TPI SPECTRUM SERIES 2024

The Race for Space: Property Rights in Satellite Spectrum

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Sarah Oh Lam:

Hello and welcome back to day three, our final day of the TPI Winter Spectrum Series. This series continues its celebration of the 30th anniversary of the first spectrum auction by the FCC in 1994. The last two weeks we talked about auctions, pipeline, and today we have an exciting discussion about the space and satellite spectrum policy space. So be sure, also, to stay on for a fireside chat with Christopher Yu and Scott Wallsten right after this panel at 11:30 AM. They will comment on the things that we talk about here on our panel and also implications for legal and economic research that still needs to be done for policymaking in this area. So today our panel is entitled "The Race for Space: Property Rights and Satellite Spectrum." We have two other panelists coming on, but we have a little bit of technical difficulties, so hopefully they can pop on in a few minutes.

So this morning we have David Goldman, director of satellite policy at SpaceX, Kalpak Gude, Head of Domestic Regulatory Affairs Project Kuper, Amazon. We have Whitney Lohmeyer, Chief Technologist of the FCC Space Bureau and Assistant Professor of Engineering at Olin College of Engineering. And we have Edgar Rivas, senior Policy Advisor in the office of Senator John Hickenlooper of Colorado. And I'm Sarah Oh Lam, senior fellow of the Technology Policy Institute. So to start off the conversation– and we'll wait for our two other panelists who hopefully can join us soon– I'm gonna start off by asking Edgar and Kalpak, if we could level-set a little bit first. So satellite spectrum usage is governed largely by legacy frameworks that may need some reform. We don't know, given increased deployments in space. Domestic regulatory agencies and international bodies have levers to speed up or slow down innovation and space, and Congress can pass legislation as well to direct the US government and how it regulates licensing, orbital debris, research funding, and so forth.

So for Spectrum in particular there's, you know, possibility for more congestion now that there's more satellite activity. What role does the US have here domestically? And then also working with international bodies like the ITU and work meetings to help innovation in this area. Is command and control inevitable because it's an international issue, or can we see more market based approaches to organizing space activity? So, big question. But you know, for folks in space and satellite and spectrum, these, this is kind of the framework that we have to work in. So, do you have thoughts? Either of you?

Edgar Rivas:

Sure. Thanks, Sarah, and thanks to TPI for hosting this discussion and looking forward to kind of seeing where this conversation goes. But maybe to also set the table a little bit, you know, just looking ahead at World Reader Communication Conference for 2027, the majority of that agenda is already gonna be focused on space. I think 15 of the 20 items are already kind of focused in some way, shape, or form on, on space related communications policy. And I think that just shows the gravity, no pun intended, of how important this domain is for innovation. You know, if you look at the way we use GPS or what we, we process banking transactions, I mean, there's, there's always gonna be some nexus with space policy. And so, you know, I think one thing that Senator Hickenlooper's been focused on is really in addition to the communications policy aspect, looking at the space traffic coordination mechanisms, we have to make sure that, you know, if we're looking at growing constellations, new NGSO or GSO operators that we have as strong of capability as possible to make sure that we can manage all that influx of activity and, and, and low earth orbit and beyond.

And I think that's a really important principle that we saw discussed at WRC 23, and I think that'll continue going forward. One other thing I think that I just wanna enter into the, into the discussion is this notion here in the US of how we set regulations or process our agency authorities with space in mind. And so I think looking at the orbital debris mitigation standard of practices is one way where I think creating a level of consistency between how the FCC or the Department of Commerce or NOA, how they all license and look at these satellite activities, I think that's gonna be a really helpful construct going forward to make sure that there's a level playing field. But Kalpak, I'll kick it over to you in case you have other thoughts too.

Kalpak Gude:

Yeah. Thank you Edgar. And completely agree with the, how you frame the, the big picture here. Let me first address what you said in, in particular the issues of space traffic management and orbital safety and orbital sustainability. I think both are incredibly important. Space traffic management, the rules of the road of how we operate in space, I think are really critical and important for the future. I think, frankly, we're still learning and it will continue to evolve in terms of how many satellites and how best to operate co-orbital arc in the same altitude, same area together. I think that is growing but improving. I think the one thing we're seeing is the large

constellation operators, I'll tell you off the top, we are all talking to each other. We are all communicating, we are all coordinating our activities.

And I think sometimes that goes under appreciated because there is this view, because we are competitive in so many other ways that that is not happening. I will tell you on the SA space safety side, that is fundamental to how we're all operating together, and I think that's a very positive step. I think the issue of, from a US perspective, this big picture of what's happening in ODMSP and other parts of the government incredibly important because we think the rules of the road needs need to be science-based, need to be grounded back into some evaluation of is this truly driving space safety or is this trying to cover a perception issue of improving certain numbers will drive the, the appearance of safety. And the problem is that this is a global business. The Chinese, for example, are moving forward. They are going to be deploying large constellations themselves, unfettered by what rules we come up with.

