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THE FREE STATE FOUNDATION

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Free State Foundation's ELEVENTH ANNUAL TELECOM POLICY CONFERENCE

**"Internet Providers and Platforms:
Getting Law and Policy Right"**

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"All-Star Panel I: Internet Providers and Platforms: Getting Law and Policy Right"

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* This transcript has been edited for purposes of correcting obvious syntax, grammar, and punctuation errors, and eliminating redundancy in order to make it more easily readable. None of the meaning was changed in doing so.

P R O C E E D I N G S

MR. COOPER: Good morning. Welcome again to the Free State Foundation's Eleventh Annual Telecom Policy Conference. We are now having our first All-Star Panel. Its title is the same as the second panel but they are different in their focus.

This panel will focus more on the issues of broadband deployment and broadband adoption, issues like universal service, infrastructure deployment, spectrum, and more. I could also call it the not-net neutrality panel. That is not really going to be the focus here today.

To use today's buzzwords to describe the purpose of our panel, we are hopeful that our panelists will be able to offer insight into how our public officials, our competing marketplace providers, citizen groups, and others can lawfully collude to promote broadband deployment, to remove obstructions to broadband adoption, because we know that the work to be done is not over.

So I am going to briefly introduce the panel. And after that point, I will discuss the format and then we will get right into things.

So on our panel today, seated closest to me, we

have Jonathan Adelstein. He is with the Wireless Infrastructure Association and known to many of us as a former Commissioner of the FCC. James Assey is the Executive Vice President of NCTA, the Internet and Television Association. Maurita Coley is the President and CEO of the Multicultural Media, Telecom and Internet Council. And we also have today Kathleen Ham, who is Senior Vice President of Government Affairs at T-Mobile USA.

Our panelists have the option of taking two to four minutes to discuss our panel's themes for today, and the opportunity to make any response to what they hear. Then I am going to direct questions to the panel. With our remaining minutes, we will take questions from the audience, including press reporters as well.

So thank you to all of our panelists. I want to see if anyone is so inclined to offer some initial remarks. Perhaps James Assey with NCTA.

(Laughter.)

MR. COOPER: I wasn't going to ask you first. Because your name is with A, it was counterintuitive. But then when we added Jonathan Adelstein, I realized you weren't first so I decided to go back to you.

MR. ASSEY: As we were just commenting as we sat down, usually I am always the first called on in class, so I was happy to have Jonathan here.

So initial remarks, which I'm sadly unprepared for.

(Laughter.)

MR. ASSEY: Look, when it comes to broadband access, as a network provider, as an industry that has pretty radically in the last two decades transformed what really is the primary business of the industry to promoting and improving broadband access across America, there is probably no issue that is more central to the focus in the industry of how do we do that.

A lot of our companies, in addition to following the Wayne Gretzky maxim of not only being worried about where you are today but also trying to skate to where the puck is going to be, are trying to really be on a constant evolution of improving our network capabilities. Because the one thing we've discovered in the Internet space is, consumers always want it to be faster, they always want it to be more secure, they always want it to be more reliable. And they depend upon it more and more every day for a wider variety of things.

And it is in keeping with that that the leaders of

our industry were very excited at CES to announce their vision of the next evolution of the cable network infrastructure to be a 10G network, one that would provide 10 gigabit connections and really not just focus on speed but also lower latency, improved reliability, stronger WiFi, and really trying to chart a future that they will play a part in building. But ultimately, it will be up to consumers and application developers and new services that we can only sit here and dream of that will both inspire Americans but also serve as the foundation for economic growth and leadership in the technological age.

So we are not going to focus all our time and energy in building a network if we can't get people connected to it and give them the ability to use it. The issue of universal service has vexed our country for the last at least 80 years and probably will vex us for the next 80 years. But it is one issue we have to pay constant attention to.

MR. COOPER: All right. Maurita Coley, do you want to offer anything to our audience here today? Thank you.

MS. COLEY: I would like to take some of my two to four minutes to first say thank you for including MMTC, Seth and Randy. We're kind of the unicorn here. But I

think that the concept of getting law and policy right really reflects exactly what our mission has been for the past 32 years. We believe in speaking up to make sure that regulators, legislators, and industry get law and policy right when it comes to the niche communities that don't necessarily fit into the traditional molds.

