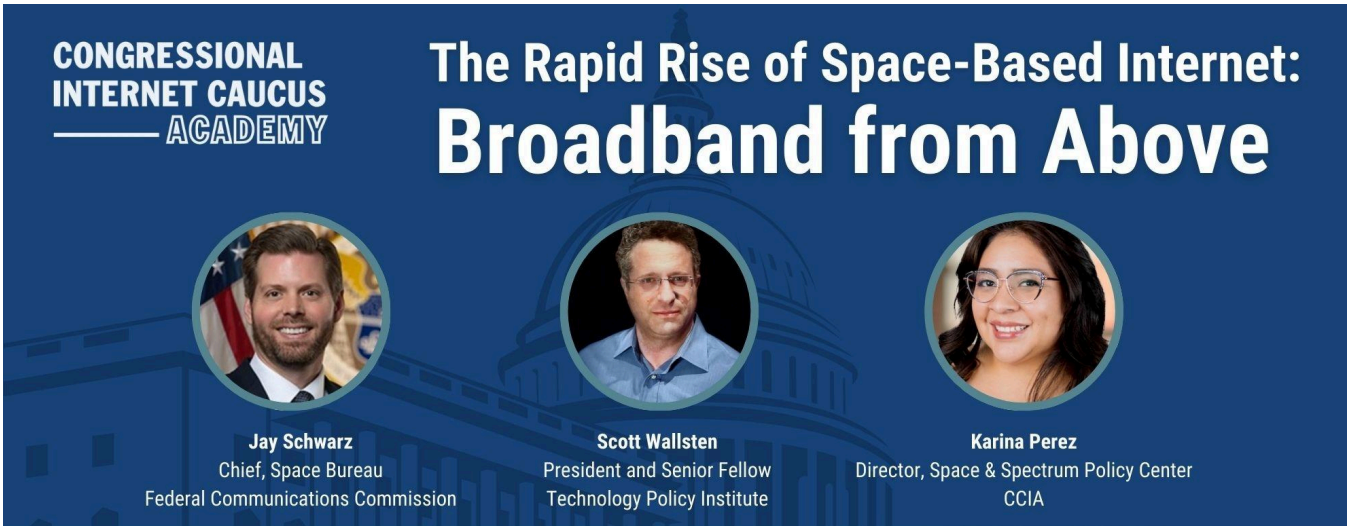

The Rapid Rise of Space-Based Internet: Broadband From Above

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Space, Space Bureau, Space Industrial Revolution, spectrum allocation, satellite, digital divide. rural Internet, data centers in space, AI, interagency coordination, launch vehicles, space debris.

SPEAKERS

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- Karina **Perez**, Director, Space & Spectrum Policy Center, CCIA
- Scott **Wallsten**, President and Senior Fellow, Technology Policy Institute
- Tim **Lordan**, Executive Director, Congressional Internet Caucus Academy

Tim Lordan 00:08
Welcome everybody. Thanks everybody for coming. Thank you for coming to the name of this event is "The Rapid Rise of Space-Based Internet: Broadband From Above. It's hosted by the Congressional Internet Caucus Academy in conjunction with the Congressional Internet Caucus itself. And the Congressional Internet Caucus was founded in 1996.

Tim Lordan 00:27
The co chairs of the Caucus on the House side are Congressman Michael McCaul and Congresswoman Haley Stevens. The Senate side, the chair is Senator John Thune. This event, we're going to look at space-based Internet. I'm really excited about this particular issue. This is, like a new issue, but it's also kind of really old. When I was a young telecom attorney up here in the 1990s around the time of the Telecom Act of 1996 which was like the last major time that Congress has rewritten our

communications infrastructure regulations. There was a proposal by a not very well liked billionaire to create a necklace of space satellites to do to transmit Internet connectivity from above, and that was in the 1990s it was Bill Gates in conjunction with another billionaire named Craig McCaul, and these are the two the richest guys in the world. Bill Gates, at the time, was not very well liked, if you, especially if you were an apple enthusiast. And I was so excited that we were going to have space based Internet. Anywhere you would go, you would have Internet. And it was really exciting, and they were going to do this thing and commit billions of dollars to it, and it failed spectacularly, a variety of reasons, technological, regulatory, the tech, you know, the permits weren't there. It just didn't work. And I'm like, if the two richest guys in the world can't make this happen. Maybe it'll never happen, but over the past, you know, 30 years, it's actually happening. Space based Internet is becoming a reality, and we're really excited about it. There it opens up so many opportunities. And there's roles for Congress, roles for the regulatory agencies, and there's an alphabet soup of regulatory agencies involved and the private sector, obviously. And so we wanted to get together today to talk about the the issues, the technology, the excitement, and also, you know what Congress should know about, what they should do and what the agencies are working on. We're really fortunate. Before I introduce the panel, we're really fortunate that the person, kind of in charge of the Federal Communications Commission, Jay Schwarz, is here. He's the chief of the Space Bureau at the Federal Communications Commission, and he's offered to come and just give some remarks, and then we'll maybe engage him in a conversation. Jay previously served at Comcast in a variety of roles. Where is where I met him. And before that, Jay had just about every job in the Federal Communications Commission, so he has a long background in this. He is the chief of Space Bureau, which didn't exist in 1996 by the way. Maybe that's why tele desk failed. And so if Jay could come up, make some remarks, and then we'll have the conversation and get going. Jay,

