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6 REALIZING THE BENEFITS OF RURAL BROADBAND:

7 CHALLENGES AND SOLUTIONS

8 TUESDAY, JULY 17, 2018

9 House of Representatives

10 Subcommittee on Communications and

11 Technology

12 Committee on Energy and Commerce

13 Washington, D.C.

14

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16

17 The subcommittee met, pursuant to call, at 10:00 a.m., in
18 Room 2123 Rayburn House Office Building, Hon. Marsha Blackburn
19 [chairman of the subcommittee] presiding.

20 Members present: Representatives Blackburn, Lance, Shimkus,
21 Latta, Guthrie, Olson, Kinzinger, Bilirakis, Johnson, Long,
22 Flores, Brooks, Collins, Cramer, Walters, Costello, Walden (ex

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23 officio), Doyle, Welch, Loeb sack, Ruiz, Dingell, Eshoo,
24 Butterfield, Matsui, McNerney, and Pallone (ex officio).

25 Staff present: Jon Adame, Policy Coordinator,
26 Communications and Technology; Kristine Fargotstein, Detailee,
27 Communications and Technology; Sean Farrell, Professional Staff
28 Member, Communications and Technology; Margaret Tucker Fogarty,
29 Staff Assistant; Theresa Gambo, Human Resources/Office
30 Administrator; Elena Hernandez, Press Secretary; Paul Jackson,
31 Professional Staff, Digital Commerce and Consumer Protection;
32 Tim Kurth, Deputy Chief Counsel, Communications and Technology;
33 Lauren McCarty, Counsel, Communications and Technology; Brannon
34 Rains, Staff Assistant; Austin Stonebraker, Press Assistant; Evan
35 Viau, Legislative Clerk, Communications and Technology; Michelle
36 Ash, Minority Chief Counsel, Digital Commerce and Consumer
37 Protection; Jeff Carroll, Minority Staff Director; Jennifer
38 Epperson, Minority FCC Detailee; Alex Hoehn-Saric, Minority Chief
39 Counsel, Communications and Technology; Jerry Leverich, Minority
40 Counsel; Jourdan Lewis, Minority Staff Assistant; Dan Miller,
41 Minority Policy Analyst; and C.J. Young, Minority Press
42 Secretary.

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43 Mrs. Blackburn. [presiding] The Subcommittee on
44 Communications and Technology will now come to order, and the
45 Chair recognizes herself for 5 minutes for an opening statement.

46 And I want to welcome you to today's subcommittee hearing
47 on rural broadband challenges and solutions. Extending the reach
48 of broadband in rural Tennessee and across America is critical
49 to ensure that everyone can participate in the digital economy.

50 While the percentage of rural Tennesseans still lacking access
51 to high-speed internet has decreased from 34 percent to 23
52 percent, we have to continue to push. You can't have a 21st
53 century economy without a 21st century internet.

54 Since passage of the 1996 Telecom Act, the private sector
55 has invested roughly \$1.6 trillion in their networks using
56 different technologies. Understanding different technologies
57 is key because broadband is more than just fiber. Moreover, we
58 should acknowledge private investment in rural deployment and
59 ensure that government-based solutions complement private
60 investment instead of competing with it. For example, I am
61 pleased to have the Satellite Industry Association testifying,
62 so we can learn about the strides they are making to deploy modern
63 satellites capable of delivering broadband internet anywhere in
64 the country.

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65 Almost six months ago, I chaired a hearing on closing the
66 digital divide. These hearings are useful, but, as chairman,
67 I like to focus on results. Today's hearing allows us to check
68 our progress, finding solutions and getting work done.

69 I am proud to report that members of this subcommittee have
70 worked together and accomplished quite a bit when it comes to
71 expanding broadband access in rural America. In March, Congress
72 passed RAY BAUM's Act, the most significant rural broadband
73 legislation to become law in the last six years. The bill is
74 named in honor of the E&C Committee Staff Director Ray Baum, who
75 passed away earlier this year. Ray was a champion for rural
76 America, and naming this bill for him is a fitting tribute.

77 RAY BAUM's Act incorporated several legislative proposals
78 we examined at our hearing in January. I will allow subcommittee
79 members to discuss the legislative solutions, but I would like
80 to highlight a couple that positively impact the people of
81 Tennessee and Americans everywhere.

82 Ms. Eshoo and Mr. McKinley took the reins on the broadband
83 conduits, the idea that the Department of Transportation should
84 facilitate broadband infrastructure on highway projects that use
85 federal dollars. I am pleased that we could work with Ms. Eshoo,
86 who had this great idea, common sense, and we finally got it done.

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87 Mr. Kinzinger and Mr. Loeb sack worked together to require
88 the FCC to study the potential of using spectrum more efficiently
89 for rural areas.

90 Lastly, our full committee chairman, Greg Walden, took on
91 the difficult issue of ensuring the solvency of the Broadcast
92 Relocation Fund. Wireless broadband providers spent over \$19.8
93 billion at auction for TV spectrum. Ensuring the solvency of
94 the Relocation Fund is crucial to getting this spectrum to use
95 for broadband, especially in rural areas.

96 After passage of RAY BAUM's Act, the subcommittee passed
97 two more rural broadband bills, the Precision Agriculture
98 Connectivity Act from Mr. Latta and Mr. Loeb sack, the ACCESS
99 BROADBAND Act from Mr. Tonko and Mr. Lance. These bills were
100 reported out of full committee last week. All of this shows that
101 Congress can, in fact, roll up our sleeves and get things done.

102 Rural broadband remains a challenge and there are still
103 unserved areas that need to be connected. With limited federal
104 dollars to go around, we simply cannot afford to allow
105 overbuilding to take place while so many areas are left completely
106 unserved. We need to encourage states to find solutions that
107 best suit their needs. We will not stop working, and I am proud
108 to lead this subcommittee in working with the President to find

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109 good bipartisan solutions.

110 I yield the balance of my time to Mr. Lance.

111 Mr. Lance. Thank you, Chairman Blackburn.

112 I have introduced the AIRWAVES Act with Ranking Member Doyle
113 which, among other things, would help spur rural broadband
114 deployment by dedicating 10 percent of spectrum auction proceeds
115 under the bill to rural broadband. Had this rural dividend been
116 in place during the previous two spectrum auctions, over \$6
117 billion would have been raised for rural buildout. I think that
118 it is incredibly important that rural America be treated the same
119 way as the rest of America.

120 It is also important that we recognize that any federal funds
121 for broadband deployment will be finite. I have worked hard to
122 pursue policies to ensure coordination between various agencies.

123 Mr. Chairman, I ask unanimous consent to introduce a
124 coalition letter of support for the AIRWAVES Act, and it includes
125 the African-American Mayors Association, the American Library
126 Association, the National Black Chamber of Commerce, and the
127 Taxpayer Protection Alliance.

128 Mrs. Blackburn. Without objection, so ordered.

129 [The information follows:]

130

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132 Mr. Lance. And I yield back the balance of my time.

133 Mrs. Blackburn. The gentleman yields back.

134 At this time, I recognize Mr. Doyle for 5 minutes.

135 Mr. Doyle. Thank you, Madam Chair.

136 Before I get started, I want to express my deepest
137 condolences to Robin Colwell, the majority's chief counsel, on
138 the passing of her husband Bill. I know Robin and her family
139 are grieving their loss, but our thoughts and prayers are with
140 her and her family.

141 Madam Chair, thank you for holding this hearing.

142 We live in a divided nation when it comes to broadband access.
143 All too often, people living in urban areas are the digital haves;
144 whereas, those living in rural areas are being left behind with
145 few or no choices, higher prices, and lower speeds.

146 As I and many of our colleagues have said in the past, if
147 we are going to bring more broadband to rural America, our
148 government needs to make a sustained investment in building out
149 more infrastructure. That is why I am proud to support Ranking
150 Member Pallone's LIFT America Act, which would dedicate \$40
151 billion to building out broadband infrastructure in the unserved
152 and underserved parts of the country. We also need to give
153 communities like Pinetops the freedom and flexibility to

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154 provision their own service. That is why I am proud to continue
155 to support Ms. Eshoo's Community Broadband Act. Ms. Coker Craig,
156 reading your testimony, reiterates exactly what this is such an
157 important option for rural communities.

158 I am also proud to have introduced the AIRWAVES Act with
159 Mr. Lance. This bill directs the FCC to conduct a number of
160 spectrum auctions as well as to make significant amounts of new
161 unlicensed spectrum available. The bill would set aside a
162 portion of the revenue from those auctions for the deployment
163 of new wireless broadband infrastructure in unserved and
164 underserved parts of rural America.

165 Mr. Aiken discusses in his testimony a number of the bands
166 in the bill which would be ideal for buildout of broadband in
167 rural areas, specifically the Citizens Broadband Radio Service,
168 or CBRS, and the lower C-band. It is important to keep in mind
169 that these bands could be structured in a way that would enhance
170 rural broadband deployment, but they don't have to be. The
171 Commission is currently considering changes to both these bands.

