

Speaker 1:

Hello. Good afternoon. And welcome on behalf of the satellite safety Alliance and the American geophysical union. I want to thank you for taking the time to join us today. I'm Ellen Satterwhite and I helped to organize the satellite safety Alliance. So some of you may have gotten a lot of emails from me it's 20, 21 happy new year, which I think we can still say I'm going to stay at all the way probably to June happy president's day, happy recess. For very many of you. I have the pleasure of working with a number of companies and organizations that I think represent the best in American innovation and ingenuity. And I'm excited about what a lot of these companies are doing here in the satellite ecosphere. So just for some context, the us satellite industry, which is made up of private companies generates over \$110 billion in revenue per year, which directly supports over 200,000 jobs.

Speaker 1:

And though it's not the topic of this briefing, we're definitely in the midst of a space age, 2.0, that's billions of dollars. More to be invested in satellites services and manufacturing in this sector. The GPS part of this sector has contributed over \$1.4 trillion directly to the U S economy. Over the years, it has supported the creation of millions of jobs and the birth of countless new and innovative businesses. And GPS also provides critically safety services for the aviation sector and for the public satellites also make real time weather data possible. As we'll talk about later, this function is crucial to warn Americans about approaching hurricanes and tornadoes and to monitor floods and title server surges. So it's fair to say that healthy satellite comes GPS services and weather data monitoring are critical to the functioning of our economy from agriculture to supply chain logistics, to emergency preparedness to something seemingly simple as the delivery of groceries to those of us in quarantine.

Speaker 2:

And all of this depends on our airwaves

Speaker 1:

As a former FCC employee, myself and a keen observer of spectrum policy, which I don't think you hear too often, but probably this group you'll hear it a lot. I'm always hurting by the bipartisanship in this area. So the desire to protect critical infrastructure, consumer services and public safety is almost always a shared public policy goal. And everybody's usually very collegial

Speaker 2:

About it, but an order

Speaker 1:

From the sec last April involving a speculative venture known

Speaker 2:

As legato could put crucial

Speaker 1:

Services from satellite companies and from this industry in jeopardy. So today we have some very distinguished guests who I will ask to unmute themselves and, and show themselves via their video right now. So we can get all settled. We have these very distinguished guests assembled who are going to

guide us through in substantive detail, the very real concerns they have about this legato order. There'll be talking about what happened since our last briefing. I think many of you joined us in October of 2020, and some of those big changes include an election change in leadership at the federal communications commission and a change in leadership at the, at the top of the presidency, there was also the passage of the national defense authorization act, which included some provisions pertaining to legato. So let me introduce you to our panel of experts. And then we'll just jump right in.

Speaker 1:

I'll ask them to tell us a little bit more about themselves as they answer their first question so we can get right to the meat. But first I'd like to introduce Dr. Susan Avery, who's a distinguished atmospheric scientist and professor emerita at the university of Colorado. She's also president and Maritza at the woods hole oceanographic institution. I'm also joined by Jay David Grossman. Who's executive director of the GPS innovation Alliance, captain Steve Jen Gellis. Who's a Delta airlines pilot and the aviation safety chairman for the airline pilots association. And last but not least Rob McDowell, former FCC commissioner and current partner at Cooley LLP. So welcome panel. Great to have you very excited. I'm going to start first with Rob, just, you know, you get the hot seat. So I've done a very little bit to set the scene, but I'm wondering if you can give us, you know, in 20 seconds or less, you have a little bit more time, the 20 year history of this issue and just a few minutes. So why are we here?

Speaker 3:

That's a lot to cover as well. I'll try to be little Catherine data here. So first of all, thank you for having me. Second of all, full disclosure, I represent radium communications and that is a great American satellite communications company. A couple of years ago, they launched a new constellation of satellites valued at over \$3 billion and offer all sorts of services. They operate in the L van. So we're gonna hear a lot about the L band. That's the spectrum neighborhood, where there's also GPS and there's a personal of land if you will, for Noah as well. But radium offers critical services in the cockpits of every commercial airliner, essentially, and a lot of private airplanes and jets air to ground communications, data, emergency tracking, position reporting. They help scientists with weather data and just general crew, crucial airline and aviation communications overall also provides a backup service for GPS.

Speaker 3:

So when we talked about this, a debate in the all band, there's the GPS part of the neighborhood. We're just down the street from radium and there's a radium down the block as well. So real quick. So you understand the 20 year history and I'll try to do this just a few seconds, a little bit of spectrum one Oh one for folks who might be watching her and new to this issue, spectrum policy for about 87 years at the federal communications commission has been a lot like real estate or land use policy use zone. Like with like you have certain frequencies that are better suited either for physics purposes or other purposes, they're better suited for certain purposes. So the L band has always been so a satellite band and that's because you need a very quiet neighborhood and the L band, the satellite band, you need to be able to hear mirror whispers from satellites and space, those whispers to and from earth, but especially coming from space down to her foot both ways. So

Speaker 4:

