AAS 1 Cleaning

[00:00:00] **John "Slick" Baum:** This is a special episode of the Aerospace Advantage podcast to tackle an alarming headline in the news, Russia's planned to put nuclear weapons in space. Last Thursday, Congressman Mike Turner of Ohio publicly requested that the Biden administration declassify intelligence regarding a new Russian space power capability.

[00:00:19] **John "Slick" Baum:** While the White House hasn't spoken with tremendous specificity about the development cited by Congressman Turner, various statements made by a range of officials suggest that this is a nuclear anti satellite weapon that is still in development, but once launched, Could hold the vast majority of satellites at risk, both civil and military alike.

[00:00:40] **John "Slick" Baum:** This technology isn't new. It dates back to the Cold War. However, this sort of attack is so broad and debilitating, both the Soviet Union and the United States chose never to actually feel this capability at an operational level. The U. S. tested it once really early in the Cold War, but stayed away from it ever since.[00:01:00]

[00:01:00] **John "Slick" Baum:** In fact, the U. S. and the USSR signed a treaty Banning this sort of capability. So that's what we're here to talk about today. What is this new development? Why does it matter? And what should we do about it? We've got Charles Galbraith of the Mitchell Institute Space Power Advantage Center of Excellence with us today as our in house expert.

[00:01:21] **John "Slick" Baum:** As you all know, he spent his career as a space professional in the United States Air Force and then the Space Force, retiring as the Deputy Chief Technology Officer at the rank of Colonel. And just to be clear, we are really fortunate to have him with us today. He's spent a significant portion of his career thinking about these sorts of challenges in his first Mitchell Institute report focused on space control, discussing how we should handle increasingly offensive actions in space by adversaries like China and Russia.

[00:01:49] **John "Slick" Baum:** We've added a link to this paper in the show notes, and I think it's really crucial reading given all that's in play right now. All right, Charles, thanks so much for being here on short notice. You know, I tried to [00:02:00] summarize it in the opening, but please walk us through what developed last week about this newly revealed threat.

[00:02:06] **Charles Galbreath:** Yeah, slick. I, I appreciate the overview that you provided. I think it was very accurate. What a lot of people might've seen last week was a headline similar to nuclear weapons in space, and that would obviously get a lot of people's attention. So how did this all unfold? Last week on February 14th, Mike Turner, the house intelligence committee chairman said that there was a threat to our space capabilities that.

[00:02:30] **Charles Galbreath:** He wanted, uh, there to be more of a discussion about, he wanted the Biden administration to, uh, release information so that they could openly discuss this. Uh, it caused a lot of people, uh, some concern and, and got a lot of headlines. The next day, John Kirby, the White House spokesman, held a briefing that talked about the fact that, uh, there is a threat that we are tracking.

[00:02:52] **Charles Galbreath:** Uh, it is not an immediate threat. Uh, he did not confirm or deny whether it was a nuclear powered threat. Uh, and [00:03:00] he said that, uh, we're working through this and we're going to be briefing the, the house, uh, uh, members on, on that Thursday and then the Senate, uh, in, in a few weeks when they reconvene, so while there's headlines that say, yes, there's a, a threat to our space capabilities, that is something we should all be taking very seriously and we'll discuss what that.

[00:03:22] **Charles Galbreath:** might manifest as what the Russians might be pursuing in here in a little

[00:03:26] **John "Slick" Baum:** bit. Yeah. I appreciate that Charles so much. And can you help us understand what this really means? I mean, people hear about a nuclear weapon and they're obviously extremely concerned. Uh, and it's about as serious as it gets, uh, in a national security context or, you know, really in any context.

[00:03:42] **John "Slick" Baum:** So what does a threat on orbit really mean? Yeah.

[00:03:46] **Charles Galbreath:** So there's basically different categories that we could, uh, see a nuclear capability or an ASAT system, uh, manifest. On the far extreme would be a nuclear detonation in space, and that could either be from a direct descent on top of [00:04:00] an ICBM that then detonates into low Earth orbit, for example, or it could be a satellite that hosts a nuclear weapon that then plans to detonate or release an electromagnetic pulse.

