnuts, and so visually think of our radiation belts around the Earth as a doughnut surrounding the Earth. And radiation gets trapped in that doughnut for periods – for long periods of time. So if you have a high-altitude nuclear explosion go off, that radiation gets trapped in those belts for a long time. And so any satellites that are orbiting through those doughnuts, orbiting through those bands, will accumulate radiation over time, and that will also degrade or destroy electronics.

So you have earthbound effects with electromagnetic pulses; space effects, prompt radiation effects; and then delayed radiation effects that accumulate over time. I want to say this is not a black-and-white issue. There's so much "it depends" in this. The effects would be felt based on where you are in your altitude, the yield of the device, the device design, other factors.

Why this is so concerning and it's been back in the headlines over the last year or so is because it was believed that the Russians were testing out a – some sort of nuclear device or nuclear weapon in orbit at about 2,000 kilometers. You know, I showed – I'll go back here. I showed an example. This would be a line-of-sight detonation at 400 kilometers. You get a large swatch of low-Earth orbit. Now imagine that detonation going off at 2,000 kilometers. There's a lot more – a lot more satellites that would be impacted by such a detonation.

You know, the challenge here and the "so what" is that this would be indiscriminate. So any satellites in low-Earth orbit, which now number in the thousands – over a hundred nations now have satellite activities. Over 90 percent of what's in orbit today is commercial satellites. We use space in our daily lives, obviously for security/intelligence but navigation, communications, weather, remote sensing. It underpins our modern military, our financial networks. Our personal navigation devices run off of satellite services and data. Many of those capabilities

would be at risk. And that's the "so what" that has really, I think, changed the game.

Dr. Williams: Kari, this is so fantastic, I think, in demystifying that and bringing some of the important nuance.

Tom, I want to turn to you to talk a bit about the governance of space.

Before I do that, I should have said at the outset that we – the form is open online for questions if you want to submit your questions. We will be coming to those at the end.

But, Tom, for you, this all started with concerns about Russia deploying a nuclear weapon in space or some sort of anti-satellite capabilities on the part of Russia. Doesn't that violate some treaties or one treaty in particular? And aren't we supposed to have some sort of norms and governance to try to prevent something like that from happening in the first place?

Tom Karako: Yeah. So, look, if the Russians were to actually do that way, it would I guess kind of round out their batting average, seeing as how they've basically violated every arms control agreement that they've ever gotten into, basically except the Outer Space Treaty of 1967, which Article IV says you can't put weapons of mass destruction in space, you can't put them on celestial bodies, so on and so forth. And apparently so far that hasn't been done, but this would kind of round it out, as I say, because, again, you name the arms control agreement, at one point or another they've violated it.

But this would be – as Kari says, this would be a very, very problematic event. I think it's important to kind of emphasize the obvious, which is the effect and, you know, frankly, over-relying upon either treaties – you know, good parchment paper with ribbons on it – is a security blanket. And the Soviets, and now the Russians, have just proven again and again and again that they don't share our same norms. They don't share our same views of strategic stability. We're doing a whole lot of projecting and perhaps hoping that they will. But again, time and time again, whether it's invading their neighbors – (laughs) – early and often to just about everything else – the INF Treaty, things like that; the ABM Treaty back in the – in the 1980s, so on and so forth. So lots of that in the news, but I think it's really important to kind of also disabuse – yes, demystify, but also disabuse ourself that a scrap of paper from 1967 is going to protect us. I think it's pretty clear. And the news reports have kind of suggested that they're taking this – or, pursuing this capability seriously.

Dr. Williams: Yeah. I would just add to that in terms of how this tracks with previous Russian trends. This is on trend, not just in terms of arms control but also Russia's broader strategy of all-domain competition. It's not just limited to nuclear weapons or conventional; they're also looking into a lot of dual-use or regional capabilities. Obviously, drones have played a huge role in the war in Ukraine. But also, nuclear signaling and nuclear saber-rattling has been part of their modus operandi in the war in Ukraine since the very beginning, and for decades Russia has just been overly reliant on their nuclear capabilities. And so to me this seems like they're trying to get as much mileage as possible out of being a nuclear power and thinking, OK, what are some creative ways that we can use to remind the world we have a whole lot of nuclear weapons, we might be more willing to use them than you are, just to try to strengthen that deterrence signal that they're sending.