172 The CBRS band was envisioned as a model for an innovative
173 new spectrum licensing system that would cover smaller areas than
174 traditional cellular licenses. This licensing model was
175 supported by a broad range of industries, including rural

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176 broadband providers who see tremendous potential in being able
177 to access smaller, more affordable blocks of license spectrum.
178 But the Commission is considering changes to this band that would
179 drastically increase license sizes, crowding out smaller players,
180 so that only the largest wireless providers could bid on these
181 licenses.

182 The Commission also opened up a proceeding on the lower
183 C-band. Several satellite companies that operate in this band
184 have proposed making a portion of the band available for mobile
185 broadband, which is great, but I agree with Mr. Aiken that this
186 band has a lot more potential. The rest of the band could be
187 shared between satellite operators and broadband providers using
188 fixed wireless service. This proposal has the potential to
189 greatly expand broadband deployment in rural parts of the country.

190 In both of these bands, the Commission has before it two
191 roads. They can work to make as much spectrum available for
192 mobile broadband services. At the last hearing we had on that
193 topic, every witness acknowledged 5G would not solve rural urban
194 broadband divide. Or the FCC can adopt spectrum policies that
195 bring broadband to all Americans. I think it is important for
196 members on this subcommittee to realize that these are the
197 decisions that the Commission is making right now that could

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198 affect the future of broadband in rural communities.

199 With that, Madam Chair, I want to yield the remainder of
200 my time to Mr. Butterfield.

201 Mr. Butterfield. Thank you very much, Mr. Doyle, for
202 yielding time this morning.

203 And thank all of the witnesses for their testimony.

204 Madam Chairman, one of the privileges extended to members
205 of this committee is to introduce their constituents when the
206 committee invites them to testify. So, you can imagine my
207 surprise when I learned that the committee had extended an
208 invitation to one of my constituents from the town of Pinetops,
209 North Carolina, population 1300, to serve as a witness for today's
210 hearing on rural broadband.

211 The town is a small, rural community located in my district
212 in Edgecombe County. The town, with a population of 1300,
213 comprises an area of about one square mile. In fact, I was in
214 the town on Saturday night. I pass through there quite often.

215 I stopped at Abrams Bar-B-Q, and former Sheriff James Knight
216 was there. And he bought me a plate of barbeque, slaw, and hush
217 puppies just this past Saturday night.

218 Pinetops, Madam Chairman, is home to my constituent Suzanne
219 Coker Craig, who accepted the committee's invitation to testify.

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220 Ms. Craig and her husband Doug are small business owners in the
221 town. Before starting her business in 2010 that continues to
222 grow, Ms. Craig was Director of Advocacy Programs for the North
223 Carolina Hospital Association. She served as Pinetops' Town
224 Commissioner from 2009 to 2017, played a key role in securing
225 high-speed internet service for the constituents in the town.

226 And so, I am proud to welcome Suzanne to the committee. Suzanne
227 will share her experience of living in an extremely rural
228 community and the challenges that she and others face when not
229 connected to the digital world.

230 Thank you for yielding this time, Madam Chairman and Mr.
231 Doyle. At this time, I will yield back.

232 Mrs. Blackburn. The gentleman yields back.

233 At this time, I recognize Mr. Walden, chairman of the full
234 committee, for 5 minutes for an opening.

235 The Chairman. Thank you, Madam Chair, and I want to thank
236 my colleagues, and certainly our panelists, for being here today.

237 Mr. Butterfield, we would have thought we would get to sample
238 some of that fine barbeque. Yes, okay, we got that on the record.

239 I want to welcome our witnesses, as I said, and I really
240 appreciate your being here. Particularly, I want to thank my
241 constituent, Ms. Jenni Word from the Wallowa Memorial Hospital,

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242 for coming here all the way from Wallowa County. She is there
243 in Enterprise, a population of 1,916 people, and the county, with
244 6800 people, spans 3,152 square miles. So, this is big, wide-open
245 country, beautiful mountain ranges, and forests and farmland.

246 It is tucked in the far northeast corner of Oregon. It is larger
247 than the state of Delaware and very rugged and remote.

248 I have worked over the years with the health center there
249 and the hospital and others on their efforts to build out fiber
250 and get really good connectivity. We recently worked together
251 with the FCC. Chairman Ajit Pai was in Oregon just after he
252 announced he was raising the cap on the FCC's Rural Health Care
253 Program. This really helps the folks to allow a county healthcare
254 district and other rural providers to get affordable broadband
255 service.

256 Ms. Word will detail the telehealth opportunities that
257 broadband access has opened up, and, most importantly, expanding
258 the care patients can receive locally without having to travel
259 hours to other hospitals. This is certainly of huge benefit in
260 a place where, as a county commissioner once told me, Susan
261 Roberts, it is winter 11 months out of the year and sometimes
262 it snows in August. And that is true.

263 Telemedicine, however, is only one example of the

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264 opportunities provided by broadband access in our rural
265 communities all across America. Eastern Oregon University, Blue
266 Mountain Community College, and others, are taking advantage of
267 distance learning to expand access to higher education in isolated
268 communities. Farmers and ranchers across America, and certainly
269 in my district, are using precision agriculture more and more
270 to regulate their inputs, and the transition to Next Gen 911 is
271 critical for strengthening public policy.

272 After all, broadband is the infrastructure investment of
273 the 21st century. Broadband means jobs, and jobs come from
274 deployment of broadband, including towers and cell sites, fiber,
275 launching satellites, upgrading facilities that constitute the
276 physical infrastructure.

277 And the economic benefits don't stop at that infrastructure
278 investment. Maintaining this infrastructure requires
279 high-skilled jobs in engineering, network management,
280 cybersecurity, advertising, customer service, and much more.
281 Beyond all that, we know broadband is a force multiplier for job
282 creation and providing efficiencies for every sector of the
283 economy.

284 Our Chair ran through some of the bills, including the RAY
285 BAUM's Act, but the Chair herself deserves credit for spearheading

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286 the overall effort. This legislation, now law, included many
287 provisions to improve broadband buildout.

288 Spectrum auctions, for example, raise billions of dollars
289 in federal revenue for deficit reduction and other investments,
290 but a quirk in the law prevented the FCC from taking upfront
291 payments of auction bidders and depositing the money directly
292 with the U.S. Treasury. Though spectrum is the lifeblood of
293 wireless broadband, this effectively stopped the FCC from
294 conducting further spectrum auctions.

295 So, this committee, and under the Chair's leadership, took
296 care of that in the RAY BAUM's Act. RAY BAUM's Act fixed this
297 by including a bipartisan bill from Mr. Guthrie and Ms. Matsui
298 that allows the FCC to deposit legally upfront payments directly
299 with the Treasury. As a result, the FCC is now moving forward
300 with its upcoming spectrum frontiers auction, which will make
301 more high band spectrum available for 5G.

302 RAY BAUM's Act, signed into law March 23rd, as you have heard,
303 I have a feeling the bill's namesake Ray, who was from eastern
304 Oregon and actually represented Wallowa and Union Counties in
305 the state legislature, and called them God's country, would be
306 very proud of our efforts then and now.

307 While some may have been content with that accomplishment

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308 that we did earlier this year, this subcommittee continues to
309 process important bills through regular order. And just last
310 week, the full committee took up four more bills that were
311 unanimously approved by this subcommittee. So, these bipartisan
312 bills include Mr. Tonko and Mr. Lance's ACCESS BROADBAND Act,
313 which is an important and necessary step to coordinate funding
314 for broadband across different agencies. We also passed Mr.
315 Latta and Mr. Loeb sack's Precision Agriculture Connectivity Act,
316 which requires the FCC and the U.S. Department of Agriculture
317 to form a task force to evaluate the best ways to leverage
318 broadband for modern high-tech farming and ranching. These bills
319 illustrate what we can accomplish when we work together, as we
320 do often, on a bipartisan basis.

321 However, other Members have put forward bills to address
322 rural broadband challenges, and these proposals will deserve our
323 attention and consideration as well. And I expect we will hear
324 about some of those today and we will continue to work on those.

325 I look forward to this hearing as a followup to our January
326 hearing on closing the digital divide and the numerous other
327 infrastructure-related hearings we have conducted this Congress.

328 So, we have got more work to do to improve access and for
329 telehealth, precision agriculture, education, and jobs across

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330 America.

331 But I want to thank Ms. Word for being here today. We really
332 appreciate your coming out. I look forward to your testimony.

333 I will say in advance we have another hearing going on at
334 the same time, so I will be bouncing back and forth. But we have
335 the testimony from all of you and we appreciate your input.

336 With that, Ms. Chair, I yield back the balance of my time.

337 Mrs. Blackburn. The gentleman yields back.

338 Mr. Pallone, you are recognized for 5 minutes.

339 Mr. Pallone. Thank you, Madam Chair.

340 From the start of the Trump administration, there has been
341 a bipartisan call to modernize America's infrastructure,
342 including expanding broadband to communities that need it, and
343 this takes significant resources and cannot be done simply through
344 deregulation or streamlining processes. Actual investments are
345 needed, and we must see states and local governments as partners,
346 not adversaries.