In 2001, there was a satellite company

Speaker 3:

Called MSV and we've seen MSV become sky Tara sky Tara became light squared, light squared became the new light squared after merge from one of the many bankruptcies this company has had. And then after that, it named itself legato. So the track record, it goes back about 20 years and it has been trying for many years to convert small parcels of land, little, lots of land in the L band to terrestrial uses. So that's on earth usage and that's been a novel concept. The FCC made a big mistake when I was there and it was not a commissioner vote. So I did not vote on it, but a Bureau action in terms of allowing the light squared application to begin with in about 2010. And of course, as Ellen pointed out, there was the order of the 2020 last April, along the way, without confusing the too much detail happening to get into more detail folks want later in QA, you've had a Congress in the executive branch multiple times intervene to say, look, what's going on at the FCC with this, what is now called legato proceeding, or the petition is likely to cause harmful interference.

Speaker 3:

And this is a bad idea and you need to stop this or change things. So we're, we're here today. And I know we'll probably talk a little bit later about the NDA and things that have changed, but that is sort of the quick summary of what has happened in the past 20 years. So what the FCC essentially did, and we'll drill down more on this slide in a minute, is up into zone rule as well as its own precedent in terms of,

Speaker 5:

We'll talk more about that.

Speaker 1:

Thank you. I'm, you know, you did 20 years and FCC history in a small amount of time. So I appreciate that. I appreciate that. And folks, if you do have questions use, please use the Q and a function in zoom. I think we've done enough of these. Now use the Q and a function and I'll get to them as we move along, but I'd like to turn to the captain and we've heard policy. I would love to hear you talk a little bit about the airline pilots association history with this issue and, and why you all are in

Speaker 5:

Well, Ellen, thank you. And thank you for the invitation. And, and I, you know, we have been opposed the airline pilots association has been opposed to all these iterations that Mr. McDowell spoke of earlier, all these different names and as they resurface because the names have changed, but really the impacts to aviation and to other industries has not, there's not a lot of satisfaction with remedies to make sure that aviation stays safe. And that's our key. Our motto at the airline pilots association is schedule is safety. And we are the largest pilots union association in the world. We represent 59,000 pilots at 35 different airlines in both the U S and Canada, along with our partner airlines at overseas, there's 110 units that we're collaborating with overseas that we're working with now, people, you know, wonder, well, what is a union have to say about that?

Speaker 5:

And we're also the largest non-governmental safety association. We have a number of pilot lawyers, pilot doctors, pilot chemists, a number of professional volunteers in our safety organization that I oversee. We're 430 volunteer pilots strong. And basically we weigh in. And when we see an issue that maybe in affecting safety, and we've done that over the years, in fact, it's been told to us that we are the

conscience of the industry, because it's not based on money. It's not based on income to the inner, to an airline where we're worried about safety. So some of the issues that come up, which we could get into later, it impedes our communications when we use satellite radios, which is a tremendous improvement over the many years that we were using basically a or radio from world war two. And I'm not exaggerating that where we were bouncing radio waves off of the ionosphere and clouds, and it was always scratchy.

Speaker 5:

And, you know, you, you, you could turn on one of those black and white movies from the forties, and we're still using those same radios up until about five to 10 years ago. So, you know, the communications have improved greatly, and it's been by a lot of work by a number of vendors to install these radios on board. And we're fearing that our communications now will be impeded, but if not worse than what we had before by some of these radio installations, also positioning of our aircraft, our locations being pinpointed with GPS have, would be effected in a number of situations, close to a radio transmitter by legato. And, you know, we are not the scientific agency. We trust others to provide that data, but we're very data driven. When we come up with a, with an argument we've seen defined pointed data that shows that if you're close to a receiver that a legato may transfer a transfer over, it may create some interference and work with helicopters, or excuse me, with aviation entities that may be operating downloads.

Speaker 5:

And that includes drones helicopters, as well as the airliners that I fly. We are not as affected because we don't spend a lot of time close to the ground because if we did, it would probably be a little bit more scary and the public wouldn't go with us. So we try to get up very high and very quickly to get out of the away from Terrafirma. But the carriers and operators that do helicopter operators, medivac, those folks that do pipeline inspections with helicopters, they are going to be most effected by this, but we're, we're carrying their, their, you know, their concerns forward as well. So this is very, this is a very troubling to us. We are going to speak up when we see a safety hazard, and this is, this is one of those. So we're glad to be a part of this advocacy effort.

Speaker 6:

Thank you. Thanks for outlining the participation. I think we'll get into the specifics of how, how receivers and, and interference could work, but I'd like to go to Susan to, to weather data, you know, satellite communications and aviation safety and GPS are, are all in this neighborhood. Also these weather data satellites. And could you talk a little bit about the water and weather community and your interests here? Sure. Sorry. It took me a while to get that un-muted there. Yes. I mean, if you look at the legato proposals, there's kind of two areas that, that impacted the first is the area of the sensors on a GPS radio occultation will be called GPS radio occultation. And basically what these measurements do is they provide really accurate temperature measurements in the upper troposphere and lower stratosphere. And this really, really has improved our weather forecast or hurricane forecast.