And also, just this past week – you mentioned the INF Treaty – there was this announcement from the Russian Ministry of Foreign Affairs saying that they would no longer be – what was it – they would no longer be bound by their unilateral moratorium on the INF Treaty. They suspended participation in INF in 2019. They have been violating it since at least 2014. And so to some extent this was a little bit of, like, a why now, what's the big deal. But it's just yet another reminder, and it does track with that trend of nuclear saber-rattling and signaling to say, just to remind you, we are – we are invested in this just as much as you are.

Ms. Bingen: Does it surprise you, then, that the Russians would pursue a nuclear counter-space weapon, given all that they've done on the nuclear front?

Dr. Williams: It's on trend, but as you said, it's so escalatory because of the risks that are associated with it, because also you said it's indiscriminate. Maybe that's something you can actually touch on a bit, is how would this impact Russian satellites and Russian capabilities? Are they somehow asymmetrically protected against this compared to us? But I think it would also be really helpful to hear about how this might impact our allies or how we might work with allies, because I want to make sure we also get into the part of the conversation about what do we do about this and how can we try to counter that threat.

Ms. Bingen: I mean, Russia is still a very capable space – you know, space player, has a lot of sound engineering and technical knowledge, but it's not the same program as it once was. And over the last several years, China has quickly eclipsed Russia in terms of being a global space power. So Russia nowadays, I'll say, has less to lose in space.

The irony, though, is if they were to launch a nuclear weapon in – or, detonate a nuclear weapon in low-Earth orbit, they would affect their cosmonauts on the International Space Station and the capabilities that they're using vis-à-vis Ukraine and in other areas today. But they are – I would assess, I mean, they are trying to solve for an operational challenge, as the United States in particular has moved way from these what we call large Battlestar Galactica satellites where you only have a few large systems to these more proliferated architectures. So on the commercial front you have Starlink, but even within the Defense Department and the intelligence community we're moving to these constellations of hundreds to perhaps thousands of satellites to collect intelligence information, for military communications, for missile detection and tracking. They're now trying to solve for how do I counter hundreds of satellites as opposed to just targeting one or two with a direct anti-satellite missile.

So a nuclear detonation would have a widespread impact on low-Earth orbit. A former assistant secretary of defense now affiliated with Tom and my program, John Plumb, had testified before Congress last year to say, hey, depending on where this thing – if a detonation were to go off, I mean, it could make large swaths of low-Earth orbit unusable for a year. So –

Dr. Karako: The trillion-dollar space economy, you know.

Ms. Bingen: Exactly, and affect the space economy. So that's absolutely it.

Dr. Karako: Yeah, let me jump in. You know, I think one of the things I took away from your slides, separate from pumping the Van Allen Belts – the sprinkles on your doughnut there – is that, yes, it would have some persistent effects, but it's also limited. And so, frankly, one of the interesting observations in this CSIS report that just came out is that you could modulate the effects to mostly affect on the other side of the world or affect things, so you could do it in a way to hurt us more than it does them. But nevertheless, because especially the U.S. has more to lose in the commercial and the military various orbits – which was a point actually made in this Space Force document from March, "Space Warfighting: A Framework for Planners," we have more to lose, so we have more to target. And so space denial – not space control, but space denial with this kind of indiscriminate use – would hurt us more than them, and that might be something that they would be willing to – willing to accept on a bad day.

Ms. Bingen: Yeah. The question then becomes: Why would they want to do essentially a nuclear space mine that stays in orbit? Because they could have the same effect putting a nuclear device on the top of a ballistic

missile and just detonating that in space, so it makes you wonder why would they pursue this particular, you know, weapon type.

Dr. Karako: We are always –

Dr. Williams: Probably for shock value – because it does draw a lot of attention, because it gets a lot of headlines. Obviously, when Representative Mike Turner made the announcement about the concerns around this, it did get a lot of frontpage news. And in some ways I think that's what Russia wants. They want those kind of really – those high-profile reminders about their nuclear capability because it just amplifies their saber-rattling message. I don't know if that tracks for you both.

Dr. Karako: Look, there's a lot – there's more value in not shooting the hostage than shooting the hostage. And so, you know, having the threat that isn't necessarily carried through is a – leaves it there for negotiation.