[00:04:10] **Charles Galbreath:** Uh, the effects of that type of a weapon would be the immediate blast that would impact several satellites in the near vicinity, as well as an electromagnetic pulse that that radiates or energizes the Van Allen radiation belts that then causes potential harm to other satellites in that orbital regime.

[00:04:30] **Charles Galbreath:** And you can see multiple satellites having anomalies or even some. Uh, becoming degraded, uh, or become, uh, unfunctional. That's, that's one extreme. Taking it down a notch might be a nuclear powered, uh, weapons system that may not release a nuclear blast and may just be using nuclear energy to fuel, uh, or to power some other sort of attack mechanism, some sort of electronic weapons system.

[00:04:57] **Charles Galbreath:** Uh, or directed energy system. And then moving [00:05:00] further down the spectrum, you could have a nuclear powered spacecraft, uh, that is using that, that nuclear fuel for, for energy source, uh, to keep the satellite functioning or to propel, uh, the spacecraft all are of, uh, you know, a concern, but certainly on the extreme side, a nuclear detonation in space would be far worse than anything else.

[00:05:20] **Charles Galbreath:** And would have indiscriminate effects. And that is one of the things that, uh, makes this such a compelling, uh, Topic of discussion.

[00:05:29] **John "Slick" Baum:** Yeah. And only because we've hosted so many podcasts and with having, you know, your leadership really, uh, peeling back the layers of the onion and having our listeners understand, uh, what warfare in space, uh, looks like, um, we're not talking, you know, mushroom clouds because there's no explosions in space, right?

[00:05:47] **John "Slick" Baum:** It's more, uh, nuclear type energy, you know, uh, flying around to affect, uh, Satellites operations, right? So kind of shorting them out or whatever, just kind of putting it into a normal context.

[00:05:59] **Charles Galbreath:** Yeah, [00:06:00] absolutely. Um, I mean, I wouldn't suggest anybody put their cell phone in a microwave. But, you know, that's the sort of thing that you might be impacting a satellite with.

[00:06:08] **Charles Galbreath:** And we've seen this before. Back in 1962, the United States conducted a test called Starfish Prime, where we detonated a nuclear weapon in low Earth orbit. Now, at the time, there were only about 24 satellites in space. So, That could be potentially affected. Eight of those actually ended up becoming, uh, dysfunctional satellites after, uh, after that detonation.

[00:06:29] **Charles Galbreath:** So there was a significant impact on, on roughly a third of, of the satellites in orbit at the time. Obviously we have a lot more satellites, uh, in orbit today, and certainly in low earth orbit with a proliferated warfighting space architecture from the space development agency, as well as, uh, SpaceX is Starlink constellation.

[00:06:48] **Charles Galbreath:** And those could be what a Russian weapon system might be trying to counter. Is that proliferated, uh, architecture, uh, that we're seeing used so well, uh, in Ukraine and as part of our overall, uh, [00:07:00] architecture moving forward for the United States. Um, but, but circling back on starfish prime, um, that not only impacted those satellites in orbit, but it actually blacked out power to Hawaii, some 900 miles away.

[00:07:12] **Charles Galbreath:** Uh, and so while there may not be an immediate effect to, to humans, uh, there is a, an indirect effect that, that could be had, uh, if this weapon system were a nuclear detonation capability.

[00:07:26] **John "Slick" Baum:** And thanks so much for the history on that. You know, as, as I understand it, you know, the U S you know, I knew that they executed that test really early in the cold war, uh, and it did not take long for the United States or the Soviet union to understand that this was a losing proposition.

[00:07:40] **John "Slick" Baum:** Uh, so both sides generally stayed away from this kind of activity, uh, and decided to, you know, essentially sign a treaty to make sure that we weren't going to play in this, this type of space. And obviously, uh, times have changed. Um, now one thing, uh, that, that I want to mention to our audience, Quickly from a nuclear [00:08:00] perspective, you know, there's a treaty that basically says we won't put anything nuclear into space.