Speaker 6:

They've given us longer lead times on our hurricane forecast have been able for us to forecast better heavy precipitation events and increased our data over the ocean. All of these things that come into making a really good weather forecast and alerting you to weather events, major weather events. These are another proposal in the, the data puzzle, which hasn't been approved yet, which, which really is

worrisome. And that is the L band between 1675 and 1688 megahertz. This is where Noah's geostationary weather satellites operate the NGOs enterprise. And that particular part of the spectrum is basically used worldwide for me, your logical satellite space to earth links. So we are linking things back and forth from space to earth. And so ground-based sensors play a really key role in get a ghost data collection systems. And so getting those data from those ground-based sensors, such as string gauge data or tide gauge data or a cargo ship data, all of these things basically link up into the, through the NGOs satellite environment and S and that's basically used for alerted alerting us.

Speaker 6:

It basically provides dissemination of imagery that are nightly news gives you a whether or not internet page gives you a satellite data in motion that you see on your TV screen at night. Can you imagine not having that? All of this communication relies on the gold satellite communication, like, which is really, really in that band of 1675 to 1680 megahertz, sharing that with a noisy terrestrial signals that legato would, would result in harmful interference and basically impact our real-time weather and water information that we get to provide and alert people around the, in our country and, and practically into the entire Western hemisphere. So that's sort of a, a brief look at that. It's a serious issue, a very serious issue.

Speaker 1:

Yeah. And I appreciate that. I've only given everybody just snippets of time so far. I will continue with that broad mandate. David, I'm going to turn to you and we could spend hours talking about GPS, but I, as the head of the GPS innovation Alliance, can you talk to us about why GPS is so important to how embedded in our lives it is and, and your interest in this issue? Ellen, Ellen, thank you so much for having me into the satellites safety

Speaker 7:

Alliance and AGU for organizing today's briefing. For those who may not be familiar with the GPS innovation Alliance, we are a Washington DC based trade organization founded eight years ago with a mission to promote, protect and enhance GPS. Our members and affiliates come from a wide variety of fields in businesses, reliant on GPS from precision agriculture and construction to consumer products and aviation. I do need to make an important disclaimer before answering that question, which is with respect to today's discussion about legato networks. My remarks do not represent the views of Garmin international and Deere and company, except to the extent they address the one DB standard for assessing a potential interference. And in the case of Garmin, the protection of certified aviation. So with that being said to answer your question, GPS really is an American innovation story started and developed by the United States air force.

Speaker 7:

And you said this statistic in your opening remarks, it's grown to represent 1.4 trillion and economic impact for the U S economy. And the vast majority of that has occurred in the last decade. And in fact, today in the U S alone, there are an estimated 900 million GPS receivers and billions more worldwide. And we've heard some of those industries that use GPS, including weather forecasting and aviation, but it is so much broader than that. I mean, we, we all think perhaps that first time we had a portable GPS navigation unit in our vehicles that provided turn by turn navigation. And of course now our smartphones have GPS built into it. And that has unlocked a slew of, of mobile based applications from those that provide turn by turn navigation to ride share services. But it really is so much bigger than

that. Of course, GPS is used throughout the military in a variety of applications it's used in the public safety community when it comes to nine 11 response and being able to locate a nine 11 caller.

Speaker 7:

It's also used in search and rescue rescue missions in other emergency response, as well as sectors. Like I mentioned, construction agriculture, and then nearly every critical infrastructure sector. And this is, I will make the point now and we can come back to it because this is something that I think a lot of people don't realize that GPS, which is a of position navigation and timing, PNT, that timing aspect is used in a lot of critical infrastructure applications. I like the electric grid, like our financial networks and as well as communications networks. And that last point I will get back to it because it really is critical in terms of how GPS is used in cell, a cell tower base stations and how they communicate with each other. So I think I'll, I'll pause there, but I think that that offers a, a good opener to how critical GPS is and why it's so important to protect and, and, and certainly continue to enhance the technology.

Speaker 1:

David, thank you. And I don't want to step on your, your toes, anything you might be saying later on, but it is true, right? That GPS is actually pretty integral to 5g services and experiences and all of these sort of immersive activities that we talk about that, that GPS and that timing aspect is, is kind of crucial to that experience for consumers, right?

Speaker 7:

It absolutely is. And this is not, not something that's new to 5g. It's been a staple of previous generations of networks, 3g and 4g that the timing allows the synchronization of these cell tower base stations. But now as we're entering into a 5g environment, the importance of having highly reliable and accurate timing from GPS grows even more important. And what that means from a consumer standpoint for 5g is faster speeds, low and lower latency. So from a communications network standpoint, it is very important that GPS be reliable and continuously available.