347 Committee Democrats recognize the need for real investment
348 and to develop legislative proposals to build the modern,
349 resilient infrastructure that Americans need and deserve.
350 First, the LIFT America Act will authorize this \$40 billion in
351 grants for the deployment of secure and resilient broadband.

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352 This comprehensive infrastructure bill, which is supported by
353 every Democrat on this committee, will also invest in drinking
354 water infrastructure, energy infrastructure, healthcare
355 infrastructure, and brownfields redevelopment. These
356 investments will make Americans more competitive, safer,
357 healthier, and connected.

358 Second, Mr. Lujan, along with a number of other Democrats
359 on the committee, introduced the Broadband Infrastructure Finance
360 and Innovation Act. This bill would authorize \$5 billion worth
361 of secured loans, loan guarantees, and lines of credit to finance
362 public/private partnerships for broadband deployment.

363 Third, Mr. Tonko has introduced the ACCESS BROADBAND Act,
364 which was just reported by this committee to the full House of
365 Representatives last week. This bill would create an Office of
366 Internet Connectivity and Growth to help ensure we are using
367 existing broadband programs and new ones to get the most bang
368 for the buck. I urge my colleagues to bring this bill to the
369 House Floor as soon as possible.

370 Committee Democrats have also put forward many other
371 innovative solutions that could make a real change in connecting
372 the unconnected and opening up our airwaves for new wireless
373 broadband services. Unfortunately, the administration and my

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374 Republican colleagues have placed infrastructure legislation on
375 the back burner behind its tax scam that benefits large
376 corporations and the wealthiest few. Rather than making real and
377 substantial investments in our nation's crumbling
378 infrastructure, they, instead, choose to throw billions of
379 dollars in tax credits at the wealthy who simply do not need them.

380 So, I think we need to invest in broadband infrastructure,
381 particularly in rural and urban communities that have been left
382 behind. According to the FCC, 30 percent of Americans in rural
383 areas and 35 percent of Americans living on tribal lands lack
384 access to baseline broadband service, and this is based on mapping
385 data that we know underreports the scope of the problem.

386 So, it is time to act. Democrats have bold proposals that
387 will actually drive broadband deployment in all 50 states. These
388 proposals are technologically-neutral and open the door to all
389 internet service providers that can deliver fast and secure
390 broadband access. We need to think outside the box in our effort
391 to connect all Americans to the benefits of the internet. I look
392 forward to hearing from our witnesses on how we can ensure access
393 to high-speed broadband throughout America, including rural
394 communities.

395 On a brief personal note, if I could just say I was incredibly

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396 saddened to hear that Robin Colwell of the subcommittee's majority
397 staff lost her husband Bill over the weekend following his battle
398 with cancer. I want to offer our deepest condolences from the
399 Democratic side and sympathies to her and her family in this trying
400 time.

401 I yield back, Madam Chair.

402 Mrs. Blackburn. The gentleman yields back. No one is
403 seeking to claim his time.

404 We appreciate so much the thoughts and condolences for Robin.
405 We know that you all wish Robin and her girls well during this
406 sad time.

407 This concludes our member opening statements. The Chair
408 would like to remind members that, pursuant to the committee
409 rules, all members' opening statements will be made a part of
410 the record.

411 Mrs. Blackburn. We want to thank all of our witnesses for
412 being here today and taking the time to accept the invitation
413 and come before the subcommittee. Today's witnesses will have
414 the opportunity to give their opening statements, followed by
415 a round of questions.

416 Our panel for today's hearing will include Mr. Tom Stroup,
417 President of the Satellite Industry Association; Mr. Justin

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21

418 Forde, Senior Director of Government Relations at Midco; Mr.
419 Claude Aiken, President and CEO of the Wireless Internet Service
420 Providers Association; Mr. John May, President of Ag Solutions
421 and the Chief Information Officer at John Deere & Company; Ms.
422 Jenni Word, Associate Administrator and Chief Nursing Officer
423 at Wallowa Memorial Hospital in Oregon, and Ms. Suzanne Coker
424 Craig, a former Commissioner of the town of Pinetops and the
425 current Managing Partner at CuriosiTeas of Pinetops.

426 We appreciate each of you being here today, and we appreciate
427 your testimony.

428 We will begin with you, Mr. Stroup, 5 minutes for your opening
429 statement.

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22

430 STATEMENTS OF TOM STROUP, PRESIDENT, SATELLITE INDUSTRY
431 ASSOCIATION; JUSTINE FORDE, SENIOR DIRECTOR OF GOVERNMENT
432 RELATIONS, MIDCO; CLAUDE AIKEN, PRESIDENT AND CEO, WIRELESS
433 INTERNET SERVICE PROVIDERS ASSOCIATION; JOHN C. MAY, PRESIDENT,
434 AG SOLUTIONS, AND CHIEF INFORMATION OFFICER, JOHN DEERE & COMPANY;
435 JENNI WORD, ASSOCIATE ADMINISTRATOR AND CHIEF NURSING OFFICER,
436 WALLOWA MEMORIAL HOSPITAL, AND SUZANNE COKER CRAIG, A FORMER
437 COMMISSIONER OF THE TOWN OF PINETOPS AND MANAGING PARTNER,
438 CURIOSITEES OF PINETOPS

439

440 STATEMENT OF TOM STROUP

441 Mr. Stroup. Chairman Blackburn, Ranking Member Doyle, and
442 distinguished members of the subcommittee, thank you for having
443 me testify here today.

444 I am Tom Stroup, President of the Satellite Industry
445 Association.

446 Satellite communication services are positioned to be the
447 keystone for bringing 21st century broadband capabilities to the
448 entirety of the United States. These services are capable of
449 providing broadband to rural and remote areas of the country,
450 where it remains uneconomical for terrestrial services to deploy,
451 and both provide speeds and prices comparable to terrestrial

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452 alternatives. These services are available directly to the
453 consumer today, covering all 50 states and delivering broadband
454 offerings up to 100 megabits per second.

455 Satellite broadband is also used by business and government
456 enterprises for both fixed and mobile purposes, using a range
457 of spectral bands to deliver assured access to broadband
458 communications. Further, satellites are providing critical
459 backhaul internet connectivity to local internet service
460 providers and community institutions in remote locations.
461 Today, approximately 2 million customers nationwide are enjoying
462 high-quality satellite broadband services at reasonable rates
463 and at speeds that meet and exceed the FCC's definition of
464 broadband service.

465 The satellite industry is investing tens of billions of
466 dollars to innovate and increase broadband connectivity to the
467 U.S. and across the globe. High-throughput satellites, for
468 example, rely on frequency reuse and spot-beam technology to
469 produce increased output factors upward of 20 times that of
470 traditional satellites.

471 The industry has seen similar increases in the capacity of
472 its systems. The first broadband satellite began service in 2008
473 with a capacity of 10 gigabits per second. Today's satellites

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474 have capacities of up to 260 gigabits per second, a number expected
475 to increase to 1,000 gigabits per second by the end of the decade.

476 These terabit-capacity geostationary satellites will provide
477 orders of magnitude capacity increases.

478 In another highly anticipated advancement in the industry,
479 thousands of new, high-throughput, non-geostationary satellites
480 will soon join existing operators in low-earth and medium-earth
481 orbits to provide additional high-speed broadband at low latency
482 levels. Indeed, prototypes of these satellites have already
483 begun to launch.

484 As Congress develops its broadband policies, it should
485 consider the many positive attributes of satellite broadband.

486 These include, No. 1, competition. Just as it has with radio
487 and television services in the past, satellite services provide
488 market-based competition to terrestrial broadband services.

489 Satellite broadband brings additional package options, pricing,
490 and innovative services to consumers, often in areas with only
491 a single or small number of providers.

492 No. 2, wide geographic coverage. To address the digital
493 divide, broadband services need to be available for the most rural
494 and remote areas of the country. The nature of satellite's wide
495 coverage ensures that all communities within the satellite's

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496 footprint receive the same quality of service, whether they are
497 remote communities or big cities. Public policymakers should
498 leverage terrestrial-style incentives with satellite's
499 geographically-independent cost structure to achieve universal
500 communication services.

501 No. 3, availability. Unlike terrestrial service, satellite
502 broadband is available today across a significant portion of the
503 country without the buildout of additional infrastructure.
504 Customers can obtain satellite broadband services by simply
505 ordering and awaiting at-home installation.

506 No. 4, cost efficiency. Because satellite systems have
507 inherently wide area coverage, when technology-neutral
508 incentives are made to encourage capacity redirection, there is
509 no additional cost to build out to rural and remote areas, only
510 lost opportunity costs in more lucrative service areas. This
511 is unlike terrestrial services, where the low density of rural
512 and remote areas makes it costlier and in most cases not
513 economically viable to build out and cover these areas.

514 And, 5, reliability. Natural and manmade disasters can
515 interrupt terrestrial broadband services. Satellites, however,
516 are less affected by these events, and satellite ground systems
517 or satellite-enabled airborne equipment can be quickly deployed

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518 to restore connectivity.