Jay Schwarz 03:21
Thanks, Tim, really appreciate it glad to be here. Everyone looking forward to the conversation. And what I want to do is just take a few minutes to give you a little sense for what we're doing at the Space Bureau, at the Federal Communications Commission. I want to share with you a little bit of our thesis for what's going on in the industry, and what that means for our agenda. And so our thesis is that we are in the space Industrial Revolution, and that's going to drive, and it should drive everything that we're doing at Space Bureau. Space Bureau has just been around for a few years. It started in 2023 in recognition of all that was happening in the industry. And so the last 13, 14, months that I've been there, we've really been focused on what needs to happen at this particular time in the industry, which, like I said, I call the space Industrial Revolution. I started calling it the space industrial revolution because I'm an economist, and the first time I saw the plot of the number of objects that are getting launched into space every year. You can sort of imagine, usually, if I have a slide deck, I'll show it, but it's flat from 1957 up until about a decade ago, and then it goes almost vertical. I think it's a 14, 15x increase in the last decade in terms of how much stuff we as humans are launching into space. And because I'm an economist, when I saw that picture, I immediately thought of a different picture, which is GDP per capita. From, let's say, over the last 2000 years. So it goes flat from, you know, start at one A.D. until about the 1800s pretty flat. Everybody was pretty darn poor. And then suddenly we as a, as a world, start getting much, much richer as we go through that industrial revolution. And thought, oh, it looks it looks similar. And so I started calling it that. But then, as I've thought about it a little bit more, I think there's a lot of there actually are a lot of very similar parallels. So one of the big things that, if you read about the industrial revolution is there's this shift from sort of bespoke handicraft production of goods,

right to much more mass production. Eventually we get to the assembly line, you know, a century later. But you go from handicraft bespoke to mass production. And something I'll tell you, if you haven't been around the satellite industry recently, is that's exactly what's happening. So I had the opportunity a few weeks ago to visit Southern California and Northern California and visit a lot of these facilities, and you feel like you're just seeing this incredible amount of manufacturing that's happening in the United States, and they're all building these assembly lines because they're recognizing that the demands for activity in space really requires going from what was actually happening in the satellite industry for most of its history, and that is, you'd build, you'd spend maybe a decade building one geostationary satellite that would cost a billion dollars. Again, you'd have a decade to build it. It'd be very bespoke. You'd launch it and stay up there for 20 years. We're now moving to a very different world of a lot more satellites. Typically, they'll be up in space for shorter periods of time, and just you see this shift in mass production. So I think that's a similarity with the Industrial Revolution we're also seeing, and a lot of this leads from that is lowering costs, right? So you see lower launch costs. You also see lower costs to just have satellites. So one satellite doesn't cost a billion dollars, it might cost millions of dollars. Or some people have even said to me, you know, hundreds of 1000s of dollars. And so you see that lowering cost, and I think that's, of course, something else you saw in the industrial revolution, and it all leads to what's really important, and that's mass availability. So we go from having goods and services that were often only available to the wealthiest parts of society are only available, available to certain people that now you get mass availability. So this congressional Internet caucus, and you know, a big concern, and probably a concern for every member of Congress, is, you know, connectivity, and particularly rural connectivity, is a huge one. And so something that we've seen in the last decade, if not less, is availability of Internet becoming much, much more widespread, particularly to rural areas that I'll pick on, Scott because you worked a little on the National Broadband Plan in 2010 but in that plan, you know, you guys failed to foresee the Future, and all of this. And so it's been really exciting for me to say, even 15 years ago, it was hard to even imagine all of the activity that's happening here. So we have this mass availability of Internet connectivity delivered by space, but also, you know, other other goods and services and products, and you're going to, I think, keep seeing them more and more. So I said I go through all that to just say that's the time that we believe we are in at the Space Bureau. And so we want our agenda to reflect that, and we think it necessitates that we must scale regulations to reflect the type of industry we have. So as the industry has gone through this pivot, we're also going to go through the pivot, and that's how we think about what we need to do with the regulations and the frameworks we're adopting at the Space Bureau. So let me briefly go through the big categories of what we're working on. Number one, we are doing a full on reworking of our entire licensing process. So a big part of what the Space Bureau does is folks come and ask us for permission to use the radio frequency spectrum so that they can launch a satellite system, a commercial satellite system, and this process has been far too slow. It's been far too unpredictable. It's required, essentially a Mother-May-I may I, relationship between the space industry and the Space Bureau for decades and decades. And so we are doing a complete re look at that, to. To try to achieve greater speed, greater predictability and greater flexibility. And we actually call it the licensing assembly line. So that's, you know, probably, you know, probably not a just, just a coincidence, but you know, as we're thinking about this transition to, you know, through the space industrial revolution, I think talking about an assembly line and having applications come in and then very predictably and in a timely fashion, move through the process. And so that's really important, because when someone gets a license, they're able to go and start delivering service, whatever service they want to deliver. And so that's sort of our key, key initiative. Happy to talk

in the panel about any of these, specifically more if you want to. Our second one, though, is spectrum. So spectrum is the lifeblood of so many activities. We have proposed in an NPRM last year, 20,000 megahertz of new spectrum available for satellite services. So as there's much greater demand, the Commission again going through the process of the demands from this industry are greater, and so we want to make more spectrum available. We also just in the beginning of March here, and we were planning on having, having consideration of it at the March meeting in a few weeks, we are making available more spectrum for a very specific type of activity, which would be