So we champion communities such as minority and small businesses, low-income communities, and underserved groups who have nuanced issues that aren't necessarily captured by large consumer groups and think tanks. And we like to say that we use our voice to make sure that they have a voice at the FCC. So you see us at the FCC, increasingly now at FTC as the privacy issues have come. And historically, we focus on minority business opportunities and equal employment opportunities in the broadband area. We've really focused on making sure that the digital divide is addressed. We have said to the FCC, if we have an overarching mantra, it's that we ask that the FCC first regulate with compassion, that it ensures equality and that it champion opportunity.

In a nutshell, our view of infrastructure is that we believe in full deployment. We believe it's necessary to full adoption. This morning, Congressman Clyburn was on

CNN, talking about the Affordable Care Act and relating it to infrastructure and the need to build out infrastructure to ensure that children are able to use broadband at home, dealing with the telehealth issues. It's clear that infrastructure is a necessary prerequisite to bridging the digital divide. So we've weighed in on a number of dockets promoting streamlining and accelerating, both the wired and wireless side, with caveats that are sort of common sense. People need to play nice and make sure that you at least consider the environmental and historic preservation issues, that there's coordination with Native American tribes, state and local governments, and environmentals. We caution state and local governments not to try to game the system and use infrastructure buildout opportunities as a way to get money to fund things that don't have anything to do with that, because we think that that harms adoption.

So we have a partnership with some of our panelists here, because we do believe in promoting jobs and upscaling and making sure that people have an opportunity to participate in infrastructure buildout. So we have a partnership that we work on with Jonathan, which I am sure you will hear about today, to build apprenticeships in the telecommunications area and the whole upscaling

opportunity. Because as we're building out 5G, we have to make sure that people have jobs.

On the Lifeline area, we've spoken out. We really support the fact that if you have people who are 120, 130 percent of the federal poverty level, you can't just leave them behind. Broadband connections are vital for success in education and bridging the homework gap, providing access to jobs, telehealth, and civic engagement. We don't believe that the lowest income citizens should have to decide between broadband and bread.

On the spectrum side, we've spoken out. We believe there is also a nexus there to the digital divide. So we support expedited rollout, preemption of conflicting statutes. And again, in all of these, we ask for common sense in terms of the players acting honorably. We've warned about the fact that there could be some people that are left out of the equation and we do our part to make sure that they're not.

So I guess, the overarching issue for us is we want to do what we can do to use our voice to make sure that people don't have to choose between broadband and bread.

MR.COOPER: Thank you, Maurita.

Jonathan Adelstein.

MR. ADELSTEIN: Thanks, Seth. And I appreciate you having me here. Even if you're not following regular order on alphabetical order. Speaking of James, 10G is great but we're pretty excited about 5G. Well, it delivers pretty much everything cable does and more, because it's mobile.

The 5G really is the most transformational standard potentially in the history of technology. It's going to create enormous economic activity, not just for our sector but for every sector of the economy, with \$275 billion in investment that the industry is planning to make, creating 3 million jobs and half a billion additional incremental activity in the economy.

It's not just that it's faster and you get more data, but that it's able to connect 100 times more devices and it will be five to 10 times more responsive in terms of latency, which opens up entirely new applications, potentially creating whole new industries. Just as the 4G economy created the app economy, with 5G we don't even know what's going to happen in health care and transportation, certainly connected communities, smart cities being transformed, educational opportunities, and energy.

But, you know, infrastructure is our middle name at WIA, and 5G is only as good as the infrastructure on which

it's deployed. I like to think about 5G as having three legs of the stool. If you want to succeed and get the policy right, you need to have the right spectrum policy. I think we heard from David Redl this morning that the administration is doing everything they can, as is the FCC, as we will hear from Commissioner O'Rielly, to get that right. And we are making progress on getting as much spectrum as fast as we can. The other aspect that we focus on a lot is siting policy, making sure that we are encouraging investment in terms of the ability to deploy infrastructure. And the third leg of the stool, that I think gets underreported and that Maurita talked about, is workforce. We need the skills training and we need the skilled workforce that is capable of building this advanced network in very short order.

So, in terms of those three, just briefly: On spectrum, obviously, the Congress took action last year in the RAY BAUM'S Act, and the FCC and NTIA have identified a substantial amount of high frequency. We also need mid-band frequencies to create these dense networks. We need all of these different frequencies. And it is not just going to happen at high frequencies. The misnomer of 5G is it's a super-high-frequency network. It's going to be on

every frequency, it is going to be on every form of infrastructure from towers to small cells and DAS. So, in order to get that done, we have to have the siting policy right.