519 Of course, all of the breakthroughs we have seen because
520 of satellite technologies should not be taken for granted. They
521 depend upon our industry's ability to access spectrum. In order
522 for our industry to sustain and meet the growing demand for
523 satellite services, we encourage regulators to continue to
524 allocate sufficient spectrum for satellite use and to support
525 the national broadband mapping system as to provide a clear and
526 complete map of broadband services.

527 Thank you, and I look forward to your questions.

528 [The prepared statement of Mr. Stroup follows:]

529

530 ***** INSERT 2*****

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531

Mrs. Blackburn. The gentleman yields back.

532

Mr. Forde, you are recognized, 5 minutes.

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533 STATEMENT OF JUSTIN FORDE

534

535 Mr. Forde. Chairman Blackburn, Ranking Member Doyle, and
536 members of the subcommittee, thank you for inviting me here today
537 to discuss the challenges we face and the solutions we are working
538 on to bring the benefits of broadband to rural America.

539 My name is Justin Forde, and I am the Senior Director of
540 Government Relations for Midco. Midco is the leading provider
541 of internet and networking, cable TV, phone, data center, home
542 security, and advertising services in the Upper Midwest. We
543 serve more than 385,000 residential and business customers in
544 South Dakota, North Dakota, Minnesota, Kansas, and Wisconsin in
545 communities ranging in size from less than 100 people to more
546 than 180,000.

547 Midco has a history of innovation in the Upper Midwest that
548 continues to motivate our business today. In 2017, we launched
549 the Midco Gig Initiative, a commitment to bring gigabit internet
550 speeds to our entire service area. We have invested over \$56
551 million in the Gig Initiative over and above the millions of
552 dollars we invest in our network annually. Today, Midco Gig is
553 available to more than 80 percent of our customers, with more
554 communities to come in 2018.

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555 We are also focused on expanding our service to more cities
556 and more communities across the region, but there are challenges
557 and high costs associated with building fiber in our area of the
558 country. While thinking about a creative solution to this
559 challenge, we were contacted by the rural community of Brooktree
560 Park, North Dakota, to help them obtain broadband access. We
561 quickly determined that bringing wireline service to the area
562 was not economically feasible, but we partnered with InvisiMax,
563 a fixed wireless provider, and we were able to offer broadband
564 service to that area within 30 days.

565 Recognizing the potential of the fixed wireless solution
566 to provide broadband to more rural residents, Midco has acquired
567 InvisiMax, and we have begun to expand fixed broadband wireless
568 with service more broadly in rural areas within our footprint.

569 Fixed wireless allows us to reach areas that are up to 50 miles
570 away from our fiber network, and we can implement that solution
571 relatively quickly without the expense of constructing fiber
572 networks.

573 We can use fixed wireless to offer internet where the terrain
574 can make it difficult, if not impossible, to provide wire
575 internet, such as the Badlands of North and South Dakota, the
576 granite fields of northern Minnesota, or the limestone cliffs

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577 in eastern Minnesota. We can also reach vast areas of farmland
578 where it is not economically feasible to run fiber to every single
579 acre. We can deploy new fixed wireless during the winter months,
580 when difficult winters make new fiber construction impossible.

581 I, myself, am a Midco fixed wireless customer. I get my
582 internet from the top of a grain elevator in Prosper, North Dakota,
583 to my small farmstead 6 miles west of Argusville, North Dakota.

584 On a normal day, my three kids are streaming video or other
585 content while my wife is using the internet to run a small
586 business. This service has been a great asset to our family.

587 Even today, it allows me to keep an eye on the farm from
588 Washington, D.C., through a video and security systems enabled
589 by fixed wireless.

590 Midco supports your hard work to ensure that all Americans
591 have access to broadband services. We greatly appreciate the
592 bipartisan commitment of this committee to produce bills that
593 nurture a broadband-deployment-friendly atmosphere. Your
594 efforts on the RAY BAUM's Act and the MOBILE NOW Act to include
595 broadband deployment provisions like the dig-once policy and a
596 spectrum policy bouncing licensed and unlicensed uses, your
597 thoughtful consideration of the ACCESS BROADBAND Act, have
598 contributed to an environment in which we are more able to easily

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31

599 invest, expand, and deploy.

600 Today, I would like to offer two suggestions for how you
601 might help us further advance the reach of broadband networks.

602 First, in some cases, government help is needed to bring
603 broadband access to areas it is not financially viable to build.

604 In the past, some broadband funding programs have allowed funds
605 to be uses in places that already have broadband service. We
606 were encouraged to see the pilot funding program in the Omnibus
607 Appropriations Act and in the Senate farm bill that both seek
608 to limit funding to areas that need it most. We ask your support
609 efforts to keep broadband funding dollars to unserved areas.

610 Second, to serve the greatest number of rural residents via
611 fixed wireless, we must have the ability to purchase spectrum.

612 We need more wide channels and spectrum bands where we receive
613 interference protection, and we must have a fair ability to
614 compete for access to any spectrum that is open and appropriate
615 for fixed wireless service.

616 Congress should support the FCC in its effort to expand the
617 categories of eligible uses for certain underutilized spectrum
618 bands, like 2.5 gigahertz, and support the FCC in adopting smaller
619 license sizes and appropriate auction rules for bands that have
620 potential for fixed wireless in rural areas. These actions will

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621 help all Americans, including those in rural America, to receive
622 the full potential of America's broadband networks.

623 Thank you again for inviting me here today, and I look forward
624 to working with all of you on these important issues.

625 [The prepared statement of Mr. Forde follows:]

626 ***** INSERT 3*****

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33

627

Mrs. Blackburn. The gentleman yields back.

628

Mr. Aiken, you are recognized.

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629 STATEMENT OF CLAUDE AIKEN

630

631 Mr. Aiken. Good morning, Chairman Blackburn, Ranking
632 Member Doyle, and members of the subcommittee.

633 I am Claude Aiken, President and CEO of WISPA, the Wireless
634 Internet Service Providers Association, representing more than
635 800 small businesses who are closing the digital divide in rural
636 America. I am honored to offer our perspective on how fixed
637 wireless broadband is making a difference in rural America.

638 The majority of our members got their start the same way.
639 They were bootstrapping entrepreneurs who saw the need for better
640 broadband in their communities and answered the call. Whether
641 it was via maxed-out personal credit cards, small loans from
642 family members, or putting their life savings on the line, our
643 members have built workable, cost-efficient, local networks and
644 given their neighbors what they never had before, high-speed
645 broadband internet.

646 Our members use whatever spectrum is available, unlicensed,
647 lightly licensed, or licensed spectrum. They lease whatever
648 infrastructure is available to hang radios. It may be commercial
649 towers, local water towers, or a neighbor's grain silo or barn.
650 They transmit internet data, often over many miles, to small

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651 fixed receivers on their customer's premises, and they provide
652 high-speed, low-latency, uncapped broadband, typically in the
653 range of 5 to 50 megabits per second, and speeds of up to 1 gigabit
654 per second are possible with current technology.

655 Our members are overwhelmingly small, local, rural
656 providers. More than half have fewer than 1,000 customers.
657 Almost three-quarters have fewer than 10 employees. But, despite
658 their small size, they are making a difference, serving more than
659 4 million people across our nation, and the majority do this
660 without any government subsidies.

661 Most importantly, WISPs can deploy fixed wireless service
662 to residential consumers at about one-seventh the cost of fiber
663 and one-fourth the cost of cable. That is right, we can deploy
664 broadband for a fraction of the cost of fiber and cable, and we
665 can deploy much more quickly, usually in months, rather than
666 years.

667 Clearly, we are a significant part of the solution. So,
668 how can we in D.C. help unleash the power of fixed wireless
669 economics to better serve your communities? The most important
670 thing the subcommittee can do is to support more flexible, shared,
671 and lightly licensed use of underutilized spectrum bands. Our
672 members are often frustrated that they have potential customers

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673 within range of their towers, but insufficient spectrum to serve
674 them, all the while licensed spectrum in their areas goes unused.

675 Thankfully, this subcommittee has been a part of the
676 solution. We commend your work to lower barriers to
677 infrastructure deployment, streamline regulations, and widen the
678 spectrum pipeline. Legislation like the AIRWAVES Act and the
679 ACCESS BROADBAND Act will make a difference in rural America.

680 WISPA also commends the FCC for moving forward on rulemaking
681 proceedings that could and should make more spectrum available
682 for rural broadband deployment. The FCC is at a critical juncture
683 on one proceeding that I will briefly highlight, the ongoing
684 Citizens Broadband Radio Service, or CBRS, proceeding. It is
685 no exaggeration to say that this proceeding is vitally important
686 to the future of rural broadband.

687 In 2015, the FCC adopted innovative rules that would have
688 auctioned seven 10-megahertz spectrum licenses in blocks the size
689 of Census tracts, about 4,000 people each. But, last summer,
690 the FCC reopened the rule seeking comment on greatly enlarging
691 the license areas, up to the size of a partial economic area which
692 generally contain both urban and rural areas and often cross state
693 lines.