Ms. Bingen: And it's a harder – I'll say it's a harder indications-and-warning challenge as well, as you can see a missile – presumably see a missile being erected on a launch pad, maybe you'll get some other signatures, and then that gives your policymakers some options. But when this thing is idle in space that could be detonated at any time and place that they want, that's much harder to warn against.

Dr. Karako: Well, you know where my mind is going; it's to space fires and to countering other satellites. It could be this sort of a thing or any number of other things. And, of course, to missile defense. And there's a whole – been a whole lot of discussion on missile defense in space and boost phase. There was an industry day on this the other day, about a week-and-a-half ago, for instance.

And I think that this is the kind of thing that helps us think perhaps a little more clearly about why you might want boost-phase missile defense against the bigs – against Russia and China – is, yes, it is a very hard problem. It is a very hard problem for stopping everything that China could throw at us or everything that the Russians could throw at us, but it's not necessarily about that. If, for instance, we had really good intelligence or fairly good intelligence that the Russians were going to launch something like this, a single nuclear device, and we believe that this was – they were serious about this, you know, a thin boost-phase missile defense to take that out over their own territory, for instance, one missile, that would be a pretty interesting capability to have. That would be a very valuable capability to have for that kind of a scenario. And it's not necessarily, you know, such that big – the big, massive bolt out of the blue of thousands of missiles; it's sometimes much more

targeted, discrete, and boutique effects in terms of the missile intercept of what John Plumb called weapons of choice for these various missiles.

I would include FOBS there as well. You know, FOBS are missiles that go up, orbit, and come back down – fractional orbital bombardment, multiple orbital bombardment, which is of course presumably what something like this would be.

That's the emergence – this is the advent of space fires – the advent of space fires in all kinds of effects in, from, and through space that I think we're going to see just a whole lot of very interesting discussion about. And I think the future of space and missile defense is bright. We're going to be busy on this front. And I think when you begin to think about more than just the big kind of artificial nuclear attack kind of scenarios, think discretely, the value of that kind of capability becomes apparent.

Dr. Williams: We have a question coming in already about nuclear dyads and how you do deterrence in those that I think will pick up on that nicely.

But before we get to that, Tom, I did just want to ask if you had any other reflections from the missile defense industry day. You talk about space-based interceptors that might have some implications on these risks.

Dr. Karako: Yeah. So there were two industry days, one last week for kind of the overall Golden Dome initiative. It had been canceled twice before. It's great to see that they moved forward with it in Huntsville, Alabama, last week. And then the week prior to that there was also a space-based interceptor industry day. So two things going on.

The space-based interceptor piece was closed. But nevertheless, there's been some readouts. I suspect that there will be some responses from industry in terms of the acquisition strategy. It's a – it's reportedly a very aggressive acquisition strategy, by which I mean putting a lot of the onus on industry to pony up a lot of investment that they may or may not get back. But it's also, I think, a very aggressive and thoughtful approach to, you know, from space hitting things in the atmosphere or out of the atmosphere in early ascent or even midcourse, as well as the more stressing things of no-kidding getting it in boost below 120 kilometers, for instance.

So they're looking at the whole thing and they have a very aggressive timeline to have a test of some form. There's several lines of effort, several gateways. They want a no-kidding couple of tests or gates to pass and something in 2028, which is of course the end of this

presidential term. So lots to come there. It's going to be – it's going to be a busy couple years on this front.

Dr. Williams: So we're starting to identify some things that can or can't be done to try to mitigate this risk. So don't count on arms control or norms, for a start; thinking more about missile defense, space fires, space-based intercepts. Kari, what would you add in terms of what we can possibly do to deal with this risk coming from a potential Russian investment in nuclear weapons in space?

Ms. Bingen: Well, and I should have backed up and said, you know, while this is a developing threat from Russia, we have also seen China look at the effects of a high-altitude nuclear detonation, and we've written on it in successive Space Threat Assessment reports that we put out every year. So it's not just Russia; it's China. And back earlier in my career, I was looking at this threat about 20 years ago and we were concerned at the time that it could be the North Koreans that would place a crude nuclear device atop a ballistic missile – so not necessarily an orbiting space mine, but a ballistic missile – and also cause widespread damage to our space capabilities.