In fact, it has taken us 30 years to get 200,000 towers up. And we are going to have to, in very short order, get 800,000 small cells built. If we are going to locate an additional 800K small cells by 2026, it is going to take a lot of effort. And I think we are getting the policy right.

The FCC came up with two outstanding orders last year. They are being litigated now but they have paved the way and we are already seeing enormous progress on the local level of getting infrastructure deployed. Meanwhile, 22 states have enacted legislation that we have worked closely with our industry partners on to speed the deployment of small cell legislation. Matter of fact, it will be 23 momentarily, because Georgia passed a bill and it is pending the governor's signature now.

Finally, on the workforce, the skills gap is real. In order to build this network quickly, we really haven't seen the educational system in the United States keep pace with the level of change and development in wireless.

Field techs don't have wireless training, essentially. So WIA is leading an effort to create apprenticeships in industry through what we call TIRAP. We've created a training program called the Telecommunications Education Center, conveniently TEC as an acronym. We partnered with MMTC, the National Urban League, and others on the apprenticeship efforts. And we are really making a lot of progress, signing up employers to get that done.

So, wireless infrastructure is going to enable 5G and we need to make sure that we have the policies that encourage that deployment and innovation. And I think we are getting it right. There's more to do but I think both Congress and the FCC and the agencies are doing everything they can to get that done.

MR. COOPER: Thank you, Jonathan.

Is there anyone on the panel who has any further response before I go into question time?

MS. HAM: Sure.

MR. COOPER: Kathleen? Kathleen Ham.

MS. HAM: So thanks to Seth and Randy for the invite today. This is always a great event, all the smart people in D.C. show up for this.

One of the things I want to point out is that we

talked about getting it right. And I really think spectrum policy is key. Especially, we are really at a crossroads here, going to 5G. I think Jonathan talked about the 4G economy and that it brought Lyft and Uber and Facebook and Google, et cetera, et cetera. We don't know what 5G is going to bring, really. But it's going to be good.

And spectrum is really the lifeblood of that for my company and for a number of other companies I see sitting in the room. And so getting that policy right, and infrastructure policy, is very important. Glad to see we've got movement at the Commission on that, some great work is being done on infrastructure reform. Also at the state level, I think we're up to 22 states now with small cell legislation and Georgia just yesterday adopted legislation on that and there's more to come.

I would also just add that it's really important to get competition policy right in this environment. And I love being on a panel with the cable folks because I feel like, right now, we are at a crossroads. There is definitely convergence going on between cable and wireless, if you haven't noticed. So the industry is changing. It's evolving. Who we are competing with is evolving. And so I hope we will get into that discussion today as well. Thank

you.

MR. COOPER: Thank you. So I'm going to provide the first question here, and I will direct this to Jonathan and then, James, I would be interested in your view after that.

What might be the most promising legislation that the 116th Congress could pass to make 5G wireless or high-speed wireline and cable infrastructure speedier to deploy, less costly, removing any kind of regulatory barriers, and the like?

MR. ADELSTEIN: Well, as I mentioned, the FCC is doing a fabulous job. Its *Wireless Infrastructure Order* is being litigated. It would be nice to have some support for that, in terms of legal authority, to shore up 253 and 332 on which the order for enforceable shot clocks was based. Something we couldn't get was a "deemed granted" provision because of the limitations on the legal authority. It would be nice to have that, and authority for enforceable shot clocks strengthened.

Maybe something that might surprise you a little bit, I think we could use some legislation on workforce training that really focuses on 5G. We ought to create a 5G corps, one that makes sure that we build out not only

the work on towers but small cells, DAS, building out all manners of wireless infrastructure, and doing it right, doing it safely. This is a national priority. If it's going to transform the entire economy, I think we need even more support from the federal government to ensure we have the training and that we create the kind of skills that we need to build this out quickly and efficiently.

So we could use some help that would shore that up and also I think support apprenticeships under industry. Apprenticeships are new to telecommunications. It's not something we traditionally have done. And we're beginning to make some inroads on that but we could use some support from the Department of Labor. And certainly, Congress could clarify their authority to make sure that they're focused on 5G.

MR. COOPER: Thank you.

MR. ASSEY: So I'm not supposed to talk about net neutrality so I'm not going to.

Maybe, Seth, the best way to answer it at the macro level, whether you're talking about 5G, whether you're talking about cable's next generation infrastructure, all of our companies operate in environments where greater certainty around the rules of the road benefits our ability

to deploy capital in new infrastructure and to extend it as far and as wide as the economics will bear. So I think that is the general theme or rubric that any legislation that Congress may pick up really needs to be judged by.