On the other hand, how do you get the Chinese, the Europeans, others to all move in the same direction? We really do think that the encouragement of the development of best practices industry led, but supported by governments and, fostering sort of that broader adoption, we think that is the quickest way to get people to behave in a better way. Because I will tell you, I think most of industry wants to do the right thing, and you create the right environment in which you're supporting through science-based metrics. These are the right ways to drive safety. You're going to get more buy-in than governments independently, individually doing things themselves. And so we're big supporters of it. Sarah, on your original comment, I'll just make one big picture comment on, on spectrum. I do think people need to understand, obviously from a spectrum thing, for the last 20 plus years, auctions have been the direction in allocating spectrum.

Satellites operate very differently. We share in almost all bands, we share spectrum, not just between satellite operators, between different technologies. Geos share with Ngso, we share terrestrial. That is all the more important and critical as you move up in Spectrum band. I mean, what we've seen is in the millimeter wave bands and 28 gigahertz and beyond the allocation of spectrum to terrestrial through auctions has led, I would argue, to really inefficient use of that spectrum because the propagation characteristics of millimeter wave do not lead to broad, nationwide, or wide area coverages. They're very localized in usage, where if you then allocate that spectrum on a nationwide basis, it really leads to less utilization. And I think that is creating

friction for satellite usage of some of those bands where we think we can deliver more value more quickly to more people. So I'll stop there.

Sarah Oh Lam:

Thanks Kalpak and Edgar, and just wanted to welcome on Whitney and David. Sorry for technical difficulties to get you on. And David's calling in, but I can repeat the question that I posed to them. I was asking if we could level-set a little bit about just the framework of regulation that we have. Domestic regulatory agencies, international bodies and then Congress and the US government and, and what kinds of policies we can make domestically, but also since this industry is international, how do you balance the two? And especially to promote US competitiveness and innovation. So just had thought wanted to ask you and then for Spectrum in particular, but space in general. So maybe we can hear from you Whitney, and then David your thoughts about this question of, can we see more market-based approaches for organizing space or is command and control inevitable?

Whitney Lohmeyer:

Sure. So hello everyone. My name's Whitney Lomeyer. I'm chief technologist of the Space Bureau, and I started in this industry about 10 years ago now as one of the initial members of what is now One Web. So I was an engineer there and I worked with Kalpak and worked with a bunch of folks in the industry. And what I'd like to do is address your first question, thinking about the regulatory frameworks that exist and kind of shine light into the WRC process and how we come up with US positions and the FCC's role in that and industry's role. And hopefully in doing so, address your other question. But, so the FCC, Federal Communications Commission, works with industry and NTIA and ultimately the State Department. State Department oversees kind of the US position, if you will. And we hear about the WRC, but unless you've actually attended it, it's kind of this mystery.

But it's a meeting that takes place for a month every three years. And in between those meetings there are study cycles. And so leading up to the WRC where decisions are made about studies that have been taking place there are also decisions that are made of the WRC about future studies. And so the FCC engages in the working parties that look at these different issues. They lead them, they serve as US heads of delegation. They also work with what's called the WRC

Advisory Committee, which is made up of industry advisors who come forth and advise the FCC on the state of industry. And the FCC then takes those positions and communicates with NTIA, which oversees effectively federal spectrum federal entities like NASA and NOA, and ensures that their spectrum needs are being met. And then we put forth these positions, we reconcile the various needs and stakeholder inputs to the regional bodies, which ours is called CL, that handles the Americas. And then those go forward. And so I think what's most important today is to note that in order for us to ensure that we're maintaining leadership and that all voices are heard is that entities, individuals are, as part of regulatory teams of companies participate in this process.

I will hand it over to David to talk more about the congressional side and also add any color that he'd like.

David Goldman:

Hey, everyone. Thank you so much for having me. I apologize for joining a little late and missing Kalpak and Edgar's answers, which hopefully, hopefully my answers are consistent. But I, this is such a great question to ask because I think what we're seeing is access to space has just, has dramatically changed over the last several years, and excuse me. And so what we're seeing is more and more companies are interested in deploying space-based systems for more and more services with new innovative ideas that no one would've thought of in the past. But because, because space is more accessible, because it's more affordable, there's now new business models that were never, that were never available before. And because of that, that's why this is such a great time to ask this kind of question, is, are our rules that many of them were formulated decades ago, are they still up to the task? And I think, excuse me, I think that there, there really is, in some cases the answer is no. But I think Chairwoman Rosenworcel is a bold thinker, you know, she's made the point over and over again that the new Space age needs new rules. And that seems absolutely right to me. And the formation of a space bureau is a great step in the right direction. But I think the next step is to start looking comprehensively and ask whether our rules are scalable. Whether the, because in your question you asked about command to control inherit and command to control is a case by case approval of every single application that comes in. And what we're seeing is applications are piling on top of each other. And we're, more and more services are applying. There's more and more systems that are applying existing operators are applying for more and more new things, and case by case may not be able to handle that

anymore. And so I think it's time for the New Space Bureau to really start kind of taking the, the bold following the bold leadership of the chair, of really starting to ask the difficult questions of, is there a better way that we can do this? Is there a new way we can do this going forward?