But in terms of the what do we do about it – and you and I did a commentary on this last year – you know, a few different things, I would say. And start with there's no silver bullet here.

But on the diplomatic front, international pressure. You know, we talked about how China has quicky grown in their own use of space. They are in the process of putting up their own versions of Starlink. Quite a few intelligence, surveillance, and reconnaissance satellites as well, which has been a significant push on their front. So you would think that China would come to the realization that this does not bode well for us either if Russia does this. So, you know, seeing how China engages on this front. Ironically, though – and you asked about the international dimension of this – when a U.N. resolution was offered last spring, sponsored by the Japanese who have been very focused on space safety and sustainability, supported by the U.S. and 65 other nations, the Russians vetoed it and the Chinese abstained, which is telling there. But diplomatic options.

This is a really hard defense problem. Technology-wise, you could shield or harden satellites. But when you think about 90 percent of satellites up there being commercial, the cost to harden is really expensive. So the U.S. government is going to look at its own architecture, and it has in the past. You know, what are those nuclear command-and-control satellites or missile-warning satellites that must be able to operate through some sort of nuclear event? You know, we're going to pay the money and

invest in hardening those. But largely in the commercial sector, that's where I think we'll really be in a bind and there will be a significant economic cost there.

But you're also seeing more focus on architectural resiliency, you know, more of these not just putting satellites in low-Earth orbit but orbital diversity, cross-domain so that if certain parts of space orbits are affected, can you switch over to air or to ground options. Greater intelligence capabilities and space-domain awareness, monitoring what's happening up on orbit to buy decision time for your policymakers and the different options that they would pursue, whether it be hard power, diplomacy, or otherwise.

I also think that from a policy perspective, you know, there will come a point where we'll have to – and, Tom, I'd be curious in your thoughts on this, too, and you hit on this – is, you know, as a matter of policy, do we just not – the satellite that's up in orbit now was believed to be some sort of test or demonstration, according to reports. But if the Russians go ahead and intend to launch an actual nuclear device, is our policy going to be to prevent it? And what are our options – what are our options there. So will we – will there be a hard decision for a policy of preemption. We look at kinetic or non-kinetic options to prevent that from happening.

You know, Golden Dome also emphasizes these left-of-launch capabilities. So, you know, we may have things in our toolkit on that front as well.

So I think there's a lot of different things and there's just not one silver bullet.

Dr. Karako: In terms of the mitigation thing, I mean, I have to go back to our report from December of 2023 called "Getting on Track," which was specifically on space-based sensors for or hypersonic tracking us, especially we hit this. We hit the threat of pumping the Van Allen Belts and polluting low-Earth orbit. And we had a pretty good foot-stomp in that report saying don't put all your eggs in the PLEO basket, the proliferated LEO, which was all – which has kind of been all the rage. And I got to tell you, when we said, you know, look at MEO, look at other orbits, and look at airborne.

And I'm going to tell you, people laughed: Oh, nobody would do that. Nobody would pump the LEO because of all the – they would hurt themselves and this kind of stuff. Well, two months later, in February of 2024, that news came out. And so I feel a little bit vindicated about that, just saying that we had it back – had it back then.

And I also have to just make the reference that, you know, back in the '60s when we and the Soviets were doing Starfish Prime and, actually, a whole series of space-based – a whole series of them, and the Soviets were doing Tsar Bomba and all these other things, you know, part of it was to figure out the effects on satellites. Part of it was to figure out the effects on missiles and reentry vehicles in space. Both we and the Soviets, we have to remember, before the advent of hit-to-kill missile defense technology, we were going to use nuclear devices of various kinds. We had the Spartan and Sprint deployed up in North Dakota for a short time, for instance, with nuclear kill devices on the front. So, you know, using these things to counter strategic weapons is something that both we and the Soviets and, importantly, the Russians still have, deployed nuclear-armed missile defenses.

Dr. Williams: So we have a lot of questions coming in. I apologize; we're not going to be able to get to all of them.

There's one I really would love to hear you two help unpack, though, and it's about, as I mentioned, these evolving nuclear dyads: the U.S.-Russia and the U.S.-China. And, obviously, it isn't just nuclear, as you've outlined; it's also about competition in space. But it's – it could be all-domain competition, really. And so I'm wondering how you two are thinking about how does the U.S. deter arms racing /escalation in those two dyads. Do you do – do you deter them separately? Do you try to do it in aggregate? And are you more concerned about the deterrence challenges of Russia or of China? Kari. Or, oh, Tom, I'll start with you. (Laughter.)