In addition to the issue that will not be named and settling that, I think Jonathan alluded to the work that had been done at the FCC to remove unnecessary obstacles to deployment on the wireless side. There probably also needs to be some relook or reexamination of the process by which cable infrastructure is deployed and the interface between industry and state and local governments and Title VI. The fact of the matter is we have a very different regime in Title VI than we have for wireless carriers. And to Kathleen's point, all of our infrastructures are starting to look very similar.

The wireless guys have a very big interest in wired connections to towers. Cable operators have a very important interest not only in the wireless drop in your home via WiFi or increasingly in 5G and next generation wireless standards. So that type of hybrid architecture really creates more similarity than there is difference.

And to Jonathan's point on spectrum, I would just point that one of the things Congress did very well

previously is to recognize that any future approach to spectrum really has to have balance between its focus, not only on licensed frequencies but also in expanding access to unlicensed spectrum as well. There are some areas where we believe action could be taken to expand WiFi. We're going to need wider channels in order to support all the next generation investment that's being made and faster speeds. And certainly, Congress can help speed that along. So, those would be the areas I would focus on.

MR. COOPER: Okay, I am going to go on to Maurita and Kathleen about infrastructure in a moment. But let me just stick with you one more second, James, on something that's more narrowly focused. And that's at the FCC, and I think it touches on perhaps barriers or regulatory barriers. And it has to do with the FCC's Section 621 reform proceeding, its use of its local franchising authority for cable providers and how that touches on broadband and things like that.

So what's going on with that and what do you expect to see in the near future on that?

MR. ASSEY: In keeping with the Commission's rightful attention on deployment obstacles, the Section 621 proceeding on remand from the court has been a long-running

controversy. And we are hopeful that we can reaffirm the basic structure of Title VI, whereby we would remove impediments to getting franchise renewals or getting franchises. Congress pretty clearly set forth in the statute the compensation that was going to be provided for the franchise and we get into this situation where creative localities come up with different ways of imposing taxes or fees on consumer bills or asking for different kinds of in-kind support that are off-the-book costs that only slow down the process for getting franchise renewals and deploying capital to build better infrastructure.

So some reaffirmation of that by the FCC is not only due but overdue, in our opinion. And it probably also tees up a broader reexamination of franchising generally.

MR. COOPER: Okay. I would be interested in getting a take from Kathleen and Maurita in terms of infrastructure siting and deployment, getting to the state and local level. What remains to be done or what are the biggest obstacles at the state and local level in terms of government obstacles or any other kind of obstacles? And what kind of reforms, if you were to look at the state or local level, would you best recommend for improved siting, speedier deployment, and adoption? So that could include

civil society groups and those kinds of organizations.

MS. HAM: I think I mentioned that we have the 22 small cell legislation that we've been working with. I know Jonathan's organization, for T-Mobile and I think all the wireless carriers, we're trying to work very constructively with state and local folks on deployment, especially now as we're looking to change up with small cell technology. There's a big difference between smaller cells and the big towers that people are used to.

And, with 5G, it is going to be everywhere. So it's important that localities literally buy into the 5G deployment story. Because it's going to benefit their local economies and the like.

Time and money are always obstacles with deployment. I think some of the jurisdictions really don't want to abide by a shot clock. About a third of T-Mobile's deployments are tied up by noncompliance with at least the FCC's shot clock, which is in litigation right now. But also, money is a big factor. A lot of localities look at wireless deployment as something they can derive a lot of money from and that's also an obstacle.

So it's important for the localities to understand the benefits that are going to come to them from 5G. And

the industry maybe has to do a better job of explaining that.

MS. COLEY: And I say, on a macro level, our position has been that more deployment results in more adoption. We are very pro-innovation. If you know anything about the early cable days, you might have been tempted to deploy in Georgetown first but, in fact, residents of Ward 8 tended to buy more cable. And I think the cable industry learned that some of the assumptions that you make aren't necessarily there.

On the wireless side, Latinos and African Americans led the smartphone revolution. And I think that wasn't something that was expected on the industry side. But now it's something that's commonly known and we believe that innovation drives opportunities. So to the extent that we can lower prices, to the extent that we can get greater deployment, then that helps to bridge the digital divide.

I spoke earlier, the overarching principles really have to do with just having common sense. So on the cities, we do have cities that call us about some of these complex issues. We don't think that cities should game the system, but we think that there are opportunities for a city and industry to come together and work out what makes

sense. Keep in mind that the costs that you add on deployment ultimately get paid by the consumer. And the consumers that we advocate for are generally the least able to assume those costs.