Sarah Oh Lam:

Yeah. Great. Thanks, David. So based on that, I mean, I think that opens up questions about speed and about approval cycles. And, but then there are also those trade-offs, like, you know, what happens with business conflicts like incumbents and new entrants? And so that's why it seems like this discussion kind of sometimes goes in circles, oh, we need a market based way to value, which uses can come first or, you know, a weighing system, but then, oh, but there's still need for like central command and control decision making. How, how do you folks see that interplay? I mean, is it, is it possible or are there small tweaks that can happen? Or do we study the path towards towards doing that?

Kalpak Gude:

I would argue that the, because I don't disagree with what David has said of, I do think that speed of processing of applications and speed of processing of new services is incredibly important. But I think the challenge in a shared spectrum environment is how do you do that until you have clear rules on spectrum sharing? And give the Space Bureau enormous credit, they are, and they have already moved forward on an NGSO spectrum sharing rulemaking last year. There's a further notice that will add more specificity to it that exists now. I think until you create clear rules, creating time limits or shop clocks or whatever you want to try to move the process forward is really challenging. Shock clocks don't work without clear rules. I think those clear rules are something the Space Bureau is looking at doing, and we're completely supportive of. But I do agree that with the demands for new projects, new spectrum, new capabilities I think the, the bureau is being challenged on how to move things faster. And they're doing, they're doing a, a really good job in trying to address those, but we have to recognize that it's challenging.

Sarah Oh Lam:

And do you think, just as a follow-up, do you think part of it is because the WRC process is four years long? I mean, that, that's kinda upstream. Are these four year cycles, because the NGSO sharing rules, do they depend on the, the WRC studies or, I mean it is, or should the US come up with the policy first before it gets to WRC?

Kalpak Gude:

I don't think that those NGSO sharing rules are dependent on the WRC. I think there are certain areas where harmonization internationally is incredibly important. And I think that comes through the WRC process. The US is very much a leader in this, however, and under the IU rules, under the radio regulations that exist through that process, I think it is completely consistent and appropriate that the US can move forward in a whole host of areas. Again, I think the satellite bureau is trying to do exactly that.

Edgar Rivas:

I will just wanna chime in here too. Oh, sorry, David, were you gonna say something?

David Goldman:

Oh, no, no, no. Please go ahead. Go ahead.

Edgar Rivas:

No, I'll just make a quick comment just kind of building on what Kalpak mentioned. I, I do think, you know, this kind of question of, you know, whether we lead here in the US and then take our findings to the WRC or vice versa. I do think, again, this WRC that we just kind of concluded, I mean, this was a huge discussion, right? I think everything across the space economy was very much front and center. And I do think there was I would say positive momentum in the long term at the international stage that, you know, to, I think Kalpak's point earlier, you know, the way that we all kind of use satellite based communications, it's all in the same shared domain.

And so there does need to be this level of consistency in the long term. And I do think that having this sort of, you know, consensus of the willing to look at the hard questions and, you know, whether it's you know, like the, the EPFD limit conversation or whether it's other kind of GSO and NGSO parity level discussions, I do think these are the questions that you know, I feel, I feel encouraged that this WRC really kind of took a central focus on, and I do think that's gonna continue going forward. And I think, you know, Whitney and her colleagues at the Space Bureau definitely have a, a lot on, a lot on their plate, but that's I think they're under the leadership of Chair Rosenworcel, I do think there's a lot of good momentum there as well.

David Goldman:

So yeah, you're absolutely right to bring in the international component, because one of the things that we have to appreciate is, unlike a lot of the issues that we deal with at the FCC space is inherently international. And right now there's an increasing number of state backed satellite competitors that are getting put together that will have resources that US operators just don't have because, because of their state backing. And they wanna go quickly and they're explicit that they want to take over America's lead in space, and we need to acknowledge that. We need to acknowledge what that means. And that's why I was suggesting that like, we really need to be thinking hard about how to redo our processes and redo our rules to be able to take into account the new global environment that we're in. Caltech is absolutely right. The, the Space Bureau's work is cut out for them.

This is, these are hard problems. But if we don't start moving on them, if we don't get going, we're gonna get overtaken. And so your question about the World Radio Conference is a really interesting one because the pace of innovation in space is not happening on four year cycles anymore, or eight year cycles anymore. They're happening at the pace of innovation on the ground. And no one would want to say that you can't get a new iPhone for another four years or eight years while the global regulators are sitting and thinking about it. That's just not how it works anymore. And so, while the World Radio Conference has an extremely important role and is an extremely important anchor, its countries, US and all countries need to be thinking about how do we innovate in the meantime? How do we in innovate in the interim because that's, consumers need it, they're demanding it, and we can't turn around and tell consumers, you're not allowed to have these new services that can help your lives in innumerable ways because we

haven't completed the paperwork. So I do think we can do both, though. It's staying moving quickly at a national level does not mean that you forego the ITU level, the international level. We have to do both. And as, as, as the us we need to be thinking about how do we maintain our leadership, our thought leadership, and our actual leadership in space.