694 For our members, enlarging the license areas would be like

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695 requiring an entrepreneur who wants to open a kiosk to purchase
696 an entire shopping mall. Our members need the FCC to keep the
697 existing unlicensed or GAA spectrum allocation intact and retain
698 small, Census-tract-sized licenses in the CBRS band. This would
699 increase auction participation and revenues and enable our
700 members, and all kinds of entrepreneurs and innovators, to
701 participate in the auction, not just our largest companies.

702 And here's another reason why balanced spectrum policy is
703 so important. If rural service can be deployed at much lower
704 cost by fixed wireless providers, there is much less need for
705 doling out subsidies to large carriers to offset their much higher
706 costs. For example, ZIRKEL Wireless in Colorado is serving areas
707 with one person per square mile without any government subsidies.

708 With the right spectrum policy, access to private capital will
709 become easier for small providers, and broadband deployment in
710 rural and small town America will accelerate.

711 To the extent subsidiaries are necessary, they should be
712 made available in a technology-neutral and a provider-neutral
713 manner. Too often, small WISPs find themselves overbuilt by
714 providers receiving state or federal subsidies. We need to work
715 together to find solutions that will prevent small companies that
716 have invested private capital from facing competition from large

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717 companies backed with government subsidies, grants, and loans.

718 Madam Chairman, our members are closing the rural broadband
719 gap without subsidies, and we call on you to help modernize and
720 rebalance U.S. spectrum policy, so that we can reach even more
721 Americans in underserved areas.

722 We thank you for the opportunity to testify, and I look
723 forward to your questions.

724 [The prepared statement of Mr. Aiken follows:]

725

726 ***** INSERT 4*****

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727

Mrs. Blackburn. The gentleman yields back.

728

Mr. May, you are recognized.

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729 STATEMENT OF JOHN MAY

730

731 Mr. May. Chairman Blackburn and Ranking Member Doyle, thank
732 you for the opportunity to be here today and speak about rural
733 broadband, a very important issue for many farmers and others
734 in the agricultural sector.

735 My company, John Deere, is the global leader in manufacture
736 of agricultural, construction, turf, and forestry equipment.
737 For 181 years, Deere has been helping farmers get more production
738 from their fields in an efficient and sustainable manner.
739 Technology, a big part of agriculture and the John Deere story,
740 is the key to helping farmers meet the world's needs for food
741 and agricultural goods in the future. And having access to
742 broadband internet services is absolutely essential to leveraging
743 the benefits that technology has to offer.

744 The evolution of technology in agriculture is critical.
745 That is because global demand for agricultural output, which has
746 more than tripled since 1960, shows no signs of easing. Given
747 forecasts of global population growth and dietary improvements,
748 farm output will need to roughly double from 2000 levels to meet
749 the projected demand in 2050. What's more, these output gain
750 will need to take place with essentially the same amount of land

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751 and water, and probably less labor. By and large, the
752 technologies needed to produce these gains depend on the delivery
753 of reliable internet connections to farmers in the field,
754 something many farmers can't count on today.

755 The extent of the broadband access problem in agriculture
756 is hard to measure in exact terms, but we know anecdotally it
757 is a significant issue. Based on the rate of successful
758 connections between our John Deere customers and our data
759 management platforms, we know there are many instances where
760 producers cannot fully leverage the benefits of their data on
761 account of nonexistent or unreliable internet service. This is
762 to say nothing about connections that are never made or even
763 attempted by those who lack internet service and don't bother
764 to invest in the technologies in the first place.

765 The nature and the extent of the problem is exactly why we
766 believe federal policy and programs should give more
767 consideration to the needs of farmers and ranchers. Without a
768 better understanding of the problem, we can't begin to design
769 the right solution.

770 John Deere commends the Energy and Commerce Committee's
771 approval of H.R. 4881, the Precision Agricultural Connectivity
772 Act. Along with our partners in the Agricultural Broadband

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773 Coalition, John Deere endorsed the bill. We see it as an
774 important first step to addressing agricultural broadband issues.
775 We are hopeful this legislation will be enacted this year, either
776 as part of the farm bill or on its own.

777 We also believe federal agencies with broadband deployment
778 mandates should view access through an expanded lens, one that
779 incorporates a geographic and functional usage metric, as opposed
780 to looking only at population centers. In our view, broadband
781 access on active cropland should be included as a metric for
782 identifying areas where broadband infrastructure investment is
783 most needed.

784 Cell towers are for the time being the key for delivering
785 high-speed LTE terrestrial signals, and we need more of them over
786 croplands and ranchlands. As you know, farms represent a
787 significant source of commercial activity in rural communities.

788 Owners, employees, buyers, vendors, and service providers all
789 conduct business in and around the farm operations. Supporting
790 increased wireless broadband deployment in the very places where
791 farming activities occur, in the fields, will bring many benefits
792 to rural communities. These include increased economic growth,
793 improved environmental stewardship, and enhanced food security.

794 John Deere's higher purpose or mission is to help people

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795 live better lives through our commitment to those that are linked
796 to the land. Today, we are expressing that commitment in the
797 many ways we are developing and using technology, almost all of
798 which is digital in nature and internet-based. That will help
799 feed the world in a sustainable manner for generations to come.

800 Thank you, and I look forward to your questions.

801 [The prepared statement of Mr. May follows:]

802

803 ***** INSERT 5*****

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804

Mrs. Blackburn. We thank the gentleman.

805

Ms. Word, you are recognized for 5 minutes.

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45

806 STATEMENT OF JENNI WORD

807

808 Ms. Word. Good morning, Chairman Blackburn, Ranking Member
809 Doyle, members of the subcommittee. Thank you for this
810 opportunity to appear before you today.

811 My name is Jenni Word. I serve as the Associate
812 Administrator and Chief Nursing Officer at Wallowa Memorial
813 Hospital in Enterprise, Oregon. Our facility is a 25-bed
814 critical-access hospital and Level 4 trauma center. I am proud
815 to report we have been named one of the top 20 critical-access
816 hospitals in the nation for the past two years.

817 Our hospital serves Wallowa County and, as Congressman
818 Walden referred to before, has a population of just under 7,000
819 people spread over 3,152 square miles in frontier northeastern
820 Oregon. That is a population density of 2.2 persons per square
821 mile. The next nearest hospital, also a critical-access
822 hospital, is 65 miles away.

823 I would like to focus my testimony on the important role
824 broadband plays in bringing telehealth services to rural and
825 frontier areas. Our hospital provides a wide array of services,
826 but not all the services our community needs. Telehealth has
827 enabled us to fill this gap and ensure access to high-quality

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828 care in our frontier county.

829 In my written testimony, I provided three examples that
830 illustrate the lifesaving role telehealth can play in areas like
831 ours. Broadband infrastructure is the foundation on which
832 providers like ours can use telehealth technology to meet health
833 crises like these.

834 Moving forward, reliable, affordable broadband in homes and
835 remote rural hospitals and clinics will be critical as we
836 transform the current healthcare delivery system. Our goal is
837 a system that effectively coordinates care for our patients,
838 rewards value, improves quality and patient safety, and reduces
839 costs. Broadband is the lynchpin of that effort.

840 We are fortunate in Wallowa County to have good broadband
841 infrastructure. But, even so, our county has many remote areas
842 that do not yet have broadband connectivity. Nationwide, the
843 Federal Communications Commission reports that 34 million
844 Americans still lack access to adequate broadband.

845 Oregon has made significant progress in the deployment of
846 broadband connectivity. However, a 2014 survey of broadband
847 adoption in Oregon found that rural areas lagged behind their
848 urban neighbors in having access to broadband connectivity and
849 rural residents are less likely than their urban counterparts

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850 to use broadband technologies.

851 The Mississippi State Extension Service Index identified
852 Wallowa County as one of 10 Oregon counties with the highest
853 digital divide index. Congress took steps in the fiscal year
854 2018 omnibus appropriations bill to address the digital divide,
855 and the FCC recently increased funding available through the Rural
856 Health Care Program, which supports broadband adoption for the
857 nonprofit rural healthcare providers. We applaud both of these
858 actions and thank you for your role in making them a reality.

859 As these programs are implemented, we look forward to taking
860 advantage of these new resources.

861 Finally, I would like to say something about telehealth.

862 The potential for telehealth to expand access to medical
863 treatment seems limitless, especially in rural and frontier areas
864 where vast distances make it difficult to get to a doctor or to
865 a hospital. However, there are barriers preventing us from
866 realizing that potential. For example, Medicare payment policy
867 restricts sites eligible for reimbursement, limits distance site
868 providers, and restricts the services for which Medicare will
869 reimburse. Medicare does not reimburse for remote patient
870 monitoring, a potentially vital tool in monitoring patients with
871 chronic conditions, especially those in rural areas. Medicare

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872 also doesn't reimburse for phone, email, fax-based services, or
873 store-and-forward technology.

874 Providers would like these geographic and setting location
875 requirements eliminated and expansion of the types of technology
876 that can be used, and coverage for all services that are safe
877 to provide. Rural communities also need additional capital to
878 develop telehealth capabilities as well as adequate funding to
879 operate systems, once they are up and running.