Speaker 1:

It, you know, when, while we're talking about 5g, I wonder if we could bring Rob into this discussion a little bit, because something I see repeated quite often, at least for as, as some sort of backup for the FCCS grant of LaGoddess petition in April, is this idea that maybe it has something to do with 5g. And I think those of us that watch this area pretty closely are left scratching our heads a little bit. And I wonder, Rob, if you would, could weigh in, are we talking about 5g with, with this piece of spectrum that legato has?

Speaker 3:

Well, the guidelines really says so, and it's predecessor relates where it is certainly such. So here's some specific, here's some fundamental problems with that. There's all it is a speculative play. They just it's important for folks to understand that just refinance their debt and junk junk bond status race 16% have got \$175 million leftover and they have about 35 megahertz worth of spectrum. And if you look at the major carriers like at and T Verizon T-Mobile, they have between 117 megahertz and over 300 for a nationwide 5g network. So it would be next to impossible to have a nationwide 5g network with only 35 megahertz worth of spectrum to begin with. And only as \$175 million to, to build it out. Right? So we're splitting at the current C-band auction at the FCC for 5g, and it's already over \$80 billion system in the value of the spectrum.

Speaker 3:

The spin there let alone the 300 billion that will be needed to 5g. Okay? So it's not 5g for a variety of reasons. First of all, the spectrum block size is the size of the lot. The land is a 10 megahertz in size. These are central 10 megahertz islands that are spaced far apart with 5g engineers. Spectrum engineers really want to have large contiguous blocks of spectrum, sometimes a hundred megahertz wide, and they should be closer to them. And that's not the case here and keep in mind again, it's only 35 megahertz spectrum. So these are little islands, small islands that are spaced far apart. The L band is not part of the FCCS 5g fast plan from the previous administration. The L band is not internationally harmonized for 5g. Meaning the spectrum engineer come together and international standards, bodies and such kind of agree on which frequencies are going to be used for what purposes we'll call it harmonization.

Speaker 3:

And it's no, it is not a global gold standard, a global harmonization for 5g. It's not a regional standard. So between Canada, Mexico, and us, for instance, it's not a regional use designated for 5g. It's not part of the other engineers are many bodies. So the three GPP, which is legato keeps telling us that someday they're going to study. But yes, the old man is great. And you know, the reason for that is symbols because these tiny blocks of spectrum are interleaved in between existence, private sector licensees. And it's important to underscore that point. So the folks that the GPS innovation Alliance, wherever Zen, these are private sector, licensees Iridium is a private sector licensee. The federal government happens to be customer one of many customers, both private sector and public sector, but this is not Pentagon spectrum. There's a slice of respect for Noah in the L band, but that is a small part of the overall debate. So keep that in mind. So it just isn't 5g spectrum. Now there is, you know, one proposal I've seen out there a couple of times, if you took some of the C-band frequencies that are being auctioned right now, paired it with some of these band frequencies versus downlinks, and maybe there's a value prop right there. That's a

Speaker 5:

Highly spike on it needs to be addressed head on, but it's not going to work right for a variety of reasons. So this is in the meantime, the sec has in the prior administration repurposed over 5,000 megahertz of spectrum, not all there for 5g stuff and all those things, the sense of how much spectrum has been repurposed for connectivity, because there's a lot of talk about the U S needs to be China and other countries in the race to 5g, which is absolutely true, but this tiny 35 megahertz of spectrum, isn't gonna do that for us. So there's so many reasons why the 5g debate is it's a false one here. And by the way, we have other advanced spectrum is going to be your auction later this year, the three dot four or five dot five, hopefully next year, getting by this year. So we'll say so there's a lot, a lot going on. Legato is not 5g.

Speaker 1:

Thank you. Thanks for, I think that helps put it in context, especially for folks that are on the Hill, watching the C-band auction happen and talking about three dot four, five coming up and even looking at CBRS and, and what the FCC, you know, that really innovative from work, the FCC put together there. This is very different, I think, than, than what we're talking about here. So I do want to switch gears and go back to some of the specifics about potential harmful interference. And I'll turn back to you, captain Jane Gallis. And you mentioned in your, your opening answer about the interference from these radio stations, these potential proposed radio-based stations of legatos with essentially planes and other

flying vehicles as they get close to the ground. I wonder if you could kind of walk us through the non-engineers and uninitiated among us. I wonder if you could talk a little bit more about that?

Speaker 5:

Sure, absolutely. You know, and I, not an engineer myself, I, like I say, I'm an interested party because this affects me directly. And you know, I'm responsible for the safety of Oh 185 people behind me. So as I pointed out earlier, you know, I usually fly my aircraft very high and way from way from the ground. But, you know, in a, in a situation where if I was to say, have to descend to a, due to a rapid depressurization meaning where, you know, you see the masks drop and we always see it on the video about what to do, but the mask over your face. And, you know, once we do that in a flight deck, we're taking that airplane down and we're going to get downloaded to where you can breathe the air. So folks that have experienced that in the back of an airplane that does not happen at often, you know, they say, well, it seemed like we were diving at the ground pretty rapidly.