Whitney Lohmeyer:

And to follow off that, I, I can say I'm incredibly encouraged having prior to joining the FCC worked in the roles similar to Kalpak and David internally to a single company advising on regulatory process and now seeing the inner workings of the FCC exactly what David just mentioned, striking this balance of ensuring right, that folks don't need to wait four years to get an iPhone, but also that we maintain our treaty obligations under the ITU and that we are cognizant of the repercussions of putting forth policies in this country that may affect our bordering neighbors, right? And so I, I am, I'm incredibly impressed with my colleagues at the FCC that this is such a priority and it's a daily conversation. And I will say I've never worked with this talented of a team. And it's also right.

It's, it's such an exciting time and there's, I mean, I can't even begin to describe, like, we see if you, if you launch something into space, realistically you're gonna wanna talk to it or hear from it. And every one of those entities through the US comes through our office and we often talk to these groups and we see them and the different applications and services, we couldn't have even fathomed them two years ago. There's companies that are launching microgravity environments to kinda generate molecules that have longer shelf life for pharmaceuticals. There's companies that are wanting to launch technology to effectively manufacture retinas and, and bring them back so that they can reverse neural degeneration in the eye. On the other hand, there's these in-orbit servicing and manufacturing. We heard at the WRC of even space hotels, I mean, we weren't thinking about these.

And as we've been talking, right, we have to maintain leadership. We have to respect and divide and participate in the ITU process understanding the international repercussions that we can go ahead and put forth our policies, and we are, and that everyone is looking to us, for example. And so we take that very seriously. And I've been on the other side where you're just like, what's happening? You know, I haven't heard anything going on with this proceeding. Is it just kind of sitting on a shelf? And I can ensure it's the complete opposite. It's actually different entities

within the FCC are communicating, we're communicating with other government agencies, and we're ensuring that all relevant parties are a part of the conversation.

David Goldman:

Hey, Sarah, can I, can I respond to that real quick?

Whitney Lohmeyer:

Yeah, sure.

David Goldman:

Whitney's point is exactly right, and, you know, we're super excited that she's there to help drive these conversations. One example of where the Space Bureau is actually doing a great job on exactly managing this tension is that at the World Radio Conference, there was a lot of discussion and there ended up being a new agenda item that got passed on the supplemental coverage from space or the direct to device proceeding. The US was very active in shaping how that would go, but that's gonna be a four year process. And again, the chairwoman and the Space Bureau have said, well, we're gonna engage in that process, but we can't withhold the service from consumers in the meantime. And so they're engaging in parallel and doing a rulemaking which is, which is great. I mean, that's the model of how this can work.

At the same time, another interesting thing that Whitney, Whitney pointed out is like, all these cool things that are happening in states that nobody is envisioning, you can't see it in advance, but that goes to kind of as we rethink how these rules can work, the case by case mod model is, is not gonna be able to withstand this. It's not gonna be, it's not gonna be able to enable an innovation if we continue to go that each application needs to have its own separate review, multi-year review. It's, we need to start looking at what's been successful in other places. And I heard Kalpak could say it earlier of like, what's going on in terrestrial with auction doesn't necessarily work in space. I think there's, I think that's right, but there are lessons that we've learned in terrestrial of what, what works there and what doesn't.

And one of the things is it's can you have more flexible licensing? Can you have more fungible licenses? When you have command and control these licenses can't transfer. And so everybody's

stuck with your own unique license. And if they can't manage it, it's very hard to then have someone else come in and kind of pick up where they left off. It just gets dropped. And you get these kind of first in time, first and right rules that make it much more difficult for later entrants to come in. And I think there's models that we have on the terrestrial side that have made the US the leader in terrestrial wireless that got the US to be first to 5G that we can then see if we can start thinking of ways, and I totally take Kalpak's point that this is a heavy lift, but can we take any of these larger lessons and start applying it to space licensing? Because otherwise we're just not gonna be able to keep up. We're just gonna drown in the new innovation and the new applications that are coming in.

Kalpak Gude:

Coming. Yeah. Just to add to that, don't disagree. I think, I think look at what's happened on the terrestrial side. It's complicated. There's lots of things that they moved in that direction, but one was they use standard setting to really drive a commonality of approach. I think for a variety of reasons, that's more complicated on the satellite side to do it, but it doesn't mean that the industry-based best practices work when we're getting to the, the issue of space sustainability can't help drive some of these things forward in a much more similar and, and common way. Rather than looking to individual governments or collectively governments to set forth from above, here is how everybody shall operate. Let that come up from the bottom, let industry develop some of those practices to move forward. I think you're gonna get a much faster development of such rules and best practices allow much more development, much quicker. So in a very similar place with respect to space sustainability I think that is an exact exact kind of an example of sort of a parallel in the, in the trust room.