MR. COOPER: Thank you. Jonathan.

MR. ADELSTEIN: Just a couple of things. I think Kathleen is right, we are still running into some resistance from some communities. Others are being cooperative. Some communities recognize the value of 5G and we can always do better to educate them. The ones that are resisting need to rise to the level of the ones that are really rolling out the red carpet and welcoming investment.

I think the FCC has done a good job of getting rid of some of the unreasonable obstacles, some low-hanging fruit. Maybe there's some more work that could be done. Congress enacted Section 6409, which allows collocation by right and the FCC wisely applied that to small cells as well as to macro facilities. And some localities are really abusing it. They are not doing what it indicates and they are throwing up all kinds of obstacles. The FCC could clarify that Section 6409 has to be complied with, in identifying some of the specific abuses that we're seeing

in localities.

Another area of concern is what we call "compound expansion." As we get ready for 5G, we're going to use these sites for the edge data computing. It may be at the tower site, and there are going to be hubs for small cells. Sometimes, that requires an expansion of the compound. But we have this anachronism where, if you want to drop and swap a tower, you can expand a compound by 30 feet in any direction. But if you want to add an edge data center, you want to put in a generator for public safety, or you want to put in a FirstNet deployment, you have to go through NEPA and NHPA for even a one-foot expansion. We're seeing a bunch of FirstNet deployments getting held up because they need to expand the compound a little bit to accommodate the equipment. If they were dropping and swapping, they could do it by 30 feet. So it's really an obstacle that could fairly easily be clarified by the FCC, consistent with previous policy to make sure that we can quickly upgrade these networks to 5G.

MR. COOPER: All right, Kathleen, I want to go back over to you and ask you about spectrum. Congress moves slow and maybe the action isn't going to be there this time, it could be at the FCC. But in the last Congress, we

saw a lot of spectrum legislation. I think there was SPECTRUM NOW Act, AIRWAVES Act, and SPEED Act. Is there anything promising, or the most promising vehicle in this Congress, the 116th Congress, to get more spectrum resources available for commercial use? I would compound that by saying, meanwhile, we've got a lot of proceedings going on at the FCC, Spectrum Horizon, Spectrum Frontiers, a number of other proceedings involving lots of numbers and letters that it's hard to keep track of.

So if there's not too much in Congress, what are the next steps the FCC can do to make sure its proceedings are successful in getting all the resources out there for commercial use?

MS. HAM: T-Mobile is a big fan of auctions. And I know there is an auction going on now, which I can't speak of. But we also have been advocating for an auction in the C band.

There is a very long lead time to bring spectrum to market, just because everybody is using it. For the most part, all the spectrum that's out there has to be repurposed, whether it's federal, whether it's broadcast, whether it's satellite.

Right now, T-Mobile, for example, bid in the 600

megahertz auction. We got, on average, about 31 megahertz of spectrum nationwide. We're actively working to clear broadcasters from that spectrum. And these things take time.

So it's important for Congress to get started. The MOBILE NOW Act was a great piece of legislation calling for additional spectrum. It also called for some reforms in deployment on federal lands and the like.

So I do think it's important for Congress to look at that and see where there may be opportunities. There could be an opportunity in the C-band, for example, for an auction. We've been advocating for an incentive auction there. We would like to see some of that spectrum brought to market.

There is some spectrum that's out there that hasn't been built out by a company called Dish. I'd like to see that spectrum come to market. We're at a time where every megahertz matters and we shouldn't have spectrum sitting on the sidelines. So there may be some opportunities there, too, to make some spectrum available.

And then I would be remiss if I didn't advocate for our merger with Sprint right now. Because the combination of our two spectrum portfolios, our low-band spectrum,

their strong mid-band spectrum and future high-band spectrum is definitely going to make for a powerhouse in the market, just at a critical time when we're moving to 5G. So it's all about coverage, it's about the breadth and depth that we'll be able to bring with that spectrum portfolio which, like I said, is going to make us a powerhouse competitor going forward.

MR. COOPER: Thank you. Maurita, I am going to move over to universal service and I am going to ask you a question about the Lifeline program. There have been a couple of FCC proposals out there. One of them has been to limit Lifeline subsidy support to facilities-based providers. Another proposal that they have put out there, which it appears that they are going to implement on December 1, would be to mandate steadily increasing minimum service standards for Lifeline service and then retaining a 925 cap per household at the same time. So can you give us your views on those proposals?