880 I am pleased that the Bipartisan Budget Act of 2018 expanded
881 Medicare coverage for telestroke and provided waivers for some
882 alternative payment models, but more should be done. Every week,
883 it seems, new technologies become available to help patient needs.

884 The use of telehealth and other new technologies will improve
885 access to healthcare, improve outcomes, and reduce costs. Public
886 policy should not hold us back as we seek to realize the potential
887 these new technologies hold.

888 I applaud the committee and its Chair and my Congressman,
889 Greg Walden, for the leadership it has shown in addressing these
890 challenges. There is certainly more work to do, and Wallowa
891 Memorial Hospital and other rural hospitals stand ready to work
892 with you in that effort.

893 Thank you.

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894

[The prepared statement of Ms. Word follows:]

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897

Mrs. Blackburn. We thank the gentlelady.

898

Ms. Coker Craig, you are recognized for 5 minutes.

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899 STATEMENT OF SUZANNE COKER CRAIG

900

901 Ms. Coker Craig. Thank you all for your invitation this
902 morning. I appreciate the opportunity to be here.

903 And thank you to Congressman Butterfield for the
904 introduction. I am glad to hear you are hanging out at Abrams.

905 [Laughter.]

906 My name is Suzanne Coker Craig, and I am small business owner
907 and former Commissioner in the town of Pinetops, North Carolina.

908 Our little town is 65 miles east of Raleigh and is centrally
909 located between Greenville, Wilson, and Rocky Mount. We have
910 a significant number of our residents who live well below the
911 poverty level, and we are located in Edgecombe County, which is
912 one of the poorest counties in the state. Unlike much of North
913 Carolina, our local population has declined over the last 20
914 years, and we struggle to attract and keep college-educated people
915 as well as small businesses and small industry in our area.

916 Even with all of these challenges, Pinetops is a wonderful
917 community in what I consider to be the best part of North Carolina.

918 We have all the benefits of small town life, but are an easy
919 drive to small cities around us. We are a great place to live
920 and to raise a family. And in March of 2016, our little town

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921 got symmetrical gigabit speed broadband internet service that
922 made my 25-year-old nephew in Raleigh jealous.

923 But our own state legislature has constantly fought to
924 disconnect us and take away the best economic, educational, and
925 lifestyle benefit we have had in 50 years. Like most small areas,
926 ours got left way behind in the technology boom. As the internet
927 exploded, we struggled to get much more than a dial-up connection.

928 Our only provider showed little interest in upgrading their
929 antiquated services beyond what they billed as high-speed
930 internet, which was defined as up to 10 megabits of service.
931 Speed tests commonly showed that that was really between 4- and
932 6-megabits download with less than 1-megabit upload. And that
933 was within a quarter mile of their hub. This would have been
934 great service in 2000, but in 2015 it was a serious challenge
935 to running a small business and providing access to modern
936 education or healthcare. Other providers served nearby towns
937 in our area, but were not at all interested in serving Pinetops.

938 So, around 2008, the city of Wilson, which is 17 miles west
939 and in neighboring Wilson County, began providing gigabit-speed
940 fiber-to-the-premises internet service to their citizens. They
941 borrowed money from private investors and have repaid them with
942 revenues from the network without using taxpayer dollars.

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943 The city of Wilson has provided electric service to the town
944 of Pinetops for well over 40 years and has been a great partner
945 for our little town. So, we asked Wilson if they could bring
946 that fantastic internet service our way. Well, in 2011, the North
947 Carolina General Assembly passed a law that not only put
948 significant restrictions on building municipal broadband
949 networks, but also specified that Wilson could not take their
950 network beyond the Wilson County line, which was 6 miles away
951 from Pinetops. So, we were sentenced by our own legislature to
952 being 6 short miles away from technology that could help us help
953 ourselves.

954 In 2015, the FCC preempted that state law and opened a window
955 for Pinetops to invite Wilson to bring their internet service,
956 which is called Greenlight, to us. So, in March of 2016, Pinetops
957 residents eagerly began signing on as Greenlight customers.

958 I spoke with several people in town who telecommute or have
959 small businesses, and the difference in service was amazing.
960 One neighbor who works for a large banking operation described
961 downloading and uploading her daily work files in 15 minutes
962 instead of the hours it had taken with the fastest service that
963 CenturyLink could provide. A small furniture manufacturer in
964 town reported downloading large files from international

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965 customers in an hour or two rather than the 12-plus hours it had
966 taken earlier. A local fire chief was able to use for the first
967 time online video resources to train his volunteer firemen.
968 Families with multiple children no long had to timeshare to finish
969 their online assignments. The service was fantastic, and we on
970 the town board were working to promote Pinetops as the little
971 town with symmetrical gigabit internet service.

972 Bur, once again, our legislature betrayed us. The state
973 sued to overturn the FCC's ruling, and they won. Greenlight would
974 have to be forced to leave Pinetops, and we would be forced to
975 take 10 giant steps back economically.

976 About the same time, Hurricane Matthew hit, and we were
977 flooded terribly. The Greenlight techs were there within hours
978 of the roads opening and hooking up the emergency shelters and
979 the disaster operations. Our town board, with the enthusiastic
980 backing of the residence and business, were eager to fight to
981 keep Greenlight. And so, we were able to get an exemption, with
982 a lot of fighting, that would allow Pinetops to keep Greenlight.

983 But, if another provider came in providing fiber services,
984 Greenlight would have to leave. And we couldn't get language
985 in the legislation that would make that service have to be
986 comparable or serve everyone in town.

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987 So, we got the exemption and we were happy with that. But
988 now, Suddenlink has decided that, since they didn't want to serve
989 us with basic service, now they are bringing fiber to Pinetops.
990 So, Greenlight has to leave.

991 Good internet service in today's economy is as essential
992 as electric power was in the forties and fifties. Rural areas
993 and small towns then had to be creative and resourceful and rely
994 on municipalities and co-ops to provide electricity in areas that
995 private providers weren't willing to serve. If not for the
996 forward-thinking leaders of that time, it is hard to imagine how
997 small-town America would have survived. We still have to be
998 creative and resourceful in keeping our towns alive. We have
999 to be given the freedom to use all the tools we have.

1000 I need to emphasize that, while Pinetops now has broadband
1001 access, that great service is limited to our 1-mile-square town
1002 limits. Wilson would be connecting those homes, small towns,
1003 farms, and outlying areas if the state barriers didn't exist.

1004 The solution to getting rural communities connected will
1005 not come from one-size-fits-all legislation. It will not come
1006 from waiting for large providers to come to our communities.

1007 Mrs. Blackburn. The gentlelady's time has expired. If you
1008 can wrap up?

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1009 Ms. Coker Craig. Yes, ma'am. I am sorry about that.

1010 [The prepared statement of Ms. Coker Craig follows:]

1011

1012 ***** INSERT 7*****

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1013 Mrs. Blackburn. You are perfectly fine. We are so
1014 appreciative that each of you are here. We appreciate your
1015 testimony.

1016 This concludes our testimony, and we will now move into our
1017 Q-and-A portion of our hearing. And I will yield myself 5 minutes
1018 for questions.

1019 Mr. Stroup and Mr. Aiken, I want to start with you. In your
1020 testimony, you mention existing alternatives in the marketplace
1021 to a big government approach that removes the ability for states
1022 to make important decisions that directly impact their financial
1023 health. One of the bills that does cause me concern is the
1024 Community Broadband Act, which I think would threaten to undue
1025 much of the progress that is being made across the country. The
1026 bill is essentially a further-reaching version of the FCC's failed
1027 2015 Municipal Broadband Order, which basically preempted the
1028 fiscally-responsible measures that Tennessee had put in place
1029 regarding municipal networks.

1030 So, Mr. Stroup, can you expand on the differences, the
1031 specific advances, that some of your member companies have made
1032 in recent years that have positioned them to become competitors
1033 in the broadband market across the country? And is there anything
1034 additional that we can do to help increase competition?

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1035 And then, Mr. Aiken, to you, kind of looking in that same
1036 vein, but from the wireless side, talk about how fixed wireless
1037 has become a viable alternative. And are there specific examples
1038 that might be illustrative to the committee?

1039 Mr. Stroup, to you first, please, sir.

1040 Mr. Stroup. As I noted in my testimony, certainly the most
1041 important things that our members have done is to increase the
1042 capacity of the satellites that have been launched as well as
1043 the speed, which ultimately makes the services more
1044 cost-effective. So, I noted just the change in the last 10 years,
1045 there has been a 20 times increase in the capacity of the
1046 satellites. Satellite services start at \$49 a month. And so,
1047 those are the two and three most important things that the industry
1048 has done.

1049 As I also noted, there are plans to launch additional LEO
1050 satellite systems. To give you a sense of that, there are
1051 approximately 1700 satellites on orbit today. There are
1052 satellite applications that have either been granted or pending
1053 at the FCC for over 18,000 satellites. So, the growth in the
1054 industry is tremendous. The capacity that will be available is
1055 increasing accordingly.