Whitney Lohmeyer:

And we saw at the World Radio Conference Space sustainability put forth and discussed, and there's a resolution at the radio assembly, which to make the WRC process even more confusing is kind of a separate meeting, if you will, that goes on. And we're in touch with the ITU, they are very serious about this. The FCC has an transparency initiative too, where we are trying to provide guidance documents and resources to the public who are interested in our application process and are interested in learning more about our rules. We have an upcoming open house on

orbital debris rules and are celebrating 20 years of regulation, of, of space sustainability, which is a focus for the chairwoman. And this is yet another place where we are considered leaders and we are still approached for kind of lessons learned and guidance. And so the ITU, like I said, is, is really prioritizing this. And as are we.

Sarah Oh Lam:

So to bring also some current events to the discussion. So last week there was a headline about a partnership for mobile satellite services about direct to smartphone satellite communications. And so there were a lot of geo satellite operators on the L and S bands ViaSat Terra Star, Legato, Omni Space Yasat. So they're creating a to, to use their spectrum to do direct to smartphone. In an article that I read they talk about also the LEO satellites like SpaceX link and AST space mobile using cellular spectrum to do a similar service. But, you know, not quite coordinated with the GEO satellites. So what do you all think about, you know, there is a question of new entrants, new companies trying new things, but then there's also incumbent GEO satellites working with low earth orbit networks. Do you think there'll be more like cross cross mergers or deals, partnerships between GSO and NGSO operators? That's one kind of dimension, you know, maybe there are rivalries between GSO and NGSO, but would there be partnerships too?

Whitney Lohmeyer:

I can speak to this, I'm sure others will have thoughts too. But I guess historically there was a, a major effort in the nineties and early 2000s to launch low earth orbit constellations for broadband. And due to various reasons, those networks didn't pan out for the most part. And so this has really take two and it's been a huge success. But even from the beginning, there have been partnerships with the GSOs and the NGSOs working together. So OneWeb Intelsat and interoperability has been a focus of the industry, especially as these new players, OneWeb, Starlink, Kiper come on board, and GSOs see opportunity in providing services and expanding their service capabilities. So we, we do see articles written about the challenges in the regulatory world and protecting these different networks and coordinating and ensuring that we protect incumbents.

And just with any sort of market, there is consolidation over time. There is innovation. And so I think everyone is kind of coming together at minimum to coordinate and then as well to think

what is this industry gonna look like in the next five years, 10 years? Like we said, we weren't talking about manufacturing pharmaceuticals or space hotels or things like this even, you know, two years ago. And now we are. And so I, I'll say this has definitely, interoperability has definitely been a part of the conversation of the last decade. And so we'll continue to see that, I think.

Kalpak Gude:

I'll jump in here to say, I think interoperability collaboration is a great thing if it's done for the right reason. In other words, if it's done to add value to the customer, by all means let's go find it. We will find it, and we will go forward with it. What it shouldn't be, is done for regulatory reasons, done for other non-customer focused reasons. And I think that's the challenge that's in front of us. I think right now, the level of investment in NGSO technology is, is enormous. And again, we'll get back to what David said before, the US is really leading the way, and it is causing a great deal of concern among GOs among other nations. And I think some of that is on us from another nation perspective as NGSOs to bring comfort to them about what we're doing, how we're doing it, that we're gonna comply with the rules, that we're gonna comply with the, with the laws that of governments around, around the world, and that we're bringing real value.

I think that's important. I think what what we don't want though is to look for combinations or this LEO, GO construct that frankly, to date, now, I've been hearing about this for a decade, we have yet to see the solutions arise. That's not to say that they won't arise in the future, but LEOs constellations are delivering now more capacity, more services that the addition of GOs are, we're still trying to figure out where that might be going forward. And I think we wanna do it for the right reason. So just touching back on spectrum sharing for a moment, I really do think that the debate on protecting existing services is oftentimes the wrong debate. What was, what seemed to be clear to lots of people is the debate at the WRC was really about protecting GOs against competition rather than protecting their actual services. What we were looking for, what the NGSO community was looking for was studies to evaluate whether the current rules are appropriate to be able to protect GO services. That's the question that was blocked. It wasn't a let's move to a different paradigm. It is, let's study whether we can walk, move to a different paradigm. I think we have to move past that and, and really start embracing a more efficient use of spectrum. So I'll stop with that.

David Goldman:

Yeah. And so to build off of that, it really, spectrum efficiency is what's gonna make all of this work, right? It's the way you can have different kinds of technology to serve different consumer needs. And the way you have new competitors and new entrants come in is if everybody is efficient, it's not just a new entrant, but whether incumbents have to improve on their technology over time, they need to also, you can't just sit there, you can't drive a horse and buggy on the highway anymore. You have to keep moving forward. And so, as Kalpak was talking about, one of the things that the US was leading at this past World Radio Conference and should continue to lead is are there protections? And in, in this case, the one that, the one that Kalpak was talking about in particular is the, these protections that were built for geostationary satellites 25 years ago when there weren't any of these next generation satellite systems really in place.