Jay Schwarz 11:36
more, well, we just call it weird space stuff. So we couldn't, we couldn't think of a great, really nice technical term, so we just started calling it weird space stuff, and it stuck. But it's a lot of these non communications type activities that really are starting to build out the space economy. So you think of the you think of the Amazon LEOs, you think of the Starlinks. Everybody's familiar with that, but there's a lot of other things to service in space. Think of refuelers. Think of tugs, certainly think of human habitable systems. Think of lunar systems. All of those need radio frequency spectrum so they need to come talk to the FCC. That spectrum has been really hard for many of these commercial missions to find. And so that's another example where we're trying to make more spectrum available. Happy to talk more about that, if you like. And then the last, the last thing I would say is we're thinking about this transition and pivot through the space industrial revolution is we really want to make sure the regulations enable new business models, right? So as business models have gone from something pretty standard to now all sorts of great ideas that people have, we wanted to make sure the regulations provide the freedom and flexibility for that. So I'll just give you three, three quickly that we've we've been working on. One is ground station as a service. So I won't go into all the technical details about the rules, but as more and more, particularly smaller companies are wanting to get into space, they need to have ground stations on Earth to connect with and so maybe big, big companies will own their own ground stations. But if you think about really trying to lower the cost of entry into into space, particularly if you're smaller company, what you might want to do is, you might just want to go, essentially be able to rent access to a ground station. And it actually turned out that our rules made this very, very difficult to get authority to do that. And so we put in place some rules that now are, you know, I think, make make the ground station as a service model much more easy, so that there can be companies that run ground stations and then folks that want to come to them and get access to those ground stations can in a pretty streamlined fashion. The second would be direct to the device. So I have emails. This is very exciting. I think I have emails listing people who have actually had their lives saved in the United States because of direct to device capabilities just in the last few years. I mean, and now, like, you see Super Bowl commercials, right? Advertising this stuff. And so it's gone really mainstream. But, yeah, that's, that's, that's a huge one. We've done a number of things. You may be familiar. There's a number of transactions in front of us, which I won't go into specifics about, but really people trying to, again, acquire more spectrum and the opportunity to deliver even better service, so that potentially, anywhere in the world you'll be able to get connectivity on your device. And I think that could be really revolutionary. And then the third business model that I'll give you as an example, before we turn to the panel I mentioned earlier, a whole growing set of. Activities that are that are sort of outside the communications and observation categories, which are very traditional. So these are, these are non traditional. This is what, you know, many of these would would fall in that weird space stuff category. But we wanted to make sure that when they come to the FCC and get a license, it's the rules

make sense for them. So, for instance, if you're operating one, let's say one mission extension vehicle. So this would be a satellite that would go up to a GEO maybe, and extend its life by several years by refueling it, or adding or adding propulsion, or maybe goes up and moves it. Maybe it's a tug that is. That's things people want to do. People are trying to build a business around that. I don't think the rules and criteria should be the same as if you're trying to build the Starlink system, for instance, they're just completely different, right? There's maybe things you need to worry about in that first case and not worry about in the latter case and vice versa. And so we really had a square peg, round hole issue in our rules, where the rules only contemplated kind of the GEOs and the, you know, in these in GSO or low Earth orbit systems, but there's this whole new category of stuff that's happening. And so we've proposed a framework to to do those. So those are just three examples of how we're trying to think about the future, think about what's going to happen as the space Industrial Revolution builds out, and with that, I'm gonna sit down and

Tim Lordan 16:45
get a glass of water. Yeah, Chief, that's great. Thank you. And we'll go to we'll go to you for questions for the chief in just a bit, after we have some conversation. So get your your questions for the chief ready. Thank you for that. We also wanted to have a few you know experts from the industry as well to from different perspectives, to kind of talk about a little fill in you know more from the private sector what's going on. Karina Perez is the director of space and spectrum policy center at CCIA, which is a large Internet trade association. And then also Scott Walston, who's president and senior fellow at the Technology Policy Institute. And Scott is also a senior fellow at the Georgetown Center for Business and Public Policy. So if I can just go to Karina like, you know, for years, people have had, you know, the chief mentioned geostationary Internet. If you drive like into rural areas just a few hours out of the city, you can see people with like, these enormous satellite dishes on their front lawn, right? That are the size of Volkswagens, and they've been able to get kind of Internet for a long time now, right? Why is this so different? I mean, is this science fiction that you could actually get a satellite to beam Internet to your handheld phone? Like, what has changed? And why is this so interesting? And why am I so excited.

Karina Perez 18:01
There's one. There's so many things to be excited about. One of the one of the things that change is technology. Technology has evolved. We're at a point where these satellites can provide this low latency Internet service. Then we also had more launch capability. We the price of launch, as Jay talked about, it decreased, so it allowed more people to launch more and more things up, and now you don't need those big satellite dish. You need something that is maybe the size of a laptop. If you are running an enterprise, you'll need a little bit bigger, but considering the size difference, it's a tremendous upgrade. The other thing is that the Internet is actually fast, so you can stream, you can game, you can do what you would normally want to do in

Karina Perez 18:50
as you do now in your home Internet. So we are seeing this change. We're seeing it evolve. We're seeing it deploy now, and we're seeing now more competition. So I would say it's not science fiction. We're more in the growth stage of we got players in now we're getting competition. Now we're getting more services, and overall, this is going to benefit so many people. I think in America, we have about 40 million people who are still either not connected or lack reliable connectivity. That's about 13% of the

US population who still need access to connectivity. And I'm not saying satellites is going to be the end all be all, but it is part of the it is part of the puzzle to finish connecting everyone and to make sure that there's that economic growth opportunity, that there's that emergency services, and you can even see it now if you have an iPhone, and sorry, I only have iPhone experience with this, but you if you lose service, you can see a little satellite logo on your iPhone that allows you to send emergency texts or emergency communications and.

Karina Perez 20:00
That is in large part due to the constellations that are currently up there, and we will see more and more of that accessibility. So we're seeing a big growth. We're seeing what the economic benefits of that is when, when you now see a community that gets access to the Internet, you see economic development, you see the GDP grow. You see all of this. And now we can do it in a somewhat affordable way, because we're, you know, we're still in the growth stage, but it's getting to the point where you can buy a subscription and have access to the Internet and have access to all the information and education and business development. So it is a very exciting time, and we are, I would say, also in a time where our regulatory partners are moving forward and getting some of those backlogs through and getting the spectrum available, that was one of the big things, is, how do we do this? We need the spectrum. We need we need to make sure we can provide these services, and now we're getting at the point where the all the parts are falling together to really enable this growth and to enable this connectivity.