Dr. Karako: I will. Obviously, both. You know, obviously, we have to be focused on both. You know, China's the pacing threat, but Russia's the acute threat. Well, acute means kind of nearer to the boat in some respects, and there's just no telling.

And I would just kind of repeat what we talked about earlier, Heather, which is that again and again the Russians in particular show the willingness – kind of the complete lack of inhibition of norms and this kind of stuff, the willingness to turn over the chessboard when they start to be losing. And I just want to emphasize how much things have changed, how I think – how important it is to get out of the ruts, the conversational and the policy ruts, that the nuclear and missile defense and space conversation so frequently fall into in Washington.

And you mentioned the INF. You know, it was just a couple weeks ago when Germany requested the deployment of U.S., quote/unquote, "intermediate-range" missiles to Germany. How things have changed since the 1980s. You know, these are non-nuclear, but nevertheless

Germany – which is also getting, by the way, an Israeli ballistic missile defense system; again, how much things have changed since the 1980s. So it's really important to not fall into those kind of – that intellectual baggage of the past.

So, obviously, we have to worry about both. What I worry about most acutely other than Russia is the window may be closing for us to be able to do that with conventional deterrence, with a blunting strategy and this kind of thing that we've been talking about and diagnosing and prescribing for the past, you know, close to a decade, since we realized history had returned in the 2014 timeframe. And I just don't believe that we or allies have done enough on the conventional deterrence buildup. And I always say if you don't want a nuclear arms race you better dang well double down on a conventional arms race. We're doing more, we're ramping up, but nowhere near the number that we need to.

Dr. Williams: Hmm. Kari, what do you think?

Ms. Bingen: Yeah. Actually, I think that's excellent.

I'd probably build on that and say it is both as well. But both China and Russia and their leadership, they're different, so one size that fits Russia will not fit China.

And so I'll go back to the important work that our intelligence community does is, you know, we need to understand how decisions are made and what each of those countries' values, where they're vulnerable. And it will be different.

I'm also – I'll try to keep this simple, too – is, you know, you learn, particularly in the intelligence practice, you look at capability and you look at intent. And intent, both China and Russia have been very clear in their statements on what they intend to do, and they're matching that with capability. They're both building tremendous conventional/nuclear capabilities, capabilities in space, and counter-space capabilities that are – I have to look at them as a threat. And so in very simple terms, I mean, it's – (laughs) – we need to defend against those. I mean, we need to have hard capabilities to defend against those threats, but then also not just play defense but also have a good offense in the toolkit as well.

And I would just mention just on space, you know, we've spent this time talking largely about the Russia – a nuclear anti-satellite capability that would threaten, you know, satellites in low-Earth orbit. But the Russians/the Chinese are both pursuing a wide range of counter-space capabilities. So I put this in a much broader context where both countries are intent and matching the intent with capabilities to erode

our space advantage. It's really the driving force behind the establishment of the Space Force and of Space Command five years ago, is this is a domain where threats are evolving and growing, where military – it is a domain of military operations and increasingly of warfare integrated into other operations on the ground. And you know, we need now a professional military service to protect and defend our interests, whether it be against high-altitude nuclear detonations or any other range of threats that would, you know, put our space capabilities at risk.

Dr. Williams: I think the three of us are in agreement on the importance of deterrence, deterrence by denial but also defense. And a little bit earlier, Kari, you had mentioned that there is a role for diplomacy here, which I'm also glad you said. I think a bit part of that is getting out the story of what the Russians and the Chinese are doing, that they are not respecting existing norms or agreements. They are rejecting opportunities for risk reduction and dialogue. They are not interested in strategic stability, at least not in the same way that we are right now. And that is a diplomatic and a bigger messaging effort that I think is also going to be contributing to deterrence. It's not mutually exclusive.

Dr. Karako: Yeah. You know, diplomacy is always useful, but it's not necessarily universal and it's not necessarily global. And you know, whether it's just communicating the Russian violations of INF to our NATO allies – say, hey, we want you to know this is real; we're not making this up. The Russian invasion of Ukraine in 2022, among other things, helped drive NATO together in a lot of ways. And so diplomacy among our closest partners and allies is important, while having, I would say, modest expectations about bilateral or trilateral negotiation with Russia and China.