Are those still the right ones? Or what we believe is, can you actually maximize the efficiency of these new systems, optimize these new systems to bring service? Because Remember, the point is to bring new service to people. It's not about protecting companies or business models. It is about bringing new service to people. And so is there a way that you can make sure that the existing customers don't get harmed while you allow these new next generation systems to come online and provide service for more people and faster service and better service and higher capacity service? And that's where us again, you know, Chairwoman Rosenworcel, when she was saying it's the new space agent, it needs new rules. This is a place where she's really been a leader, and the FCC has been a leader on this, is driving for can we start updating these rules?

And I think the FCC, you know Kalpak's been talking about the spectrum sharing proceeding that's between NGSOs, right? That's between these new and kind of next generation systems that are coming online. One of the things that we proposed that the FCC took on was protections for the older systems, which by the way, it older is not old, older is that things have been coming out in the last few years. But for new entrants, do those protections need to stay in place forever? And what we propose is no, even for our system, we propose to sunset those protections over time. Because again, you can't drive a horse and buggy on the highway. At some point you need to be able to innovate your own system over time and make it better over time and allow other operators to be coming in. And that'll drive efficiency. And we should be looking for these places to drive efficiency. So we proposed some setting protections on our ownselves, and I think the,

the FCC took that up correctly. And I think looking ahead, we should be looking to see are there other protections that can be sunset over time to drive everyone new entrants and incumbents alike to be more efficient, to make sure we have more competition to bring more service to consumers.

Sarah Oh Lam:

So to go into that question a little bit more also, so we talked about NGSO-NGSO sharing, but, and then GSO to NGSO sharing are, is the discussion in the us are we, is the FCC able to make rules between the US region between sharing rules between GSO and NGSO operators just in the US? Like what, what areas do they punt to the international sphere and what can be done here at home?

David Goldman:

So the, the quick answer on that is, yes, under the ITU rules, you can change, you can change your national rules within your borders as long as it's not harming countries who are adjacent, who share border with you. The US is uniquely situated to be able to do that, considering the size of the landmass and the few number of borders that it has. And so that is something that the US should be considering, is are there things that it can do within its own borders? It at the same time that it's participating in the more drawn out ITU process.

Kalpak Gude:

And the US has done that before and demonstrated incredible leadership to the rest of the world, because if it works here, that can be demonstrated to work elsewhere. And so I think it's it's a valuable tool and opportunity for the US.

Sarah Oh Lam:

And so for our final little segment, I just wanted to get your all's takes on, you know, what do you think are the most important policy issues for the next five to 10 years? So maybe start with Edgar, you know, what types of bills are you working on? I think I've heard murmurs of a space

package for next year. And then just hear from each of you, like, what, what should policymakers be thinking about?

Edgar Rivas:

Yeah. Well, it's a great question and you know, I think just to echo what what Kalpak and David have been driving home, as you know, I think we need to not be afraid to, you know, to break the glass ceiling and really look forward at at setting new, setting new precedent for ourselves and for the, and for the world and in communications policy. And so I think you know, obviously, you know, their, their companies are at the tip of the spear as part of that effort, and I think they're they're rightfully, I think, looking at a lot of these questions in a, in a really thoughtful way, so I just wanna kind of applaud and emphasize what they mentioned just previously. For, for, I think going forward, I think on the congressional side, you know, I think one thing that Senator Hickenlooper's been thinking about is, is, you know, how do we kind of let science drive the decisions that we make?

And how do we really kind of put that at the forefront of, of, of crafting legislation? I think there's, there's oftentimes a lot of a rush to kind of one corner versus another. And I think that, you know, whether it's in the NGSO versus GSO discussion or any other policy debate, I think there's really kind of a, an inherent need to kind of play defense before somebody plays offense. And I think what we should really be thinking about is how we create a sustainable environment for everyone to compete in going forward, especially in, in space. And so one of the things we've been thinking about is developing these technologies for spectrum sharing. You know, one of the things that we're really proud of in, in, in Colorado is we have the, the NTI research lab, the Institute for Telecommunication Sciences there.

And if anyone hasn't had the chance to visit that facility they do incredible work. And I think they're really kind of at the forefront on the federal side and working with the FCC on, on kind of different spectrum regimes that are gonna be beneficial to all these technologies. One other bill that we've been working on and has passed the Senate last congress, and again, this time around, is the Orbital Sustainability Act. And really, when we kinda look at this international stage, one of the things that we've been really focused on is how do we have these technologies able to, you know, maintain this operational environment that Amazon and SpaceX and all these other

operators reside in going forward. And so what that bill does in a, in a nutshell, is it really kind of kickstarts a demonstration project for in space servicing active debris removal through NASA, but then kind of creating a new commercial market for these technologies to kind of lead the world going forward.

Two other quick things from our end. You know, a lot of the discussion here today has been focused on international regimes again, and one of the things we should also be thinking about separate from the ITU is the US obligations to the outer space treaties. And, you know, those are things that, you know, I think transcend communications policy and I think are, are really at the forefront of, you know, whether we're talking about space hotels or microgravity labs and on, on orbit, this question of how we continuously supervise these activities as a nation is really, you know, a pressing question. And I know that the Biden administration's been taking some steps to propose a new framework for supervision under the Outer Space Treaty. Senator Hickenlooper's been working on a similar proposal that creates this framework. But more importantly, I think this drives home all the discussion today.