Tim Lordan 21:08
Well, let me go to Scott. We did a poll. We the outgrowth of this briefing series is called the state of the net conference. And we did a poll for all the attendees coming in, and we asked them how many words were in the Telecom Act of Telecommunications Act of 1996 and we gave them multiple choice, and one of them was 26 words. And about 25% of people said the Telecom Act of 1986 was 26 words. Because all people remember from the telecom after 96 was that section 230 and they think that's the only thing that was in the Telecom Act of 1996 but it was, it was actually about 60,000 words, and those 60,000 words really kind of aimed at producing competition in the telecommunications market, right? Which was like the old like, it's a massive piece of legislation. Congress really wanted competition in the telecommunications sector so that we could have these things and have them at good prices, great innovation. And so I'd ask Scott, like, you work on this stuff a lot. Like, how does, how does what's happening now fit into larger competitive landscape? Where does this LEO based Internet fit in our entire like, how we get our Internet, how we get our video, how we get everything, and what do we see for competition going forward in that several years? Right?

Scott Wallsten 22:21
Well, you know, it's a little known fact that that's also the number of additional lawyers it took to implement

Scott Wallsten 22:28
so but before I answer your question, I just want to say a couple of things. First, a lot of the advances that Jay talked about are just things that he's very humble and doesn't want to brag, but he was just able to do without, without new rules, just figuring out how to make things make sense and eliminate a

lot of the backlog. And that was hugely consequential. So just, he should get some credit for that, I think.

Scott Wallsten 22:52
And then also he mentioned that we didn't know, or we didn't really discuss satellite in the Telecom Act, which means that I have to tell you a story that's unrelated, but it's my very favorite story about something I got wrong. And I wrote a paper on secondary spectrum markets. You can sell, buy and sell, like spectrum licenses and billions of megahertz pops change hands in this way every year. And so I wrote a paper on this with a colleague who I won't name, because he can decide whether he wants to be embarrassed. And so we're describing, you know, how common secondary markets are in the economy. EBay is an entire secondary market, right? And then we had some examples that certain things could never be in secondary markets. Houses, cars never. And, you know, it was only a few months later before Airbnb and Uber were founded. So which is why I'm not a billionaire. Okay, now to the to the questions at hand, the competition, I think there are, sort of, there are two, sorry, let me back up. One more thing, before I go to competition, they have this, what they're called, with the weird space stuff. I believe that what's going to have the biggest economic effects is not necessarily just the increased connectivity. It's this weird space stuff, because there's so many things that you can't we may be able to do in space that we can't even conceive of. Now, you know, that was kind of what the Industrial Revolution brought a whole new advance in all kinds of things, and the ability to start exploring that is huge. I mean, there are pharmaceuticals that people think they can make in space that you can't make anywhere else. And then I guess you toast them on the way down. And that helps too, but it's a big area, and I really hope the phrase weird space stuff sticks, because it's

Jay Schwarz 24:27
awesome. It's on the docket now. So,

Scott Wallsten 24:31
so All right, so competition, the first is how it affects competition of broadband, generally, right? Because usually, at least even with until sometimes even still today, when you read about how much competition people have for broadband, you'll see something like 60. I make up the number, 60% of households have access to two broadband providers, and then they'll usually mean a cable and a fiber sometimes still DSL and. And people sometimes will get into an argument, Oh, what about cell service? How much does that count? And there is a real argument, how much is it a substitute? Or not? We had that argument for a decade at least, and now that's changed, because now the LEO services really do provide an actual competitor to this wireline service, not so much in an urban area. They're not designed to provide service in very, very dense areas, but it suddenly made a real service, fast service available almost everywhere. I mean, there's some places where there's so much tree cover and, you know, you're troll hiding out in a mountain, and you can't get to see the sky. But for the most part, it's got everybody. And I don't want to overstate it, because people do worry about ways that it might be interrupted by types of cloud cover and so on, but it's a huge sea change, and when people still talk about broadband as only those two things that only include wires, they're wrong. They're just wrong. And that has two consequences. The first is that it affects how we think about competition overall, right? Because a lot of our policies are about how much about either promoting competition and broadband like we should, or you know what to do about places where there isn't enough competition, and if you

don't include this service, you're just not thinking about the market properly. And anybody who's ever used Starlink knows that it you can do everything on it. Might also know there's times when you can't. So, yeah, don't want to overstate it. Now, the second part of the of the competition, sorry, this is, this is related. It's how it affects the digital divide. And I was sort of interleaving all of that together, right? Because we've had, we have this whole thing called the Universal Service Fund, which is meant to provide to subsidize telecommunications and now broadband service in areas that don't have the high cost fund. It's the part of that. It's four and a half billion dollars a year, and it came from the days that we introduced competition, from the monopoly AT and T which subsidized used rural urban service to subsidize rural service. And once there was competition, you couldn't do that. You couldn't cross subsidize in that way. So we sort of developed this plan, and that led to this thing called the high cost Fund, which never goes away, it stays the same. And we also now have about 1000 1000 tiny telephone companies that exist only because of the Universal Service Fund, and the universal fund only exists because of them. And you know, this is very controversial, but we don't need them anymore. We need the people there to have service, that's for sure. And we don't even want to just say that they can only have starlight, because that's not right either. But we need to start thinking about ways of we need to completely rethink the way we consider rural service. And if we need subsidies there, and there certainly are places that we do, how do we do it, and what should we be subsidizing? Because we're still working in a 1980s framework, and we need to, we need to change that. Okay, now there's a question of competition within the LEO market. And like everybody thinks of Starlink as the as the LEO it is right now for us, the one service that residences can use. There is another service already operating, called one web, but it's mostly for commercial services. And so, you know, we don't want to rely on only one provider up there, even though they are competing with ones down here. So we want to make sure that that means that entry into that space remains open. And the next one coming up is Amazon's Kuiper service, which they've read, named LEO. So it's Amazon's LEO LEO, as opposed to SpaceX, is LEO Starlink, and so that they actually have satellites up in space. Now, I don't know what their timeline is for offering service, but it's real, and that matters. And then another part of this competition is thinking about the vertical aspect of it, the launch vehicles right this huge hockey stick that Jay is talking about is all because of SpaceX. Almost all of these launches are because SpaceX was able to build usable launchers and just as one launch after another. And it's amazing how much they jumped in front of in front of the existing launch capabilities. But so that means competitors are often relying on their companies are relying on their competitor to launch their products. Now SpaceX, but so far, there's no evidence. Haven't even heard it from one of their competitors that they've tried to foreclose access. It just it doesn't seem like that's ever happened yet. But we want to see more competition in launch vehicles too. And we are, there are now companies that are competing in that in that space, there are also other countries that offer it, and so those are all really exciting, exciting developments. And I'm sorry this is a little bit out of order, but I think it's important, I won't jump back a little bit to the competition and talk about, how about what this means for convergence of. Different types of technology and what you can do with them, and even how you use different spectrum different purposes. So space is still stuck in a very 1960s command and control setup where you have to get permission to do everything. I'm exaggerating about that, but hopefully not for long, right? Yes, and as an economist, we are always saying we really want to see market mechanisms for people to have licenses, so they can trade them, so that you know who has put actually really puts value on them. And market mechanisms. Mechanisms do not necessarily mean auctions. By the way, people automatically put those two together, and auctions, our part, can be used to create a market mechanism, but they're