MS. COLEY: Yes. We are on the record on the facilities-based carrier issue. We are very opposed to the FCC's proposal to limit Lifeline support to facilities-based carriers. We feel as if the resellers have really done a good job of filling in on Lifeline, where some of

the facilities-based carriers have not been able to. What I'm learning is that the resellers and the facilities-based carriers actually have worked together to fill in these gaps in Lifeline.

We don't comment on mergers, but I would like to use this opportunity to thank T-Mobile. I saw your press release stating that, if the merger goes through, you are going to continue with the Assurant Wireless program in 41 states and that Sprint and T-Mobile also have Lifeline programs in nine states and Puerto Rico. So we don't comment on mergers, but we like companies that support initiatives like Lifeline.

Again, we haven't weighed in on the other two issues. The thing we have weighed in on is we don't feel that there is a need for a cap because Lifeline is not being utilized. Only 50 percent of the people who are eligible for Lifeline are using it. So we have weighed in on that and believe that there shouldn't be a self-enforcing budget cap. We should actually work to promote more Lifeline and reach out to the people who need it who don't know about it.

MR. COOPER: Thank you. James, I am going to go to you. And this touches a little bit on universal service

but is broader still, and that's the matter of a number of electricity co-ops have expressed interest in moving into the broadband market. They seek to not only provide broadband service but perhaps to obtain financing, whether it's through taxes, through bond issues, even through subsidies, including the Universal Service Fund. A number of states have legislation going on right now that would authorize their electric utilities to go into that business broadband space.

What's your view on the policy? What's your policy position about that and how should we approach this idea of electricity co-ops going into the broadband space?

MR. ASSEY: Look, in general, all competition is good so long as it's fair. One thing I will say, in recent memory, Congress and policymakers have started to pay a lot more attention to making sure when they are subsidizing the deployment of broadband that they are not subsidizing the building of broadband networks in places where it already exists. We are never going to reach our goal of promoting universal service if we are constantly papering over places that already have broadband. And it is not the responsibility of those programs to subsidize competition.

So the advances that we've seen in the Farm Bill,

and also with the CAF II auction, really need to be hardwired into policymakers' thoughts as we think about additional subsidy programs going forward.

With respect to electricity co-ops, the one glaring issue that really needs congressional action in addressing is the fact that they still have an exemption from the pole attachment regime that was set up. Back at the time the exemption was created, the thought was that pole attachment rates charged by municipal providers or co-ops were very low and that there were going to be incentives that they would stay low. And we have seen in actual practice that flipped on its head. It is hard for me to imagine a Congress and an FCC allowing co-ops to enter the business of broadband and being able to charge super-competitive rates for pole attachments that are different from the federal framework. So if co-ops are going to go into the business, that exemption needs to go.

MR. COOPER: Just to keep on this for one moment, you talked about unserved areas. Is there some kind of standard or principle that we can use to define what constitutes unserved? You mentioned the Farm Bill, you mentioned CAF II. Just going a step beyond, is there anything that we can look to and say that an area is really

unserved?

MR. ASSEY: We have to have some standard and we have to stick to it to make sure that the limited resources we have are used as efficiently as possible. One place I know that gets a lot of attention, and certainly our member companies have focused on more in recent months, is ways that we can work to try and improve the broadband maps that we have. I was thinking about this the other day as I was walking with my daughter through a flea market and there are these stalls and there are just boxes upon boxes of different maps of different states or countries or whatever. We're always in a constant struggle to improve the quality of maps that we've had. And that is going to be no different with the FCC.

But I think there is a common recognition that the focus on a map that is purely focused on census blocks and, in fact, the presence of a single customer in the census block, has a capacity to overstate coverage. So that raises the issue: What would be an improvement over that?

We've put forward a proposal at the FCC to basically change the 477 process so that providers are able to submit shapefiles that are commonly understood and allow the Commission to pretty quickly put a greater focus on the

areas that are served by infrastructure providers and give us clearer definition around places that may be in a census block where there is service somewhere but there are five houses that are out on the edge that are still lacking service. So that's one area where both Congress and the FCC have expressed an interest in improving. And that's something that we can do to meaningfully move the ball ahead.

MR. COOPER: All right. Well, thank you.

Jonathan, I am going to turn to you. I want to circle back just a little bit to the jobs issue because I don't know that it's been covered, the whole spectrum. You've talked a lot about workforce training and things like that. But for most of us out here who might be scared of heights and don't want to be climbing poles and things like that, just from a big picture level, can you speak to the idea of 5G as a job creator in terms of number of jobs? What could we expect in terms of employment opportunities to be generated?