[00:08:03] **John "Slick" Baum:** And that includes, you know, one of the biggest limiting factors that on orbit satellites have is their fuel reserve. If you think about it, it goes up and the fuel that it has either to move around or open and close things. It's, it's, uh, it's limited. So, uh, obviously the idea of, uh, a very long, sustainable type of engine like the Charles mentioned being nuclear powered, uh, would be something, but because of the treaties, um, you know, we, we are not doing those types of things.

[00:08:31] **John "Slick" Baum:** So I just want to, uh, point out to our, our listeners that since this is such a quick special that we're getting out, that there are some other episodes on the airspace advantage, if you want to get smart on this kind of stuff. So Charles and his team, uh, really doing great work. So, uh, Charles, I just want to ask, you know, are all orbits equal in terms of.

[00:08:50] **John "Slick" Baum:** Uh, this threat impact, you know, or are there certain nuances that are in play depending on where the satellites

[00:08:55] **Charles Galbreath:** are? So look, so, so there are differences, but I want to circle back with you real [00:09:00] quick on, uh, that outer space treaty, the 1967 outer space treaty, because you're absolutely right after we detonated that, uh, that starfish prime test in 1962, we, we saw the ramifications of that.

[00:09:12] **Charles Galbreath:** And shortly after there was a, a nuclear test ban, uh, treaty put in place, but on top of that, we agreed and the Soviet Union at the time, as well as many other nations agreed in 1967 that we're not going to put any weapons of mass destruction in orbit or on celestial bodies. And so certainly a weapon system such as a nuclear detonation that that some speculate the Russians might be trying to achieve here would be in violation of that and would have indiscriminate effects on on multiple satellites, multiple nations and have impacts potentially around the world, but that does not.

[00:09:51] **Charles Galbreath:** That treaty does not prohibit the use of nuclear powered, uh, spacecraft. Uh, the Soviet Union, as I mentioned, has had nuclear powered [00:10:00] spacecraft, uh, for, for reconnaissance. We've certainly used, uh, nuclear powered spacecraft, uh, to explore different parts of the solar system. You know, Voyager, uh, most famously has some nuclear powered capabilities on it.

[00:10:12] **Charles Galbreath:** Uh, so just wanted to clarify for everybody that, uh, there is a distinction between, uh, weapons of mass destruction. And nuclear powered spacecraft. Now you asked about different effects at different orbital regimes. So certainly at low earth orbit, where you might have a greater concentration of satellites, uh, you're going to impact more capabilities, more systems with a single blast or potentially a single, uh, you know, wide area effect, uh, type of weapon.

[00:10:40] **Charles Galbreath:** As you go further and further, uh, into, uh, higher orbits, uh, the effects are going to become less and less. Significant, uh, there is more radiation, the further you get into, uh, higher orbits and so different satellites are going to have, uh, rad hardening capabilities, uh, to protect their, [00:11:00] uh, you know, sensitive electronics, uh, from that type of radiation.

[00:11:03] **Charles Galbreath:** Additionally, the, the dispersal of satellites is going to be much wider. And so you're not going to impact as many satellites as quickly, uh, the higher you go in orbit. And so that's why there's, there's much greater concern. About those, uh, spacecraft in low earth orbit that could be affected by this. And then let's not forget, uh, there are 10 people currently in low earth orbit today.

[00:11:27] **Charles Galbreath:** Uh, that could be affected by this and there, there may not be an immediate, uh, health concern to them. Certainly the life support systems, the communications, the navigations capabilities that they all depend on could be impacted by an electromagnetic pulse potentially, uh, from a Russian weapon system.

[00:11:45] **John "Slick" Baum:** All right, Charles, I've got to ask you this. So how long do these effects last? I mean, there's, you know, the electromagnetic pulse, the radiation, then the dead satellites on orbit that are not under any form of positive control. So are we talking about a problem that lasts weeks, [00:12:00] months, years, or is this like

[00:12:01] **Charles Galbreath:** decades?