only part of it. Doesn't have to be the whole thing. And so there's this ongoing, long debate, is this even possible? And there are people who've been working in this area forever who don't like change and say, No, not possible. Can't do it. Nope, no way. And I don't know if you noticed that now SpaceX, Starlink has a deal with T Mobile, and AT&T and Verizon have a deal with AST. Oh, right, that was a company I forgot to mention. And what this means is that Elon Musk just jumped over the whole debate. He realized how to actually get licensed spectrum to use for space, instead of the shared spectrum. And going through the FCC policy just did a deal with T Mobile, and now they're using licensed spectrum basically to communicate with their satellites in space. I don't think people realize how amazing that is. Say what you want about him, and we can say a lot about him. We can, right, but we won't, but that's amazing, and that's going to open up a lot of possibilities here.

Tim Lordan 31:45
So in Korea, was chomping in the bit to say something. So you're saying that rather than going Mother-May-I, may I to the Federal Communications Commission, or maybe to NTIA to get the spectrum to provide that service, they went to T Mobile and used that spectrum to make that possible.

Scott Wallsten 32:00
Yeah, he just bulldozed his way through it. Yeah, like he does created.

Jay Schwarz 32:04
We do have to review some of those things, but your point, your point is completely accurate that they were able to look to the secondary markets rather than just coming to the government and having us

Karina Perez 32:18
figure it out. We will need a bit of a balance. We will need a bit of a balance there to make sure that we can still because there's what's called the supplemental service from space, which is what we're talking about, and then direct service. So we'll need to make sure we have both spectrums available. But it is true that we did see that change in how it happened. The one thing I just wanted to add a flag on the launch market is we are seeing more vehicles trying to come into into service, and we are also, as congressional staffers here, you have an opportunity to help with ensuring that there is an infrastructure to launch all those vehicles, such as doing a little plug for ourselves here, but we we put out a couple of one pagers here on launch and some of the recommendations that we have because they we are now getting to the point where we're getting the spectrum, we're getting the licenses we need to launch them. So how do we get to that point? And how to not just these LEO satellites, but all these weird space stuff that we're trying to do? How do we achieve that, and how do we make sure that we maintain competitiveness? So we have a couple recommendations for you guys to look at, including that it always comes down to investment, right? But investment on infrastructure and communications and coordination of all these launches and making sure that we can get all of our LEOs and GEOs and weird space stuff ready to go

Tim Lordan 33:46
when on Teledesic, I mentioned Teledesic, which was the 1995 venture, failed spectacularly. I was crushed. And people like, well, you just don't understand, like that. The launch technology is not there. We can't build the satellites. They're just too big and too expensive, etc. And the big thing is that there

are like alphabet soup of regulatory agencies that will crush this idea. We've solved the first two, but there's still like an alphabet soup of regulatory agencies. The FCC is just one of them. Can we maybe talk a little bit about what agencies need to be involved here? Because Congress oversees all of those agencies, and then also, what what role does Congress have to play in this?

Jay Schwarz 34:23
Yeah, sure. So there's a number of players, as you said, if we're just talking about the spectrum that you know we are providing the licenses for. We do it for the commercial spectrum. There's also NTIA that handles the federal spectrum, and so we we coordinate with them to make sure, for instance, that our licensees who are using shared bands are coordinated with all of the the Federal Interests. So you have that on Spectrum depending on what you want to do. If you want to do some earth observation, you probably need to go. You do need to go get a license from NOAA, also FAA for the launch piece, and there's that as well. So I'm probably missing, you know, depending on what you do, state might be involved. So it is very much a, you know, a sort of all of government could potentially have involvement, including, related to NOAA, but the Office of Space commerce, who there was an executive order that from August, I believe, that called on them to put together a mission authorization framework. And so that that would be another example of a work stream that that, I mean, I can let them talk, talk at some point about exactly what they're doing there, but yeah, there's a lot of cooks in the kitchen. I do think there's also a desire right now for everybody to, I think other folks recognize the important period that we're in, and so sort of a mandate from from on high to figure out how we can streamline everything.

Tim Lordan 36:05
Karina Scott, you feel like you know the agencies are coming in line, or what else would really be great to be done?