It creates clarity, creates consistency, and it's forward looking. You know, I, I think if, if we, if we establish these policies and have them locked one point in time, we can often find ourselves 2, 3, 4 or five years down the road wish, oh, wow, I wish we thought about that before. I wish we had a more flexible kind of, you know, portion of our bill to kind of consider these new, these new innovations that we didn't think of at this point in time. So the mission authorization is another kind of focal point for our office just recently. And again, you know, I think there's, there's, there's so much to unpack in, in space and communications policy, but I think these are just some things that we're most interested in.

Whitney Lohmeyer:

Might have to remind us of the question.

Sarah Oh Lam:

Yeah. So what do you think is the most important topic or topics that policy makers should be thinking about for five to 10 years from now?

Whitney Lohmeyer:

I think to echo space sustainability is, is high on the list as well as the frameworks around NGSO systems, supplemental coverage from space IAM, the, and orbit servicing and manufacturing, protection of incumbent networks with a view towards new entrants. And I'm sure there are some we can't even fathom.

Kalpak Gude:

I'm gonna take it from a slightly different perspective rather than listing proceedings. I think, I think what's really important for policy makers when you're thinking five to 10 years further out, is to think about the world you want to see, think about where we want to be in five to 10 years, and how do we get there? I think US leadership is so important because space is becoming really the new domain that we want to be in the lead of, and I'll give you an example of this to say, there are others who are building large constellations as well, and we will be competing with them, US operators, US systems will be competing with them. They are, we're not gonna be competing in the US or in their home countries because I think neither system is likely to provide services in the other country.

But where we are gonna be competing is the rest of the world, and we're gonna be defining what the internet looks like for all of those parties. And that's gonna have an enormous impact on not just space, but internet access, internet development. And I think that needs to play into how we think about space policy. NGSO technology is going to really help shape what access to the internet, access to websites, access to information and communications is going to look like going forward. So what do we want to see that to be in five to 10 years? I think that's incredibly important. And then building up the kind of regulatory response that gets us there. I think space sustainability, as Whitney was saying, incredibly important, but we have to recognize that governments don't have all the answers today. We do want them to be, and I think all of the players in government want it to be science-based, how we approach this.

But we have to ensure that that's the case rather than I'll say without, without being hostile to anybody. It's sort of, we don't want these rules to be reactive. We don't want them to be, to be something that we're grabbing on to create the appearance of space safety, but we want it to be defended by the science. And if we can do that, I think we're gonna bring the rest of the world

along with us. That's what leadership looks like. And the world will follow us when we do that. When we don't, I think there's gonna be concerns about motivations and interest and competitive advantage for driving many of these things. That's true, both on the spectrum side and the space safety side.

David Goldman:

Excuse me. Those are great answers. Now I'm gonna struggle to come up with something good to say. Actually listening to Edgar talk, it's, I could hear why Senator Hickenlooper is such a leader on all of these issues. It's, I recently took a trip to Canada, and so I've got a little hockey on on the brain, and there's just, there's a line in hockey, I think this is when Gretzky said that the key, the key to winning is that you don't skate to where the the, the puck is. You skate to where it's gonna be. And that's really where you gotta go. And when you're working in Congress, it's not just where this, the puck is gonna be in a few seconds from now. It's, where's the puck is gonna be half a decade in a full decade out. I mean, that's you gotta start steering multiple moves ahead.

And it's great to hear, it's great to hear them thinking like that. As Kalpak said, it’s absolutely, if you start looking out, where's the puck gonna be, this is international. Like I mentioned earlier, there are a number of state backed systems that are gonna be coming online in the next few years with some of them with the explicit mission of taking the lead from the United States. And we need to be looking ahead to that world. And as much as the US is in the lead now, we can't sit back on our laurels and say, whatever we did in the past is what's gonna work going forward. We have to be looking ahead to how do we make sure that we're encouraging innovation, we're encouraging forward movement and not locking in technologies and not locking in, even the technologies we're developing now. We don't want the technologies that we're developing now to be the same ones that we're using in 10 years.

So we have to start moving towards a more flexible licensing environment where it allows and encourages innovation rather than slowing things down and putting everything through multi-year review processes. Because I'm telling you that that's not what's happening around the world. What they're trying to do is trying to see how can they go faster and how can they get ahead, and we need to make sure that we're thinking the same way. And a huge portion of that is spectrum efficiency. It's that we can't allow in a shared spectrum environment, you can't allow

operators to sit on the current spectrum, users to be able to sit on inefficient systems designed to block out other new innovation and new entries. They, everyone, all of us, have to be encouraged to constantly innovate, not just the new services for consumers, but also how we use the spectrum to make sure there's enough room going forward.