MR. ADELSTEIN: There's two levels to that.

There's the actual jobs created by the wireless industry itself. And then we're going to create an enormous amount of jobs in every sector of the economy. A few will be

lost, too. If you're a toll booth operator, you don't love wireless. But, generally speaking, we estimate there will be 1.2 million new jobs created. But of those, a small minority are for our industry.

But what's so important about those that are in our industry is that they are creating the basis for all of those other jobs and for the economic growth and for the competition with China and globally. So if we don't get it right for 5G, we are essentially losing our global leadership and we're not going to be able to be as quickly and efficiently competitive because it will take longer to build these, they won't be built right, they'll be more expensive. So, as a result, we need to not only train people to climb towers, which is pretty scary, you're right, and some people just don't like to do it. But small cells are going to be probably even a larger opportunity for high-skilled jobs. And these are jobs that pay better than most jobs, and they offer career paths. You know, we have worked with organizations to bring veterans into the industry, to bring diversity into the industry. And we have a diversity summit. In fact, we worked with MMTC on and with all of the carriers that are members and other members to try to diversify the workforce. And bringing in

veterans is a great way to do that because it automatically diversifies the industry.

So these are fairly technical jobs. The major schools, like MIT and Virginia Tech, are teaching the EEs that are out there designing the network and doing some of the more advanced work. But the field techs have no idea what's going on with 5G because they've never been trained. There is no training for field techs in 5G.

We've created a program. Rick Packer, who has helped to develop that program, is here. We are training people how to deploy small cells. The fiber industry could maybe learn from that. If they're going to lay the fiber, how can they put the antenna on the end of it?

And as the network gets more congested and there are more antennas closer to the end user, you see more opportunities for harmful interference out in the field. And these field techs don't understand how different frequencies operate, have never been given the 101 basic training, and don't understand why sometimes their networks aren't optimized when they put them up. They can look at a meter and see whether or not there's ping but they don't know why or what it means.

So we want to get that baseline of understanding

more broadly appreciated. We want to create apprenticeships in the industry, which we've worked with MMTC on, because that gives people a career path and training. So we're offering through our program TEC on-the-job training, classroom training, an online platform for it, so that we can create a professionalized workforce.

It has been *ad hoc* up to now. The education hasn't kept pace. It moves like an aircraft carrier and we're moving at the speed of light, literally. So we have to do a lot more to make sure our people in the field understand what they're doing and do it better, more efficiently and safely, as well.

MR. COOPER: Thank you, thank you. Maurita?

MS. COLEY: If I could glom onto that a little bit?

MR. COOPER: Certainly.

MS. COLEY: MMTC is in partnership with WIA and the National Urban League under a U.S. Department of Labor apprenticeship program. And just to bring it home to the people in this room, because we tend to be policy people, that program is entering the third year. As of the end of 2018, which was the second year, we had over 600 new either apprenticeships or pre-apprenticeships in telecommunications, towers, WiFi, those kinds of jobs,

really good-paying jobs with career paths. We had over 600 new apprenticeships that had been created under this partnership. And then WIA had, in addition, over 1,700 conversions of regular employees to an apprenticeship model, which is a career track model. We worked with Charter Communications, as well. They also have a very robust apprenticeship program.

When policy comes together with workforce, we can really do all the things that we want to accomplish in terms of upscaling the American workforce.

MR. COOPER: Thank you. Kathleen, there's the issue of robocalls that has come to the forefront, people getting scam calls, people getting unwanted calls. I hope it's not too much of an unwanted question, but what do you see as the respective roles for the FCC and for the mobile carriers and providers themselves going forward to address this issue of robocalls?

MS. HAM: Yes, it's an annoying issue. We've all gotten robocalls, right? And it's something that we don't like because our customers don't like it and it's a problem we want to solve. It is complex, though. And so kudos to the FCC and others who have been in a leadership role on this.

T-Mobile has taken some steps I think unique to our company. We've built in some safeguards within our network to try to screen out some of these unwanted calls. We also offer a number of tools to our customers for free so that they can identify unwanted calls and screen out unwanted calls as well. So this robocall problem is something that the industry really also does not want. But a lot of these calls, as I understand, come from overseas and it's a complex problem to solve. And so we want to work in partnership with the FCC. And Congress is interested in this issue, too.