Speaker 5:

Well, we are because we're trying to get down to air that you can breathe and then we can remove those masks. Part of that issue is, is we have to get below 10,000 feet and some areas you might be in an area that might be 8,000 feet, high, Colorado Rockies are in some Hills and Montana. So if I'm passing close to one of those satellite or excuse me, one of those legato towers, my communications and my GPS positioning could be harmed and could be set off kilter by what position are we actually at based on all of the interference from this parallel spectrum. So that concerns us now. It doesn't happen often, but we always have to think about the, what if, I mean, aircraft are built with redundancy on purpose. When we talk about positioning, I was, I might be giving away my age here, but when I first learned how to fly, you'd have to learn how to look at the stars and be able to do like a Sexton and figure out exactly your position.

Speaker 5:

You know, fortunately, we were able to get rid of the navigator on board an airplane and move to some better technology where we use three systems onboard the aircraft. Number one, we use GPS positioning. We use a system that uses gyros inside the aircraft that as the aircraft moves, it sort of figures its position moving along the earth. And third are using a triangulation system of using ground-based radios. The FAA has, has been proponents of shutting down the ground-based system. It has not happened yet, but that's triple redundancy for position fixing for our aircraft. I no longer have to look out the window and look for a star or the moon or, or the sun. I can just do a technology by looking down at my system. So now if that system is affected, we've been the safest we've ever been because of technology like that.

Speaker 5:

And it's affected, that's obviously we're, we're going to speak up. And again, as I, as I spoke of earlier, I have the privilege of getting above some of the interference ranges of those towers. Whereas medevac helicopters, folks that do inspections as well as drones, well, who have GPS receivers installed would not be covered from interference. And you could have drones that are just flying at, you know, anywhere and could fly away from the operator. So, you know, it's one thing if it happens to a vehicle when there's a pilot onboard, but when it's an unmanned vehicle, it can definitely be dangerous. So that's a concern to us. Another issue is communications. As I spoke of earlier, the satellites satellite communications has revolutionized this industry. But one thing that we have found out through research of others is the fact



that if you were to take a legato equipped or a, you know, something that uses that technology transmitter or receiver onboard the aircraft in the back now, listen, I'd be, I'd be lying.

Speaker 5:

If I said, I've always had my phone off. Every time I've taken off in the back or in the front of an airplane, everyone's guilty of it. It happens. The problem is we have to play the law of averages and figure, well, how many are there actually? And, and, you know, if we had just one handset on board, the aircraft that was able to receive under this spectrum, it could interfere with our communications back down to our, excuse me, up to the satellite and back down to earth. And so that's a, that's a whole other situation that, that concerns us. But, you know, I, I really, I really think that this is very important to our aviation industry and, you know, GPS positioning as has been alluded to by Mr. Grossman as well as others and, you know, weather reporting, Dr. Avery said, you know, weather is revolutionized my business and it's made it easier for me to fly because before it was, we would get it on paper.

Speaker 5:

And now I can look at it on my tablet, inside my aircraft, because a satellite as being that information down to units that can uplift it to my device. And now I can see exactly where that line of thunderstorms is. But, you know, it's interesting as I was preparing my notes for this conversation, I get this boating magazine and it says big, bad 5g side effects that just came to me yesterday. And it's interesting. So it's not only affects us. It affects the Marine life or excuse me, the Marine operators as well. So I, I think it's not just on the aviation side, it's, it's others. If there was a transmission tower close to a port or in a navigable waterway, such as a large river. So very important to be paying attention to this. This is definitely going to cut back on the safety margin and aviation and other modes of transportation.

Speaker 1:

Thank you for that real-world example. I think balancing rarity and safety, you never want to be in that position. So I appreciate the story there too. And I want to turn, you know, as we're talking about interference and arguing about what interference is and is not David, I want to come back to you, you know, the FCC and some legato allies have argued that interference should be assessed based on one standard, whether there's actual harm to GPS and the department of transportation did its own analysis and they found something different. And I wonder if you could talk a little bit about how some of the federal agencies, how they, Hey, how they have participated in this issue and, you know, alongside all of the private companies that have an interest here to absolutely. And Ellen, thank you for this question, because it really is, is a fundamental one when it comes to the conversation that we're having here. And I think to, to be able to answer, it requires covering a little bit of GPS one-on-one basics, and you alluded to it at the beginning of the session, which of course GPS a satellite

Speaker 7:

Based navigation service. The satellites are located 12,000 miles above the earth. The signal is very weak by the time the signal reaches your a GPS receiver, it's about a millionth of a billionth of a walk. And this compares to a terrestrial based communication system that could be billions of times more powerful. And so, so with that in mind, we're not talking about an apples to apples comparison. So while a harm based standard for interference may very well be appropriate when comparing mobile communication systems in adjacent bands, it does not work the same for navigation systems like GPS. Let me explain a little further on that. So harm standard in the context of say your, your smartphone, a Mo mobile phone, you can observe forms of interference, such as call a call dropping or are static on the line. GPS

doesn't work that way. It may, by the time a GPS receiver is experiencing interference, you may not have even realized that is occurring.