You know, there's this Alaska Summit coming up on Friday of this week. I have modest expectations for what that's going to produce as well.

Dr. Williams: Me too.

I'm going to do one final rapid-fire question just because it's a good one. And it's not Russia/China; it's actually North Korea. So I'll probably start with you on this one, Tom. In recent years, North Korea has conducted ballistic missile test launches using a lofted orbit of several thousands of kilometers in maximum altitude. How concerned should we be about their tests and the capability that that represents?

Dr. Karako: You know, admittedly sometimes the really lofted shots that North Korea does, probably so that they can monitor it without going over the horizon, one of the things I always think about is it's useful to think

about the utility of different trajectories. Sometimes you really want to depress trajectory. It's kind of harder to hit or to detect and see something in a depressed trajectory. That, by the way, is why so many hypersonic glide things are useful. But it's also – you know, it's also the prospect of North Korea taking a hostage, and it could be North Korea taking a hostage or doing a nuclear detonation in space in that part of the world when we are perhaps consumed with some other conflict.

And I think the prospect of collaboration or of conspiracy on a bad day between the Axis of Autocracy – between Russia, China, North Korea, and some other folks – we can't put that out of our mind either. And so preparing for that bad day and not forgetting that North Korea is still there and still kind of nuts and could potentially be a useful proxy or a distraction – I mean, look, the Iranian stuff with Israel has no-kidding been a massive, massive distraction from what we thought was going to be the pacing threat to build up for, China. The United States of America just expended an enormous and scary number of missile defense interceptors in the defense of Israel. We are now – the Pentagon is now mashing the panic button to try to figure out how to reprogram dollars and light some fires – and light some fires in industry to build up and to do so quickly. So there are all kinds of ways in which Russia and China can be the beneficiary of a North Korea or an Iran call it a strategic distraction.

Dr. Williams: Kari, anything you want to add?

Ms. Bingen: Yeah. North Korea has learned that if you have a nuclear weapons capability your chances of regime survival are a lot higher, and they've learned that by observing others that have given up their nuclear weapons. I have to believe, though, that Kim Jong-un, as he thinks about where – under what conditions would I employ such a weapon, that that threshold, you know, would be high. If they go down the path of a nuclear detonation above their country, they have very little to lose in space. (Laughter.) I would throw that out there.

Dr. Karako: An EMP wouldn't even – you wouldn't even know if it affects North Korea.

Ms. Bingen: Yeah, yeah.

And there's also something to be said about, you know, do countries or do these leaders think that there is a – that there is a lower taboo associated with nuclear use in space than, you know, on Earth? You know, I remember then-, you know, chairman – Vice Chairman of the Joint Chief of Staff John Hyten used to say satellites don't have mothers.

You know, you don't really see the effects in space the same way that you would see it on Earth. So would that taboo be lowered?

And then just the other thing I'd offer is, Tom, your point on these – this Axis of Evil cooperating, we're seeing it on the missile front and the space technology front. So, as North Korea has provided the Russians with bodies and ammunition in Ukraine, you know, we're seeing evidence that North Korea is benefiting in return with receiving Russian space and missile technology.

Dr. Karako: Which we ought to – or, a lesson which we might take into that – or, take from that is we need to rethink how we are assessing the norms and the export controls and all that kind of stuff that we have kind of shackled ourselves with over the years. If they're going that route, we need to think about are we hurting ourselves by erecting any barriers to, for instance, getting long-range missile capability to our closest friends and allies.

Dr. Williams: And we're seeing similar cooperation, obviously, on the nuclear side of things, including in nuclear material, knowhow, and knowledge among those four: Russia, China, Iran, and DPRK. And so I feel like this is a crosscutting theme that we will probably come back to on a few additional future occasions.

But with that, I think that does bring us to a close for today. So, on behalf of all three of our programs, thank you so much for tuning in to the HTK Series. Thank you, as always, to the CSIS Streaming and Broadcast Program. And please do join us again for another conversation with the Missile Defense Program, Aerospace Security Program, and Project on Nuclear Issues – the HTK Series – here at CSIS. Thank you very much.

(END.)