To the extent we can, we're trying to combat it. But these are very smart people on the other side with these robocalls and it's a daily fight to keep up with some of that. But we definitely would love to rid ourselves of that problem.

MR. COOPER: All right, thank you. I'll stick with you for one minute here on the issue of process reform at the FCC. Since Chairman Pai came in, they've made some process reforms. One of the most notable is publishing the FCC's items to vote on or its agendas well out in advance. Commissioner Mike O'Rielly in December wrote a blog post on the FCC's website, issuing a number of other possible FCC

reforms.

I'd be interested in your take. Are there any one or two reforms that you might be interested in the FCC taking in 2019? And if you have any ideas after that, James, I'd be interested in hearing from you.

MS. HAM: Transparency is always a good thing. The Chairman's move to actually publish the meeting items ahead of time is good for people to see that transparent process under way, as painful as it might be to our practitioners in the audience because it just means we have to get organized sooner and into the Commission sooner.

I also think that Commissioner O'Rielly has some smart ideas about keeping a shot clock going. T-Mobile is under a shot clock now that we're working. Keeping things moving is always good government. Not having a backlog and trying to manage that and streamline the FCC processes where they can is something that they should always be looking to improve. Because all of that also costs the government money and time. So it is good government to be looking at our process and seeing how they can improve upon it. So I'm all for that.

MR. COOPER: Thank you, Kathleen. James.

MR. ASSEY: I would really just echo what Kathy

said. I mean, the Commission has done a really commendable job in keeping focus on process reforms. Probably things, too, that are not headline issues. But the accumulation of all these little things add up. The transparency and the publication of items has been an important development. And I know, as Kathy said, Commissioner O'Rielly is really focused on a lot of these things.

There are little things like the fact that cable operators have to keep a paper copy of the channel lineups in their file. There are probably hundreds of requirements like that that. We need to take a fresh look, maybe get the red pen out and strike them off. So what I think is good is that this Commission seems to have a concerted attention on those process issues. I am hopeful that we can take them all in due course.

MR. COOPER: All right. I am interested in questions from the audience at this point. If you have a question for any of our panelists, feel free to let us know and we will bring a microphone to you. So are there any questions out there for members of our panel?

QUESTION: Gary Arlen from Arlen Communications. You addressed the ISP factor. Could you talk about platforms a little bit? And I'm thinking, in particular,

we know what happened to Google Fiber. We don't know what's going to happen to Microsoft's white spaces plan. AWS has a role somewhere, somehow possibly.

What is your competitive overview of where the platform players are going to be in this generation going forward?

MR. ASSEY: With respect to broadband access, I know what I read in the papers. Certainly a number of the tech companies have focused on different types of, oddly, overseas in many cases, broadband access models. And again, if they want to compete in this space on fair terms, we're happy to have them. We're very confident in our path ahead. And I know our companies stay very focused on what they can control in improving the networks they have and trying to stay at the top of the food chain.

MR. COOPER: All right, we have time. If there is a last question, we have time for it. Is there anyone else in the audience before we conclude this panel? Looks like we do. We have one question over here.

QUESTION: Richard Morrison with the Competitive Enterprise Institute. Some people on the panel talked about a need for more workforce training and possibly even federal legislation having to do with workforce training.

Would the industry be looking for funding for training or loans or things like that? Or is there something in federal education, higher ed policy now that would need to change to encourage those training programs and apprenticeships?

MR. ADELSTEIN: Funding would certainly be welcome. The industry spends an enormous amount on training every year. But what we need to do is get these programs up and running. I think they will be self-sustaining. So it isn't a long-term commitment. But rather, to try to change the wheels of the educational system. We're working very closely with some of the community colleges across the country to develop curricula in wireless. But it's very expensive to develop and they don't see the return on investment right away. So if you invest in that up front, we are starting to see schools that are doing it succeed and then they are spreading around. But we need to spread it around more quickly. So a little bit of federal seed money to get that going would be good.

On apprenticeships, the government can focus on what the Trump administration is calling industry-registered apprenticeships. Right now, the funding can be focused on registered apprenticeships. The idea is to have

industry do it itself for itself. And Congress should acknowledge that when it looks at how it's updating the apprenticeship model so that industry can spearhead efforts internally and make sure that we are the ones setting the standards, we are the ones that are approving it. It makes employers more likely to engage if it's industry driven and industry registered. So those are a couple of areas of focus.

MR. COOPER: Well, thank you. Thank you to our panelists. Thank you for speaking today. Thank you again, everyone, for listening. And that concludes this first All-Star panel.

(Applause.)