Speaker 7:

And in the context of, of applications like captain Jenga, Ellis talked about like aviation, other safety of life applications. You need, you need to have an accurate predictable metric to know in advance of that interference occurring. And that's what is known as the one DB standard that I alluded to in my opening comments. And that, that is the core difference between the department of transportation's testing, which used that one DB standard and the other legato sponsored tests, which used a subjective, harmful interference measurement. There's also another important aspect that differs. And, and also, I think it's important to mention, it's not just the department of transportation there about 13 federal agencies and departments, including DLT that share this view. And many of these agencies directly depend on GPS, whether it's the department of defense, whether it's Noah and NASA, there's certainly a number of, of agencies, but the DOD testing looked at 80 different GPS receivers across a number of different sectors.

Speaker 7:

And again, this goes to this diversity of GPS that we've talked about, that a GPS receiver used in an aircraft is going to have different requirements than a GPS receiver that's used for timing in the electric grid or, or in a smartphone. So be making some blanket statement that all GPS, GPS, receivers are going to operate in a certain way. It just doesn't work. So again, you need to have this readily identifiable accurate metric, which we believe is one DB. And another point that again is important. This is not just the GPS industry saying one DB. This is, this is a metric that has been used both in domestic and international regulatory proceedings. It's been embraced by the injured international telecommunications union, the ITU and, and within the U S both NTIA and the us air force have readily embraced use of one DB because of its reliability as such a metric. So I think hopefully that helped to, to kind of set the stage and explain because it is, I certainly, when I meet with congressional offices, it's easy to say, well, I've got highly respected engineers from two different agencies, and they're coming to two very different conclusions. How do I, how do I parse those differences? And I hopefully that's helped shed some light on that.

Speaker 1:

No, I think that's really important, David. I, and I think context is key here, right? That you have very good engineers from, from highly respected agencies coming, coming with their respective expertise to the table. And one thing. So I have two, two con questions that I really want to get to. And one is about the NDA and talking about an independent review and all of the provisions at the NDA. But first I want to talk about I'm from Colorado. Susan is in Colorado currently, and something over the years, really 2020 in particular, there were numerous wildfires out West California, Colorado, Oregon. And, and it was really challenging particularly this year with the pandemic going on. And these fires, I wonder if you could talk about the predictive nature of satellite data and in the weather community and how this data could be impacted by legatos proposal, what that means for community safety, what that means for firefighters, et cetera. Yeah. Thank you. Thank you, Ellen. I, it, wasn't interesting fire season. I will say both in California where my sister lives and we were in constant communication

Speaker 6:

About what she was dealing with, but also Colorado. I think we had probably the worst wildfire season ever in this, in this lab this last summer. And it was a particularly challenging time. I think I personally was only about three miles away from the one of the wildfire that was close enough to Boulder, Colorado, but there were other major, major wildfires and very, very complex terrain. And, and how does this relate basically to what we're talking about here? You know, that it's challenging and the satellite data though, that that could be impacted by the goddess proposal, which basically plays a role in predicting the fires and keeping firefighters safe. And, and, you know, when I, every night I would tune in to my TV station and, and get the latest information on where the fire was, what the imagery from the satellites were showing, what were that some of the issues that they were facing, what was the forecast like?

Speaker 6:

And you have to remember that weather conditions can ignite and, or spread fire. You get stronger winds. Yeah. You got power line sparks and your drive vegetation, you have low relative humidity conditions or lightning or unstable atmosphere conditions. All of them, these can play into what you can have in terms of tremendous wildfire season. An of course the West is it's, that's really one of the major weather hazard issues that, that we really face wildfires also can change the localized weather. Okay. And the sensors that we get information from, and these bands that, that are being disgusted, that the data would like to use, really provide information on the weather. There's soil moisture at the locations that are often very remote. And they also give you information that can lead to forecasts on air quality and visibility. As you realize that particularly in California, when you couldn't even go outside and, and sort of breathe the air that you were receiving, getting those forecasts to people to protect human lives is, is really pretty careful.

Speaker 6:

And then also the, the, the bands that we're talking, talking about here, the, the radar bands that fell advance that were a frequency bands that we're looking at are really, really important for basically low guys, forecasts and weather briefings to firefighters. I mean, that whole communication channel that we're, that we're talking about that earth to satellite, to earth, that the things that you see on TV every night, certainly when you're in a wildfire situation, you are tuned into your TV every night to take a look at what's happening in your local area. What do you have to value back away? How far are you away from an evacuation zone? And then also providing the information for firefighters on where they need to go, what kind of hotspots do do you see all of that imagery is done in these particular bands that that legato is looking at, and that would, would really disrupt it. And I think just, you know, the problem is, is sharing bans with noisy terrestrial signals, from the really good result in very harmful interference. That's good at basically disrupt our ability and basically hamper our ability to basically serve in these tremendous areas of wildfire management and abatement. So