[00:12:03] **Charles Galbreath:** Yeah, that's a great question. And uh, the answer is all of the above. So the immediate blast, if there was a nuclear detonation in low Earth orbit, for example, would have immediate effects on those satellites in the near vicinity. That charging of the Van Allen radiation belts could persist for months or even a few years, depending on the size of the blast and where it was exactly.

[00:12:31] **Charles Galbreath:** And so that creates a hazard to those satellites for for that duration again, months or even a few years. Now, you correctly point out that those dead satellites, um, either from the blast or from the E. M. P. Effect, uh, can no longer be commanded, and that creates, uh, debris basically that has to be mitigated.

[00:12:52] **Charles Galbreath:** And if there is debris that that, uh, you know, satellite that that breaks apart as a result of the blast, That [00:13:00] could spread and as we've seen from both the Chinese and the Russian, uh, anti satellite tests, uh, of, uh, you know, direct descent ASAT capabilities, that debris can last for decades and, uh, certainly with an indiscriminate attack of, of a nuclear weapon in low earth orbit, well, we're talking about, uh, debris that could last for multiple decades and pose a hazard to, uh, any space faring notion.

[00:13:26] **Charles Galbreath:** Um, in low earth

[00:13:28] **John "Slick" Baum:** orbit, Charles, you just said a word indiscriminate. So I want to emphasize a crucial point. I mean, this impacts military and civilian satellites alike, right? Yeah,

[00:13:39] **Charles Galbreath:** absolutely. And that's, that's one of the reasons why it was banned by the 1967 outer space treaty is, uh, an indiscriminate weapon.

[00:13:47] **Charles Galbreath:** Uh, it is not something we want to see used anywhere, including low earth orbit because it would impact, all nations, uh, all commercial activities. And as I mentioned, uh, all of the, the humans that are [00:14:00] currently in low earth orbit, uh, 10, uh, three on the Chinese space station and seven currently on the international space station.

[00:14:07] **Charles Galbreath:** Um, we also know from the way that this has unfolded, that this is not a near term threat. And we're talking about a medium to long term threat. What that actually means in terms of years, I don't know. Uh, but as we begin to venture further out into space and put more and more people in space, that type of threat is going to end up.

[00:14:28] **Charles Galbreath:** Impacting more and more people, uh, and certainly as we become increasingly dependent on space capabilities for all of our, you know, day to day activities, a weapon system that can take out low Earth orbit, uh, satellites, including weather. Communications. Uh, some of our P. N. T. Signals that come from a higher orbit, medium earth orbit could be impacted by the radiation and could impact the signal.

[00:14:55] **Charles Galbreath:** And of course, we rely on P. N. T. Capabilities for just about everything today, [00:15:00] including banking and global global transfer of funds, as well as how to get from point A to point B today. So, yeah, there's some significant impacts that could be had by taking out indiscriminately. Uh, a space capability.

[00:15:16] **John "Slick" Baum:** I mean, this is beyond like the annoyance of my, my, uh, my maps not working on my, on my cell device.

[00:15:23] **John "Slick" Baum:** Right. I mean, this is a huge deal given the context. And, you know, after listening to you, I really have to push back on white house spokesman, John Kirby statement when he said, uh, quote, though Russia's pursuit of this particular capability is troubling. There is no immediate threat to anyone's safety.

[00:15:39] **John "Slick" Baum:** Now, uh, given how dependent we are on space based capabilities, Uh, people's lives would be in danger. And I mean, you can't even buy gas without connecting to space. Given the role of GPS plays in banking, as you mentioned, um, you know, good luck running emergency vehicles without fuel. And I can go on with more and more examples.

[00:15:56] **John "Slick" Baum:** So Charles, any more quick thoughts on this? No, I

[00:15:59] **Charles Galbreath:** mean, you're absolutely right. [00:16:00] We, we are incredibly dependent on space capabilities. And so, uh, any type of, indiscriminate attack against that, uh, poses a significant risk, uh, not just to those satellites that, uh, that don't have mothers as people famously say, uh, but to the men and women all around the world and in armed services, uh, that rely on those space capabilities, uh, for, you know, day to day life, as well as current military operations and, uh, You know, any attack against space capabilities ultimately puts humans at risk.