Karina Perez 36:11
Yeah, I think there's been, As Jay mentioned, with Office of Space commerce and with all the activities that FCC has been doing, more discussion on inter agency coordination that needs to happen. As you said, there's so many players that come in, including the Department of War, who, depending on your launch and what you're doing, you might have to check in with them. And you, you have all these players. And so I think we're, we're slowly but surely getting to a point where the interagency process can be faster and get the launch approve. As Jay said, you have to get your you have to get multiple licenses. The FAA has to approve your launch. They have to approve your payload safety. Then you have to get the FCC license if you're doing remote sensing. Then you have to go talk to OSC to get your some of those debris coordination there is just quite a bit, because space is complicated, as you were talking about 30 years ago saying, This is too, too complicated. We're not going to get there, but we are getting to the point where we're we're moving forward, and I think we are seeing movement happening. And within Congress, you know, you have the opportunity to to help move out those, those, especially the coordination,

Tim Lordan 37:25
yeah, besides oversight of all those different agencies, and maybe, if Congress has oversight, which they do, and then urging, you know, cooperation between agencies, what else can Congress do?

There's a sad act that's s a t act that's up here, like, can you explain a little bit what the role of Congress is and why? Congress is

Karina Perez 37:44
in a little more depth? Not me? Yeah. So one of the things that I think was very complimentary to the NPRM that's currently out the space modernization was the such streamlining Act, which included some shock logs that could provide some certainty to industry on where their application is, how they when they expect to hear back. And I think I will go back and give credit to Jay has improved, and his team have improved some of those things, of like, knowing where your application is, but this was a very complimentary thing to the NPRM and getting that done, in Congress has the power to say, Okay, we pass it now. Go, go get it done. Go do this. The other thing is back to spectrum allocations, making sure that we're talking to NTIA and finding additional spectrum. They already have some of that mandate, but as we continue to have more and more space applications, we'll need more spectrum available so NTIA also can have that mandate to go find

Scott Wallsten 38:46
I'm a little more skeptical about whether the process is working better or not. I don't know anything specifically, but I will believe something when we see action, an actual something, not just people talking, because that's what interagency groups do is they talk. And if you've had any experience with trying to think about how we want to move spectrum from the federal sector, particularly Department of Defense, to commercial sector, NTIA has engaged with these agencies and talk for decades, and it took forever for anything to happen. And still, it's even small. So just because they're talking doesn't mean anything, but sorry, it doesn't necessarily mean anything. And also people come to seem to be coming to the table with the belief that this is the way things are done that has to involve 8 million agencies, and so therefore that's what we're going to do. And I worry that maybe we're further institutionalizing the way that it's always been done, rather than trying to think about ways that it should be done. Who doesn't need to be involved? Why? You know? Why do certain things happen? How do we really deal with the international issue? Because you do have to coordinate. But the ITU usually wants to Shut, shut new entrants, down and but you've got all these people. To go to the meetings, and it's right, there's a whole network of institutions that make progress in this area very difficult.

Tim Lordan 40:10
And maybe we can preview, like a lot of these issues are worked out in the World Radio Conference, and next year 2027 is in China. Maybe what issues might pop up there, and maybe what we should be thinking about with regards to the World Radio Conference in 2027

Scott Wallsten 40:26
well, so people are obviously talking about this a lot, and I think we're the US is sort of inherently at a disadvantage in these kinds of settings, because you're supposed to come in with a country position, and that's not the way we work. We don't have a country position on things. Think about how many interests there are just in this little area. And everybody thinks that the thing that they want is the best for the country. And you know, they're not lying. That's what they think. It's what they believe. And so we have to come up with something coherent. Whereas China comes in, and obviously there are million lots of different interests in China too, but it's certainly easier for them to do X, so it's inherently

harder for us to prepare. And from what I understand, we're pretty far behind the FCC was not able to reach consensus on certain recommendations. It's going to be it's going to be difficult, and it's in China, which makes it difficult for the US. And, I, you know, I don't know. You probably know more, but maybe you can't say,

Jay Schwarz 41:24
look, 80% of the agenda items at work this year are our space related. So it is very important.

Tim Lordan 41:33
Yeah, the only thing I could say, like, we, you know, the reason why I'm an appropriate moderator, because we don't have any positions on any of this stuff. We're pretty agnostic organization, but I just would like to share with Congress my enthusiasm for where we are at this point in history. It's insane to me that the Space Bureau wasn't created until 2023 which seems nuts, like really late, right? And the fact that satellite, like LEO satellite connectivity, wasn't included in the first bead proceeding, which seems nuts to me too. I'm going to go to questions. I do have a I did promise I would ask a question about data centers in space, because you can't have a conversation about anything without talking about data centers these days. But I'll go to questions. And for anybody in the audience that would like to ask one any questions, but I have a few my own right here, sir, if you could just identify yourself, it'd be great.

Scott Wallsten 42:22
I mean, I guess it depends what you mean by expand it, because I mean you're from SpaceX, so you know that most of them have access now, then, then, I guess the question is, in very, very poor areas, how do you how do you deal with access versus adoption? Right? Because the dish called the square thing, a dish is still a few $100 and the service is more, tends to be more than wireline service. And for you know, most people, that's not a big deal, but for a very poor tribal area, people there, it might be. So I think, you know, we should be focusing on low income services more than the rural areas.

Karina Perez 43:20
Specifically, I'll add there was a I don't of the top of my head remember the name of the bill, but a farm bill that did include some language and being able to provide satellite connectivity and some grants and funds to be able to to reach those those areas.

Tim Lordan 43:37
Sir, in the back,

Speaker 2 43:40
saying that because I'm project Rios from the brokers office first. Thank you so much for presentation with you all doing migration and access a little bit in the room. But there was over 2024, 2873 launches was made in the handout. What are we going to sort of address? Sort of address space debris satellites are allocated, and impact of the environment in space strategy?