Speaker 1:

I appreciate as a, as a person with family in the West and hope to be back there soon, I don't think this is the end of, of a raging firefight fire season, unfortunately. And so thank you for sharing that perspective with us. And I do want to turn to, I want to turn to the national defense authorization act. And I want to talk a little bit about what's next with the remainder of our time. Cause we've gotten a few questions about that. So Congress had to step in with light squared. There were a number of hearings, and then this year or 2020 Congress weighed in, again with provisions in the national defense authorization act because GPS and Satcom are heavily used in aviation and national defense. So I think first for the folks

on the phone whose bosses were instrumental in making that law, I think the, the folks participating in the briefing would like to say, thank you that that was a tremendous effort, but Rob, I wonder if you could walk us through what those specific provisions are and then what that means for, for legato, for these other, these private companies and, and crucial services that, that we're interested in.

Speaker 3:

Sure. And real quick, if I could very quickly build on something that David said a few minutes ago on DB standard and the harmful effects to GPS to give the Iridium a version of that. Remember I said earlier, readings down the street. So while GPS under the SSEs orders, GPS is definitely going to experience harmful interference is 23 megahertz away from the nearest legato van already is only one megahertz away. So it's like a paper thin wall. And the noise level is 62 DBS higher for Iridium than it is for GPS. So imagine the potential for harmful interference. There all operations only operate in less than nine megahertz ports. So spectrum for its entire business. So keep that in mind, it's like having a Jack hammer testing range right outside your window, you know, a rice paper thin wall or a jet engine testing range or something very noisy place you need as a super quiet, quieter than the library quieter than a more perhaps, you know, so to hear those whispers from space and the SSTs order does not allow that.

Speaker 3:

So, and David also talked about the 14 federal agencies in addition to all the private sector experts who weighed in on the STCs record, there's something called the IRR, which is the interdepartment radio advisory board. This is the radio frequency engineer experts across the various federal agencies. Remember the federal irreverent is as a customer of private sector licenses here, the IRS didn't like the sec proposed order, which is something we did not get to see before it came out. And it came out of the shoot very quickly Thursday, and it was voted by five commissioners. Bye that's Sunday night. So we never got to see it. Unlike orders that were voted on, it opened meetings, which the public gets to look at. So for months, if not years, we were trying to advocate or analyze something that we couldn't see what the IRS could see it.

Speaker 3:

And they give it a big thumbs down. Anyway, with all that in mind, the national defense authorization act that comes out of the Senate armed services in house armed services committees. So annual authorization of the, of the defense department. It did a few things based on that great weight in the record there, the FCC private sector and public sector experts who looked at the FCC order and a determination cause harmful interference to GPS and to the Iridium, it said, number one, taxpayers are not going to be safe. I stuck with the tab for retrofitting any DOD devices that may depend on GPS or radium services. So if they have to be fixed or replaced because of harmful interference, yeah. Legato may cause it's going to be a place for that. It's not going to be the taxpayers. So you can't do it is not allowed to spend and any money upgrading or fixing those devices.

Speaker 3:

Number one, number two, if you are a defense contractor currently or want to be in the future, you cannot be contracting with a company that is going to be using terrestrial services and the albeit, right? So if you are a wireless carrier and you're thinking of buying a legato, you're out of luck when it comes to defense contracting, number three, with the NDA, did it required an independent technical review by the national academies of science. And that is a process that started well, the NDA veto override was January 1st. That process started by the end of the month and should conclude by the end of October

thereabouts, but they've already assembled an independent panel of experts to determine the extent of harmful interference in this space and then submit or create a report. So all that is coming up in the meantime, you know, with the FCC is a mistaken order.

Speaker 3:

The department of commerce had filed a petition for stay, I think is important for folks to understand just restating something where you say they have, see, can use freeze your order and not have it be effective. There was a, an order to shoot that down. The vote was three to two. We consider that an improvement over the April order, which was five to nothing. And we think there has been a sea change in part because of the NDA. And back to your question, Ellen, there was an overwhelmingly by partisan vote for the NDA, which of course contained hundreds or if not, thousands of provisions and it, but this was an important part of it on a huge bi-partisan basis. It was the first override first and only override of the veto by president Trump. So you've seen a great bi-partisan agreement in, in both chambers regarding the concern over the FCC's legato order. So that's been a sea change to material change in the law. And I think you'll start to see a change in the thinking as a result overall,

Speaker 1:

Thank you, Rob, for setting us up there. I, I note with interest that we are nearing the end of our time, and I want to give everybody on the panel a chance to give their kind of final say, we could talk about this for hours, which I always say about spectrum, but we really could. I, this is because of the wide range of companies affected industries and services consumers. I think we could talk about the potential impacts and speculate about what's next for awhile. So my final words on this subject will be pleased, watch the space. And if you have questions, if we can be helpful to your office, if, or direct you in, in any way, please let me know our web addresses, [safe-satellites.org](http://safe-satellites.org), but then I'll go first to David then captain Jen Gallis and Susan, then Rob I'll have you back cleanups. So David, what would you like to leave us with a few points? I did want to clarify something