1056 And the thing that is most important to us is continued access

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1057 to spectrum and technology neutrality. Without spectrum, we do
1058 not have the opportunity to grow, and we just want to make sure
1059 that neither Congress nor the FCC weights the scale against any
1060 one industry against the other.

1061 Mrs. Blackburn. Okay. Mr. Aiken?

1062 Mr. Aiken. Thank you for the question.

1063 I think it is best illustrated with a story. Many farms
1064 across our great country are not connected to broadband, and this
1065 was the story of Lone Oaks Farm in Middleton, Tennessee, that
1066 didn't have any broadband connectivity to the farm. Along came
1067 Crossroads WiFi, a fixed wireless provider who offered a robust
1068 business-grade broadband connection to that farm using the
1069 spectrum band that I mentioned in my opening testimony, the CBRS
1070 band.

1071 Through that broadband connection, that 2,000-acre farm was
1072 on the short list to be considered by the University of Tennessee
1073 for purchase. The University of Tennessee purchased that farm,
1074 turned it into a 4H state facility and a research institution.

1075 And that small, local provider was able to grow the bandwidth
1076 with the university, and it is just a great story of how a small
1077 provider can provide big solutions to rural America.

1078 Mrs. Blackburn. I appreciate that, and that is a beautiful

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1079 property.

1080 Mr. Forde, permitting issues are a struggle. I would assume
1081 small providers are disproportionately impacted. But we hear
1082 about permitting issues regularly. They talk about the
1083 burdensome application process. I wish you would elaborate on
1084 that and, also, the fact that the Senate now has a discussion
1085 draft that would streamline small-cell deployment.

1086 What we need to do is look at what more is needed to unleash
1087 this private capital, to streamline this process, and to make
1088 available more small cells that are like on the grain elevator
1089 at your location.

1090 Mr. Forde. Well, thank you, Chairman Blackburn.

1091 Regarding the first part of your question, we have worked
1092 very hard to continue to deploy broadband. We have had some
1093 issues in some areas. Recently, in North Dakota we tried to run
1094 some fiber from the Killdeer area up to Watford City and to
1095 Williston. We had to hire several engineering firms, and some
1096 difficult permitting issues crossing the Missouri River. So,
1097 that is certainly one of the issues that we faced. That project
1098 was delayed by several months that allowed service to get to those
1099 areas.

1100 Regarding the small cell, certainly utilizing those areas

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1101 and some of our more urban areas in our footprint in that
1102 legislation, but also I don't know if that is the solution for
1103 some of our rural areas. We believe that the fixed wireless
1104 technology will be able to cover much greater distances between
1105 those elevators, between those farms, and the small cell will
1106 be good for some areas that are a little bit more urban, a little
1107 bit more populated.

1108 We want to make sure, also, that we have a level playing
1109 field there, us as a provider, that those folks --

1110 Mrs. Blackburn. My time has expired.

1111 I recognize Mr. Doyle for 5 minutes.

1112 Mr. Doyle. Thank you, Madam Chair.

1113 Mr. Aiken, the Commission is currently considering changes
1114 to the license structure of the CBRS band. Based on your
1115 testimony, it sounds like many of your members had already started
1116 making investments in new technology based on how this band was
1117 to be structured.

1118 First, I would like to ask you, do you think that if the
1119 Commission acts to expand the geographic size of the spectrum
1120 licenses, that your members and other rural providers will be
1121 able to successfully bid for those licenses?

1122 Mr. Aiken. The short answer there, Congressman, is no.

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1123 Mr. Doyle. And what do you think will be lost if the licenses
1124 in these bands are made to be like traditional cellular licenses?

1125 Mr. Aiken. So, this band, it is absolutely critical to
1126 expand rural broadband. As you mentioned, a number of our members
1127 have already built out in the band. We polled our members. Over
1128 60 percent of them had made investments in reliance on the rules.

1129 Like I said in my testimony, these are small companies providing
1130 big service in rural America, and this would hamper their ability
1131 to reach new customers that are within range of their towers.

1132 Mr. Doyle. Basically, it is your opinion that expanded
1133 license size will actually hurt the deployment of broadband in
1134 rural areas?

1135 Mr. Aiken. I believe so, and we have a proposal before the
1136 FCC that is backed by a large number of rural providers that would
1137 retain some small area license that would enable our providers
1138 to participate in the auction.

1139 Mr. Doyle. I want to talk about the lower C-band, too.
1140 In the lower C-band, several satellite providers have proposed
1141 freeing up a portion of the band to be auctioned for mobile
1142 broadband license service. However, a broad array of
1143 stakeholders have proposed spectrum-sharing rules in the rest
1144 of the band that would enable fixed, locked, wireless broadband.

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1145 What are the merits of this proposal over the other proposals
1146 that would seek to transition the entire band to mobile broadband
1147 use? And to be honest, are these proposals even realistic?

1148 Mr. Aiken. Thank you for the question, Congressman.

1149 I think in this band we have a fantastic opportunity to enable
1150 gigabit fixed wireless in rural America and a way to do so
1151 consistent with everybody getting a win here. We are part of
1152 a much broader Broadband Access Coalition that includes, again,
1153 a broad array of rural interests. And we put forth a proposal
1154 that would effectively clear some of the spectrum for 5G, would
1155 put some rational protections in place for satellite earth
1156 stations, and would make the remainder of the band available for
1157 license point-to-multi-point fixed wireless. We believe this
1158 approach would have a significant impact of the availability of
1159 broadband in rural America.

1160 Mr. Doyle. Thank you.

1161 Ms. Coker Craig, your testimony and the story of your
1162 community is very compelling. And apparently, you have good
1163 barbeque down there, too, although Butterfield didn't share any
1164 of that with us.

1165 [Laughter.]

1166 But we have had other people from communities that have

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1167 provisioned their own broadband infrastructure here to testify
1168 before us. It seems to me that every one of them seems to be
1169 happier with the service they provided themselves than any other
1170 available commercial option.

1171 Tell me what some of the advantages are of self-provisioning.

1172 Ms. Coker Craig. Well, it was amazing the difference to
1173 be able to call if there was any problem or any problem with
1174 anything with the connection, to call and you talk with someone
1175 in Wilson who knew where Pinetops was. And the speed and the
1176 reliability of their services and technicians were amazing. They
1177 know us. They are our friends and neighbors. We could usually
1178 get things fixed sometimes within a couple of hours. Sometimes
1179 they could do it over the phone. But, if not, they would have
1180 a technician there sometimes in 30 minutes.

1181 And it was just a tremendous asset to a business. When you
1182 are operating a business, that time is money. And when you are
1183 having to wait for two and three days for a technician to come
1184 and fix your internet, it is well worth it to switch over to
1185 Greenlight.

1186 Mr. Doyle. Yes.

1187 Well, Madam Chair, I see my time is almost expired. So,
1188 I will yield back.

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1189 Mrs. Blackburn. The gentleman yields back.

1190 The chairman of the full committee, Mr. Walden, is recognized
1191 for 5 minutes.

1192 The Chairman. Well, thank you, Madam Chair.

1193 And again, to our witnesses, thank you for being here. I
1194 thought I might put a photo up, or two, of Wallowa County, just
1195 so you can enjoy the home view.

1196 And while we are working on that, Ms. Word, this is Chief
1197 Joseph, a statue -- they do a lot of bronze work there -- with
1198 the Wallowas behind. And Chief Joseph Days are coming up the
1199 weekend after next. So, if you have got spare time and want to
1200 come out and enjoy Chief Joseph Days, we would be happy to host
1201 you. But you can see these photos, the wide-open spaces, some
1202 of the farming community out there, and then, another look with
1203 the Wallowas in the background.

1204 When I learned for the second year in a row rural healthcare
1205 facilities like yours were facing a 25-percent cut in their
1206 requested funding under the Rural Health Care Program, I
1207 encouraged the FCC to take a close look at the program in order
1208 to help telehealth facilities pay for the cost of this
1209 connectivity. I talked to the Chairman and his team.

1210 So, I was really pleased in June when the FCC increased the

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1211 funding for the Rural Health Care Program by \$171 million a year,
1212 increasing the cap for the program to \$571 million, effective
1213 immediately. It is a 43-percent increase in funding. It
1214 represents what the funding level would have been today if the
1215 original \$400 million cap that was established in 1997 had been
1216 adjusted for inflation.

1217 If the additional funding had not been provided, what would
1218 these cuts have meant to Wallowa Memorial Hospital from your
1219 perspective?

1220 Ms. Word. Thank you for the question.

1221 I think, simply, it would have been decreased access,
1222 increased travel time, inconvenience for patients. You know,
1223 it is ones that aren't feeling well; travel is difficult. Family
1224 members are often taking time away off work as well. And then,
1225 increased cost to the patient and to the community to provide
1226 services or allow services out of town.

1227 The Chairman. In your testimony, you identified several
1228 barriers to expanding telehealth. You mentioned restrictions
1229 on Medicare reimbursements for remote patient monitoring,
1230 burdensome state licensing requirements, and the capital
1231 associated with developing and maintaining telehealth programs.

1232 Of these barriers, which do you think is most significant? What

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1233 impacts you the most?