[00:16:30] **Charles Galbreath:** So Charles, what's

[00:16:31] **John "Slick" Baum:** changing and why is Russia going this way? I mean, it would, it would take out their space capabilities to, you know, push China and everybody else's. And, you know, it's not going to win them a popularity contest.

[00:16:41] **Charles Galbreath:** No, absolutely not. And I think what has changed, um, is partly the struggle that they've encountered in Ukraine.

[00:16:49] **Charles Galbreath:** Uh, and, and we can't underestimate how, how devastating that is psychologically to them, um, you know, how demoralizing it is maybe to, to Putin personally that it's taken this long. And [00:17:00] he sees the use of, for example, Starlink, uh, a capability that, uh, that the Ukrainians are using to great effect, uh, to coordinate and communicate.

[00:17:09] **Charles Galbreath:** And so how do you counter that part of the reason space development agency is pursuing this proliferated warfighting space architecture using multiple lower cost satellites in low earth orbit, rather than large exquisite satellites that cost a lot of money at a higher orbit is the fact that there were threats to our space capabilities and by proliferating and using lower cost systems, we decrease the potential control.

[00:17:39] **Charles Galbreath:** Uh, motivation to go after any one satellite, uh, and that may drive Russia to try to go after a whole bunch of satellites in one fell swoop, uh, whether or not he's developing these capabilities to counter Starlink or the P. W. S. A. Architecture that the United States military is pursuing. It's unclear at this time.

[00:17:59] **Charles Galbreath:** Um, [00:18:00] but I think that our, our transition to using proliferated low earth orbit satellites is maybe one of those motivations of, of what has changed. Got

[00:18:09] **John "Slick" Baum:** it. And, and Charles, you're the expert here. So do you think China or other adversaries will try to develop these capabilities too?

[00:18:17] **Charles Galbreath:** Well, so first, I, I hope not, um, a weapon of mass destruction to take out, uh, satellites is really, as we've said, indiscriminate and it's a weapon of last resort.

[00:18:28] **Charles Galbreath:** And I would hope that, uh, potential adversaries would recognize the international laws and the norms that we've established to prohibit weapons of mass destruction in orbit. Uh, and pursue other options. so I'm hoping that, that we can, that cooler heads will prevail, uh, and that we can steer away from, from the deployment of, of, of that type of weapon system, uh, you know, any type of ASAT system is something we need to take.

[00:18:55] **Charles Galbreath:** Uh, but a WMD in space is something we absolutely have to, uh, try to nip in the [00:19:00] bud as quickly as possible.

[00:19:02] **John "Slick" Baum:** Now, Charles, you also wrote a paper last summer about space control, uh, how we deal with the adversaries increasingly seeking to contents, uh, activities on orbit. So this cuts to the heart of that.

[00:19:13] **John "Slick" Baum:** Do you mind walking us through the basics we should understand?

[00:19:17] **Charles Galbreath:** It's no secret. We in the United States and our allies have over the past 30 years done an incredible job of leveraging space capabilities and services to make ourselves more effective. We've talked about how it impacts all of our daily lives.

[00:19:31] **Charles Galbreath:** That's doubly true on the military side. There really isn't a military operation that we can conceive of today that doesn't use space in some way. And our adversaries, primarily Russia and China, have seen this and believe that attacking our space capabilities might be that soft underbelly, that Achilles heel to our capabilities that could undermine our overall strategy.

[00:19:55] **Charles Galbreath:** And so they are developing a wide range of threat systems. [00:20:00] Everything from ground based jamming, ground based laser systems. Um, ground based direct ascent ASAT systems, as we've seen demonstrated by both Russia and China, as well as on orbit capabilities, uh, utilizing jamming systems, uh, grappling arms, uh, even explosives in what we've seen as a Russian nesting doll type capability.