So, you know, we talked about a little bit in this conversation that's this EPFD, which is the, the protection for the GSO, the geosynchronous orbit satellite systems. We need to be thinking about how can we innovate on those rules now, change them at the next World Radio conference to be able to allow new services to come online. And in the meantime, the US should take, continue to hold the lead that they've had on the thought leadership on this, and start thinking about what they can be doing now to make sure we take advantage of these new technologies that are coming online. And are there ways to improve spectrum efficiency that don't harm the legacy systems, but that can also encourage innovation going forward.

Sarah Oh Lam:

Great. and on that, I think I have a hand raised, so I was hoping someone would ask questions. And so I'm gonna let you on Brennan to talk. So we have Brennan Price from ViaSat, so maybe he has some thoughts you're on now.

Brennan Price:

Thank you Sarah. I appreciate it. And I, I very much appreciate the, the opportunity to speak and thank the panelists for their, their discussion. I, I do think this has been a useful forum on a variety of issues, and I appreciate what Kalpak and David and Edgar have said on many levels with respect to space sustainability and investigating rules. It will come as no surprise to anyone that my company has a fundamental disagreement with, with SpaceX at Amazon on the EPFD issue. We our company does not design satellites designed to block out competition, and they design satellites to work for consumers and to, to serve as a viable competitor to market. We view the existing EPFD rules rules as vital to establishing rules of the road that are important to the ability of all companies to operate.

So at any rate, I did need to push back on that a little bit, particularly given that two NGSO operators were on the panel. So I, I wanted to speak up while I was here. I understand David's

suggestion that EPFD limits need to be changed at WRC 27. I do not believe that squares with the output of the conference, which quite cleanly states that there should be no regulatory consequences to any upcoming studies at WRC 27, and a change in the EPFD limit would be a regulatory consequence for those of us who rely on it in the bans where GSO has priority. We would also note that none of the NGSO operators are proposing to revisit their primacy at the 28.6, 29.1, 28.6, 29.1 segment and the corresponding downlease segment as well. So at any rate, I, I do want to thank TPI for the forum and thank all of the participants. But some of the EPFD advocacy here cannot be left unchallenged. So here I am. Thank you.

Sarah Oh Lam:

Yes, thank you so much. Yeah, we didn't have a GSO person on the panel, and I was concerned about that, so I'm really glad that you spoke up Brennan, and that actually is a good segue into just more conversations that we're hoping to have in satellite, because there are so many good questions to ask and discussions to be had especially as there's more congestion or more need for talking about market mechanisms or at least more trade-offs between new entrants and incumbents. So we're hoping to continue the discussion and we'll invite more panelists in the future. And so before we hand off to the next fireside chat, we have one final question from Evan Kwerel. Currently, the Orbit Act is a barrier to market-based approaches to assigning rights to satellite systems. Has there been any discussion of repealing or modifying the Orbit Act? So maybe I can just pass that to you, Edgar, and then we'll go to our fireside chat.

Edgar Rivas:

Sure. I can have a quick reply. So, you know, as far as repealing or modifying, I mean, it's only clear through the Senate, it's still under consideration in the house and on, on the point of the orbit attack, it's really about creating the technologies that can remediate debris, whether that's from a satellite, whether that's from another object in space. That's really all we're talking about here. And to kind of this, using this hockey analogy, you know, looking at where the puck is going in the future, there are no global leaders right now in debris removal and sustainability. We want the US to be the first, and the US should be the first, and that's the premise behind the Orbit Act. And so it's really a tech demonstration focused bill. But happy to continue the discussion as we are with, as our office is with any stakeholder on any issue. So we'll continue the discussion.

Kalpak Gude:

Great. I just wanted to add sort of one comment before we leave Brennan's comment on, on EPFDs I think is a fair one. But I do wanna circle back to the issue of what was the question at WRC? The question at WRC was, let's study the issue. Let's figure out if rules that were built 25 years ago was, are still appropriate. Those rules, by the way I was involved in that process, those rules were about protecting very different GSO services. Back then, it was about protecting video distribution of how ESPN gets distributed to cable head ends around the world. That is very different than the protection criteria. Very different than what is required for internet connectivity. I think studying those issues is fundamental, and we're happy that the ITU also and the WRC recognize the need for those studies. So we are very pleased that we're moving in the right direction to improve and update those rules to drive efficient use of spectrum and more competition and more services to customers. I think at the end, that's the goal. So thank you.

David Goldman:

Hey, and Sarah, I, I know you have to go. I just two seconds. I actually kind of wanted to apologize to Brennan. You, you made a fair point. I did not mean to say that the GSO, the GSO satellites or the ViaSat satellites were designed to block out competitors. I think I said it thoughtfully, and I apologize, that's not what I meant. What I meant to say was that if we don't look at updating rules over time and sunsetting rules over time that it encourages inefficient development of technology. But I did not, I did not mean to imply that the systems were specifically designed to block out competitors. So I apologize for that.

Sarah Oh Lam:

Great. Well, hopefully let's have more of this discussion. So, we'll, we'll schedule another panel and that would be really interesting.