Speaker 3:

When Rob mentioned about the

Speaker 7:

Space between GPS and the spectrum that legato has and referenced it as being 23 megahertz. You know, I've, I've heard that talking point out there. And I think on the surface that might sound like a, a large distance between the two services, but it goes back again to the point that I made earlier about how these are two very divergent services where a terrestrial based service can be millions or even billions of times more powerful than even with that 23 megahertz gap, it is still too much interference. Second point I wanted to make, in addition to the comments about the, the petition for stay is that there are seven petitions for reconsideration that are currently pending before the FCC, including to individual petitions from GPSI members, Trimble and Lockheed Martin, another one of those petitions from NTIA. So that's something that we'll continue to be keeping a close eye on.

Speaker 7:

And then the third point that I wanted to make, which is, as we think about looking forward into the future, how do we, how do we avoid these type of disputes between the agencies and yesterday GPS sent a letter to the white house, national economic council using the experience that we've had with GPS to talk about some of the recommendations for improving this process. And just a couple of those

that we think are worthy of consideration, updating a memorandum of understanding between the FCC and NTIA, which dates back to 2003. So almost 20 years ago, we also think it'd be valuable to have a technical advisor for each FCC commissioner's office. And I think having a, an expert, an GPS expert from one of the federal agencies that manages the GPS program to be embedded as a detailing inside the FCCS office of engineering and technology. I'll leave it at that.

Speaker 1:

Thank you, David. Those are good concrete suggestions. I think captain Jane Gallis, what would you like to leave us with

Speaker 5:

Since we're short on time, I'll keep it brief. We are the safest we've ever been in aviation, and we have trained our pilots and folks that are in the industry to look for risks. And this is a risk definitely to the safety of our operations. And I think we need to take a really deep look at this before we go forward and implement these equipment on the ground that could affect the safety of, of our flying, traveling public in flight.

Speaker 1:

Thank you, Susan.

Speaker 6:

I would say that, you know, sharing the 1675 to 1680 megahertz with noisy terrestrial signals that we would get from legato is going to result in harmful interference to real-time weather and water information from not only Noah's geostationary weather satellites. You know, this information is crucial to weather forecasting, to weather alerts, to severe weather, to flood predictions predicted, provided not only by the federal government, but also by our state and local governments and by the private sector itself. And I guess I would also note that the weather enterprise in general has had a long history of moving our infrastructure from one band to another, to accommodate various national and international demands on the spectrum. This is just not possible in their circumstance, given the environmental parameters that really require us to operate and use this band. It's just not possible for the weather enterprise to relocate given this, there's just sort of an unacceptable risk to interference in terms of the being it's putting the nation in vulnerable situations with respect to what weather and water and climate events. Thank you, Rob. No pressure bring us home.

Speaker 3:

I'm trying to do so quickly, cause I know we're about to go into overtime. So first of all, it's important. We didn't get into this, but the FCC broke its own rule, whether it's the order and that rule 25.2 55 for those playing at home, or if you have insomnia leaders might feel free to start reading it. But it's says basically a newcomer to a neighborhood can't it has all the obligations of staying quiet of observing the rules, the noise limit rules of that neighborhood. And the FCC turned that on its head, especially when it comes to Iridium and also GPS. And we have a lot of it, whether you're in a separated by 23 megahertz or one megahertz, that's how bad the order is is that it causes that much harmful interference, but it is putting the onus on the existing homeowners. If you will, in the neighborhood to accommodate the newcomer with no requirement for the newcomer to really negotiate in good faith, there's no teeth in that order.

Speaker 3:

It also, by the way, violates title three provision of title three. So statutory as well. So longer term, this is a big problem. So there's a process issue. This is an overall long a long-term fight that's been going on. And we are hopeful that a new FCC will take a second look at this and, and reverse this bad decision. One of the things I want to add, and this is sort of miscellaneous nuts and bolts in my concluding remarks is none of the folks you're hearing from today, none of the folks in this coalition are competitors or potential competitors to legato. That's often floated out there. All of these are just competitors. They don't like legato. They're afraid of looking. No, nobody hears in the terrestrial side, Jesus does in this coalition and the old man. It has nothing to do with that whatsoever. These are folks who we'd love to have great 5g service overall. You just can't have you can't violate the prime directive of spectrum policy for Trekkies out there, which has no harmful interference. And that's what this, this order does, unfortunately, would cause harmful interference. So to great detriment and with so very little upside, but it's huge downside. As you've heard from captain John and Dave Grossman and Dr. Avery and others. So keep that in mind. FC needs to go back to the drawing board and completely scrap their April of 2021.

Speaker 1:

Thank you, Rob. And with that, I will thank our panelists with my own round of applause and thank the AGU for co-sponsoring with the satellite safety Alliance. Again, if you have any questions, please don't hesitate to contact us and we'll be back in touch. Thank you.