Jay Schwarz 44:13

Sure, I'll, I'll maybe start since, since 2004 I believe the FCC has actually had rules related to those issues, and those are currently in our in our rules, our proposal that we have continues to retain those and those would be on things like orbital debris. You know? We think that there's a an interest in making sure, for instance, that communication satellites don't collide into each other, or other objects collide into them, and then you have a down network. You know. I think it's kind of in the sense. Way that you know you want to have a bunch of cars on the street, because cars provide beneficial things to society, right to to go, move around. I think having satellites and space activity is fundamentally beneficial thing. We've been having this whole conversation about all the things that you can do with it. And so I think that really goes to the question of, how do we do that safely? You know, in the same way that we have rules of the road for cars, you know, put on your blinker, we have speed limits and all those sorts of things, I think there's an analog to that. And there, there are government wide guidelines that that are already enforced. The FCC has has rules that we review for each of our our licensees and and then we're actually proposing, as part of this modern day modernization effort, which is what we call it modernization, we're proposing to have our licensees use space situational awareness systems, and so these are essentially systems that help everybody know where everybody else is and identify if there's conjunction warnings so forth. And there's a number of folks in government working on different facets of this problem. So we're certainly not the only piece of that. But to your question of, you know, that's one area that I see a lot of opportunity for movement. And we're, we're trying to do our part to say, hey, a reasonable expectation is that our licensees, you know, provide their, their, it's called ephemeris data, provide their ephemeris data into these SSA systems, and then, if you get a conjunction warning to maneuver you, you take reasonable steps say, you know. So I think this is going to be something that, as the industry becomes more and more active over time, it's going to build up, and we're going to figure out, you know what to do, and what you know what, who's the right place in government to do it. But you know, that's certainly something that I think is on is on top of mind for everybody working in the industry.

Scott Wallsten 47:05
Can I? Can I say why this issue confuses me and why I don't really know how to think about it? So, okay, so space is big, right? So think about the circumference of the planet, right? And so then for the satellites you're going out, and the circumference is expanding that much more. And you have a whole other dimension, because you've got up and down to places that things can be. Now, if you when people, somebody says there are a million things in low Earth orbit, that sounds like big number, but there are a lot more than a million things on the planet, right? And so you know, what is the number which we care about. On the other hand, the things on the planet aren't zipping around at 50,000 miles an hour. So when people give these numbers, they're not actually providing us enough information to know how to think about it. I assume they give you so look, I mean,

Tim Lordan 47:49
I tried to, I tried to do the back

Jay Schwarz 47:52
of the envelope. I don't think I've ever talked about this publicly. I hope my math was right. No, I took your number a million. I believe, you know, depends on exact coincidence. No, because that's, that's kind of a standard number. There's, there's a million object of Not, not a million satellites, but objects

out there. And I was, I had the same question, and, and it obviously depends on exactly what altitude above the earth you do. But to an approximation, there's 250 million square miles around the sphere, right? The globe. So then I wanted to put that in the context of where I live. I think it boiled down to there would be two of these objects over my county. So I live in a county in Virginia. So just to give you a sense for you, know, pretty big county takes, takes 45 minutes to drive across it, and you'd have two objects now. So that helped me with, kind of getting my head around, you know, the size of the problem. But I think we also, you know, if in 1920 to go back to the auto analogy, in 1920 you know, people might have said, Oh, man, look at all these cars. Like, look at all those cars out there. But now we have, like, I don't know, 500x the number of cars. And so I think we still want to make sure that we are thinking about, I call it, expanding the capacity for more space activity. You know, what are the systems need in place? I think we want to balance that with not over regulating too early and choking anything off. But I do think we want to be asking, how do we have more of what we think are net beneficial activities?

Karina Perez 49:29
I'll also add, I think, as we're considering this, and as we're looking at this, there's movement, there's the five year rule for de orbiting. There is the Office of Space commerce looking at their tracks program, which is looking at space situational awareness. Situational Awareness. There is ongoing work on industry standards, because, as you said, we don't also want to regulate it a little too early. Where the technology is developing, it's evolving, and we might find a solution that's better than what we have right now. So there's, there's this ongoing thing, and. And I'll Lastly, talk about the fact that the companies are investing, God knows how many millions of dollars into these technologies. It is in in the interest not just of them, but the other companies, is maintaining access to space. And I think when, when I talk to our companies, that is one of the things that we want to work towards is making sure that as we develop and we throw all of these things into space, that we continue that access it's also part of how we approach this. This topic is, how do we have the technologies that can move the satellites up and down in orbits? And this gets very technical, so I'm not going to board you, but think of it. If we're talking about the streets, how do you move from one lane to another so you don't hit someone? How do you do all this dynamic things? And there is a lot of ongoing technical work, and I think we have to continue these conversations and continue the discussion, especially with our regulator, on how to when is the right time. When are we doing these things and how, also, some of the other things that are going on in government coordinate on that. So actually,

Scott Wallsten 51:07
first of all, this is why he's great as a bureau chief, because I like people who think about this, and they, you know, try to actually calculate these numbers, but I think, but you're also saying, I think that the immediate problem isn't as great as people think it is. Say it is necessarily because lots of incumbents who are already up in the sky use the idea of space sustainability to say that we have to limit launches so that protects their own industry. But at the same time, we want to make sure that can continue to develop, so that things go forward. I mean, it's, I think it's sort of a nuanced conclusion.

Jay Schwarz 51:41
Yeah, we talk a lot at Space Bureau about two different mindsets. One would be an abundance mindset versus a degrowth mindset. And I think it comes down to that. So setting aside the question of now

exactly where we are. We are, we are trying to have that abundance mindset of saying, look, there's a lot of great stuff that you can do with these activities. How can we figure out ways to enable that? Because I do think the alternative, it's hard to it's hard for there to sort of be a vacuum and just say, Okay, we're just not gonna do anything like I think the alternative is often a degrowth approach, which is people start saying, Oh, well, we just need to, we know the answer is that this is too much and we're gonna cap it. And it puts you in that mindset of of just saying no, rather than saying, let's, let's figure out if there is a problem, and then how to work through the problem.