[00:20:23] **Charles Galbreath:** And, uh, they are developing these things again to counter the advantage we have in space to try to undermine our overall plans and create windows of opportunity for themselves, uh, to achieve their own terrestrial, goals and objectives, uh, either militarily or politically. Well, Charles, that

[00:20:42] **John "Slick" Baum:** really cuts to the core issue at play.

[00:20:44] **John "Slick" Baum:** You know, it's not in our interest to see an overt conflict in space. So we wanted to deter that sort of outcome. So how do we do that? Especially given something like this, you know, this new Russian capability that

[00:20:55] **Charles Galbreath:** we're hearing about. Yeah. Deterrence, uh, is our [00:21:00] objective, uh, obviously, uh, whether that's a terrestrial or in space.

[00:21:04] **Charles Galbreath:** Um, but in space, the chief of space operations, General Saltzman has, has laid out this theory of competitive endurance that identifies three key tenants that are aimed to control escalation, uh, to keep things in the competition phase and not escalate to conflict. And so, as part of that theory of competitive endurance, there's, um.

[00:21:24] **Charles Galbreath:** Avoiding operational surprise. So maintaining awareness of, of what's going on in space as well as the threats that are on, on, uh, land or, or on earth, uh, that could move to space. Uh, there is, uh, denying first mover advantage. And, and this gets to really the, the need to make our architecture more resilient so that it doesn't invite attack, uh, a as, uh, as we've seen, uh, capabilities by, by Russia and, and China being developed to, to try to undercut our capabilities in space.

[00:21:53] **Charles Galbreath:** And then finally is the tenant of responsible counter space campaigning. This is that, you know, there may be actions that we [00:22:00] take in space to deny adversaries capabilities, and they may take try to take actions to deny ours. But we're going to do this in a responsible manner that. To avoid what is called a pirate victory, uh, something that basically decimates the entire, uh, uh, orbital regime for, for use by anybody.

[00:22:16] **Charles Galbreath:** Uh, that's not something we want to achieve.

[00:22:19] **John "Slick" Baum:** Yeah, that absolutely makes sense. And, uh, I'm going to put you on the spot here. So let's assume you're dual hatted as the chief of space operations and the commander of space command. What do you do to deal with this threat immediately? And as it plays out over time.

[00:22:35] **Charles Galbreath:** Yeah, so let me just start with saying, uh, we absolutely have the right leaders in those positions. General Whiting, uh, as the, commander of U. S. Space Command, uh, and General Saltzman as the Chief of Space Operations leading the Space Force. They are absolutely the right people to be leading these organizations, uh, Right now, uh, and I have complete confidence that they are doing everything they can, uh, to get after these threats. But if I were in their shoes, the first thing I want to do is get as much [00:23:00] information as possible. So this means, uh, working through the intelligence communities, assessments, uh, working through our own space.

[00:23:08] **Charles Galbreath:** Domain awareness, uh, capabilities as well. What we have on orbit, what we could put on orbit. And we've seen recently some, some new launches by Astroscale that could do a on orbit inspection of, of debris. Uh, we're about to see the launch of, uh, two Jackal, uh, satellites that will have, uh, an inspection capability as well.

[00:23:25] **Charles Galbreath:** And of course, Space Force demonstrated a capability last year called Victus Knox, which is a rapid launch, uh, to put up a domain awareness sensor, uh, in the event of an emergency. So all of those could come to bear, uh, should the Russians, uh, deploy an ASAT system. Now, beyond domain awareness, what we need to do is protect our capabilities from any sort of attack.

[00:23:46] **Charles Galbreath:** And this is exactly what we're doing as part of that theory of competitive endurance and improving the resilience of our architecture overall. So as I've mentioned, we were proliferating our capabilities so that any one asset that might get taken out doesn't [00:24:00] have a significant effect. We are building in protection measures into our capabilities.