Tim Lordan 52:46
I we noted earlier that there are about, you know, seven or 10 or 20 different agencies, government agencies that we could have had on the panel in addition to Chief Schwarz, right? But there would have been a massive panel, and nobody wants to hear that. And then also, it's worth noting that, you know, as far as, like, some myths and some misperceptions about certain things, like including what what is like a million objects around the globe mean it isn't what you think it sounds like when you first hear it. There's a lot of organizations that we could have also had on the panel. In addition to Scott and karina's organizations, there's also quite a bit of bipartisanship on the goals competition. As I said, the goal of the Telecom Act from 96 was like, everybody agrees that competition, the communication space is amazing. Everybody loves it better services, more innovation, cheaper prices, and we also, there's so many, so much, and then also equity, right access to everybody that doesn't have Internet would get it. Everybody agrees, in a bipartisan way, that that's absolutely important, and these two things are driving towards those two really huge public policy goals. We could also it included, there's a report, there's a LEO policy working group. It's the international center for law and economics and new America, two really disparate organizations when it comes to the ideological spectrum, but they worked on this report, and they are, it's very, very like positive about where this is all going. So there's a lot of bipartisanship. And I, I think that's really important to note that in the there's a lot of polarization about some of the players and some of the things that are involved. But there's a lot there. It really belies the bipartisan enthusiasm for the goals of what's happening here. I promise you could get one more, one question in before I indulge my question about data center. Setback,

Speaker 3 54:42
stop, Washington, DC, a whole bunch of other stuff. My question is a little bit different off of that LEO fells in urban areas and in some rural areas when it's clustered together, you detected. The limitation with multipath and other things like that. Jake talked about man's there. My general question is, at a time in the mid 2000s there was a concept of fiber wireless technology in order to extend the Internet into other areas. We are currently working, I'm working in Berryville, because wheel fells in Berryville, you get eight people on the block, okay? We want to be able to expand the same thing in the urban community as in those areas, like creating those type of lands and making satellite more like the middle mile. Is there, is there? Is there any plans in the future among the space commission to allow us to be able to execute that dealing with the spectrum that would be involved in making that happen, you should check out your like Bridgeway, which does 10 gigabytes terrestrial wireless point to point?

Jay Schwarz 56:02
Yeah. So look, it's going to depend on the specifics, but I don't think there's any fundamental barrier in the way, even even right now for those sorts of models. I think one of the things we want to do is we

want to generally allow people the freedom to do anything that that is within the bounds of our rules and the statute and so forth and and then they'll figure out how to design their network, right? So like, you know, in wireless, we the FCC used to specify exactly how you had to design your network, and they want to know where all your towers were. And now we've moved to something extremely flexible, because the FCC realized they don't need to, need to do that, and so we want to try as much as possible to take the same view when it comes to satellite. And obviously there's you got to make sure that the interference issues with the spectrum are dealt with and so forth. But I you know those sorts of models seem like they could be certainly possible in the United States. And actually, I think those models also could be very feasible and maybe even make more sense in some other lower income countries, by the way, too, where you might have like to the rooftop of a school and then go out where there, where you're not going to have every house be able to afford, like a user terminal, for instance. So I'm excited to see, you know, those models, either in the US or here, but I don't, I don't think there's, there's not like a fundamental barrier. It would just depend on the specifics of the what the license is able to do.

Tim Lordan 57:37
And let indulge me, we had met like recently people started talking about because data centers use a tremendous amount of energy. And people talk about like, maybe we can have data centers in space. And at first everybody laughed, right? But as Isaac Asimov always used to say, the future happens 10 years after everybody stops laughing, right? And with regard to data centers in space, I guess you have uninterrupted solar and unlimited power. What is it? Is that? Is that Isaac Asimov, science fiction stuff? Or is that possible? Is that something real to solve some of our data, but putting, putting the AI compute up in, up in orbit? Look,

Jay Schwarz 58:21
I often say I am just a Washington paper pusher, and if I was able to figure out how to do all these things, then I would be doing something else and be a billionaire, right? But I want to make sure that people have the opportunity to try and experiment and innovate, to use one more historical analogy, you know, look, I call it the space Industrial Revolution. I think we all probably also recognize we're actually in the AI Industrial Revolution. And one of the things that is clearly going on is just a massive amount of infrastructure that needs to be built, and is being built right data data centers and the connectivity and so forth and so. Something you're seeing, and I'm not going to speak to any specific requests in front of us, because we have several for data centers from space, we have several for other data center adjacent applications. But it does seem like there's a massive amount of infrastructure that needs to be built as a society to support the AI revolution. And it's no surprise that some people might want to do that in space. And again, our general concept of abundance, I would, you know, I make the abundance argument when we're down on Earth, and ways we can, we can make that, that enable that. And I would say the same would be true of what we're trying to do in space.

Karina Perez 59:50
I can add that, at least from the industry side, you have seen investment from multiple companies. SJ, you know they have the license application so they they know that they. Serious investment, and we've started to, as CCIA, started to look and and really consider what it means to have data centers and spaces. Okay, you get the technology there, and then this is the fun part for the people in the in this

room, is, how do you what applies to them? Just the same rules as data centers on Earth apply to them? How do we, who here gets to license, regulate and do all of these things. So I think it is an exciting time. And just in general, for applications for space, you have, we talked about a lot of data, the amount of data that is produced from space. If we can, you know, have a smaller, smaller data set coming down, then the raw data would be would be helpful. But I think as we're seeing the technology develop and everything from a policy person, is an exciting time to think about what it actually means, and what us and people in this room can can do for to enable to enable it, and to figure out how it actually will work.

Scott Wallsten 1:01:00
I think Jay's point is right, that if somebody wants to try it, they should be able to try it, and if it turns out not to work, that doesn't mean it wasn't worth trying. A lot of things aren't going to work, but they should, they

Tim Lordan 1:01:12
should be able to Well, thanks for indulging me to come full circle. I'm super excited. I am super excited about everything, and I want to thank the chief for coming and speaking with us, and Scott and Karina, I really appreciate and thank you all for for coming. We'll live stream this. We've live streamed this, and we'll, we'll send out the video and the transcript afterwards. So thanks everybody for coming, and thank you the Congressional Internet Caucus.