[00:24:06] **Charles Galbreath:** We are using different orbits in a hybrid architecture to make sure that even if there is an attack on one orbital regime, we have others that can augment and replace. Let's also not forget that, uh, as we build a proliferated architecture that has multiple satellites being replenished on a 2 year cycle.

[00:24:23] **Charles Galbreath:** For example, those satellites can be taken off the assembly line and used to reconstitute any loss capability that that might be damaged by any sort of attack. And so the domain awareness that we're pursuing. The, plans that we're developing to, uh, increase the resilience of our architecture as well as reconstitute our capabilities are all the right things to do for any type of threat.

[00:24:46] **Charles Galbreath:** Uh, even this, this new emerging threat that we're hearing

[00:24:48] **John "Slick" Baum:** about from Russia. Got it. All right. So now I'm going to twist this a little bit again, put on your congressional hat for a moment. What should the house and Senate do? And I'm guessing pass a budget might be a good [00:25:00] place to start, but let's get serious about the scale and scope of the challenges we face and consider that now might not be the time for defense budget caps.

[00:25:08] **John "Slick" Baum:** So starting with educating the American public about, you know, the really, real dangers that are in play is probably a good place to

[00:25:14] **Charles Galbreath:** start, right? Well, absolutely. First and foremost, you hit the nail on the head. We need a budget. Uh, and this is a budget that has to be growing because the threats to our space capabilities are growing just like our dependence on space is growing.

[00:25:28] **Charles Galbreath:** And so, uh, the thought of, uh, of, tapering off, uh, any growth, the space force in the, in the immediate future, I think is, very short sighted. Um, but beyond that, yes, they actually need to be working together to, uh, You know, figure out what's happening with this threat and, aligning the American people to understand the importance of space capabilities, and, and why the space force is here to protect those capabilities.

[00:25:54] **Charles Galbreath:** Additionally, our, you know, our, our political leaders need to be working together. [00:26:00] Uh, to counter the real adversaries that are out there and, and they are out there. Russia and China are actively developing capabilities specifically target us and our space capabilities. That's the real enemy. That's who we need to be focusing our attention on.

[00:26:14] **Charles Galbreath:** Um, so, so let's get the budget approved. Let's continue to grow the space force. Let's educate people on, on what the threat is and what we're doing to get after it. And then let's let our diplomatic, uh, leaders work through the diplomatic channels. To again, reemphasize that a weapons of mass destruction in low earth orbit or in any orbit, uh, are prohibited why they're a bad idea.

[00:26:38] **Charles Galbreath:** Let's reestablish those norms and let's make sure that there are harsh penalties in place for anybody that pursues that type of weapon system. Both diplomatic as well as economic penalties, uh, and maybe even further

[00:26:51] **John "Slick" Baum:** amazing Charles. I can't say thank you enough for being here. Uh, you know, and also to Shane, our producer, uh, putting these podcasts together, [00:27:00] uh, they're not an easy feat from a publishing and editing and everything else.

[00:27:03] **John "Slick" Baum:** So just appreciate you guys being here. Any final thoughts for the audience, uh, to close out this special.

[00:27:09] **Charles Galbreath:** Yeah, slick. So to, to, to quote hitchhiker's guide to the galaxy, don't panic. Um, there, there are a lot of threats out there, uh, but we have the right leaders in place, uh, and the right folks focusing on these, on these threats to, to counter them and make sure that our space capabilities are there.

[00:27:24] **Charles Galbreath:** Uh, what I want to make sure everybody understands is, uh, that we're getting after this. And what I want our potential adversaries to know is there is no silver bullet, uh, that is going to undermine our space capabilities and weaken our overall defense posture. Um, there, there is no way to go after this.

[00:27:39] **Charles Galbreath:** And so do not pursue weapons that, will have an indiscriminate effect and do not be misguided that you think you can, um, take us out in one fell swoop. It's

[00:27:48] **John "Slick" Baum:** not going to happen. Charles. Thanks again for being here. All right. Slick. Thank

[00:27:53] **Charles Galbreath:** you very much. And, uh, keep listening

[00:27:55] **John "Slick" Baum:** folks.