1234 Ms. Word. Because we are very patient-centered and
1235 patient-focused, I think the biggest barrier is the remote
1236 monitoring or access for those remote, whether it be a remote
1237 clinic, hospital, so that we can service the patients.

1238 The Chairman. And are there additional barriers the way
1239 the current Rural Health Care Program is formulated by the FCC?
1240 Anything there we need to be aware of?

1241 Ms. Word. Not that I can think of off the top of my head.

1242 The Chairman. All right. When you mentioned that the
1243 nearest critical-access hospital after yours is 65 miles away,
1244 do you want to describe what that journey is like in the winter?

1245 Ms. Word. Well, if the roads are open, not snow and ice,
1246 it is a windy, two-lane highway. You are traveling with log
1247 trucks, potentially farm equipment, not so much in the winter
1248 probably. It is 65 miles, but it takes over an hour to make the
1249 journey.

1250 The Chairman. That is down a narrow, windy, two-lane road
1251 down into the river bottom and, then, up the canyons and out and
1252 around. It is tough territory. So, if you lose service, if the
1253 fiber gets severed, what happens then?

1254 Ms. Word. You have no connections. You are relying on your

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1255 own internal services within the county, within the cities. And
1256 that is not unusual. We have lost all connection. Your
1257 electronic health record goes down, your phone communication.
1258 We do drills around this. We are prepared for it because, for
1259 us, it is a reality.

1260 The Chairman. And talk to me about the interconnectivity
1261 among the other providers in the community there, the clinic,
1262 pharmacy, some of those things.

1263 Ms. Word. Sure. We are really very fortunate in eastern
1264 Oregon and Wallowa County, especially that we have separate
1265 clinics, we have our hospital, but we really function together.

1266 If you came from the outside, you would think it was one entity.
1267 Some of these specialists, they may be initially contracted with
1268 a non-hospital-owned clinic. Yet, we can still use them for an
1269 inpatient in the hospital. The clinic will use services that
1270 we have set up in the hospital as well. Wallowa Valley Center
1271 for Wellness, mental health and behavioral health, has a great
1272 telemedicine program that benefits everyone as well.

1273 The Chairman. All right. My time is about expired, Madam
1274 Chair.

1275 Thank you. And thanks again for making the journey.

1276 Mrs. Blackburn. The chairman yields back.

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1277 And, Mr. Welch, you are recognized for 5 minutes.

1278 Mr. Welch. Thank you very much.

1279 Mr. Butterfield has left, but I will tell a story behind
1280 his back, but don't tell him. Shortly after he got elected to
1281 Congress, he thought he was kind of a big deal, like a lot of
1282 us. And he was back in Wilson, right next to Pinetops, and he
1283 went into a diner. A number of women were there, and they knew
1284 him. They looked at him and they said, "You know, that is pretty
1285 good you got elected. Someday you may amount to something. You
1286 may be mayor of Wilson."

1287 [Laughter.]

1288 And it is that hometown commitment, actually, that is so
1289 wonderful about a lot of your testimony.

1290 Mr. Walden, just the description in those pictures, they
1291 are very evocative for so many of us in our rural areas.

1292 I just loved your testimony about how important it is to
1293 get that broadband there.

1294 Now there are two things. No. 1, I think, Madam Chair, it
1295 is a little premature for us to congratulate ourselves on what
1296 we have done for rural broadband because it kind of stinks in
1297 a lot of places. It really does.

1298 No. 2, what Congress has to do, first and foremost, is we

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1299 have got to dedicate funds to the buildout of broadband. There
1300 is just no escaping that. It is just like we made a decision
1301 in this country in the thirties about electricity. There was
1302 no economic case to be made for our utility companies to build
1303 out electricity in rural America, none. But we made a decision
1304 here, our predecessors did, that there was a social case to be
1305 made for it because rural America has the kind of people like
1306 you are describing, like Mr. Walden is describing. And we need
1307 them.

1308 So, money is really going to be important. I just have to
1309 say this. All of us who are dedicated to our rural
1310 constituencies, unless we are going to put some money in there,
1311 it is not going to go there. So, that is No. 1.

1312 No. 2, how do it? We have got to be flexible. That is why
1313 I really enjoyed your testimony, Ms. Coker Craig, because I live
1314 on a dirt road, an 8-mile dirt road, and we have got great
1315 broadband. It was local people created a nonprofit. I don't
1316 know how they managed to defy expectations, but they went up and
1317 down the roads and they got each of us to invest a little bit.
1318 And we get that kind of service that you are talking about.

1319 So, I want to start asking a few questions. I will start
1320 with you, Mr. Aiken. If we get the money -- and that is what

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1321 we need -- how do we deploy it in a way that is flexible? Because
1322 some of those pictures I saw from Mr. Walden, we don't have those
1323 in Vermont. There is a lot of hills and valleys. And one size
1324 does not fit all. So, how could we, if we had the money, deploy
1325 it in a way where we don't micromanage how to do it in Pinetops
1326 versus Tennessee? Do you want to comment on that?

1327 Mr. Aiken. Sure. Thanks for the question, Congressman.

1328 We represent predominantly small businesses. We have a
1329 couple of dozen providers who are participating in the upcoming
1330 Connect America Fund Auction. But what I have heard from my
1331 members time and time again is that complicated applications and
1332 difficulty --

1333 Mr. Welch. Well, how do we make it simple, but accountable?
1334 I do think it has got to be done at a local level. Anybody else,
1335 comment on that? I mean, you did it in Pinetops, right?

1336 Ms. Coker Craig. We did.

1337 Mr. Welch. How did you do it?

1338 Ms. Coker Craig. Well, like I said, we worked with the city
1339 of Wilson. The only thing, we had that small window of time with
1340 the FCC ruling. That was the only way we were able to do it because
1341 the state legislature had said there would be no more expansion
1342 past the Wilson County line.

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1343 Mr. Welch. Okay. Anybody else want to comment on that?
1344 How do we have accountability if we deploy money, but
1345 flexibility? So, where a community is ready to go and they have
1346 got whatever it takes, we can get them going. Anyone?

1347 Mr. Aiken. I can take a stab at that, Congressman.

1348 I think accountability on the back end is important. I think
1349 we are comfortable with a reverse auction design like that which
1350 is included in the LIFT America Act. We think that a streamlined,
1351 but accountable application is important. That is one of the
1352 reasons why we think the principles in the BROADBAND ACCESS Act
1353 are so important.

1354 Mr. Welch. Okay. Thank you.

1355 Ms. Word?

1356 I am going to yield back. I am out of time. Thank you.

1357 Mrs. Blackburn. The gentleman yields back.

1358 I will say, we put \$670 million in the omni, our U.S., for
1359 deployment, and \$171 million at the FCC for rural healthcare.

1360 Mr. Lance, you are recognized, 5 minutes.

1361 Mr. Lance. Yes, thank you.

1362 That brings me to my questions regarding the additional
1363 funding that we put into our U.S. for a new loan and grant program
1364 for rural broadband.

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1365 To Mr. Forde and Mr. Aiken, from your perspective in rural
1366 America, what is the best way this funding could be deployed in
1367 order to reach the most Americans in need with the amount of
1368 resources that the government has placed in that program?

1369 Mr. Forde. Certainly, focusing on those areas that are
1370 truly unserved to make sure that we take care of them first I
1371 think is very important, and, obviously, being
1372 technology-neutral. We, of course, have our fiber networks.
1373 We deliver gig through high-frequency cable, and then, we use
1374 the fixed wireless tools to reach the last mile. So, having all
1375 those things work.

1376 And I think there are some unique broadband grant programs
1377 out there. The state of Minnesota has a program where you get
1378 more points if you put more private capital into it. There is
1379 a challenge process to make sure that there is no overbuilding
1380 taking place, and a lot of unique things with that program that
1381 we work with that really help to find those areas that are truly
1382 unserved that need it most, and we are not spending too many
1383 federal dollars on those.

1384 Mr. Lance. Do you know, do other states intend to proceed
1385 the way Minnesota has proceeded, as you have outlined it?

1386 Mr. Forde. Not currently in our Midco footprint. Kansas,

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1387 I believe, has looked at it a little bit, but they are in the
1388 initial stages of that process.

1389 Mr. Lance. Thank you.

1390 Mr. Aiken?

1391 Mr. Aiken. Yes, I would echo what Mr. Forde said, that a
1392 focus on unserved areas is critical. Ensuring that private
1393 capital isn't overbuilt by government subsidies is also critical.

1394 And we also believe that there should be a focus on
1395 cost-effectiveness in the program. We have a limited number of
1396 dollars. We have a lot of people to serve. And we need that
1397 money to go as far as possible.

1398 Mr. Lance. There is, of course, a difference between
1399 underserved and unserved. Mr. Aiken, from your expertise, how
1400 many Americans are completely unserved?

1401 Mr. Aiken. The number is smaller than those that are
1402 underserved. I think the FCC counts 24 million as not having
1403 access to advanced telecommunications capability. That number
1404 includes folks who have access to less than 25/3 broadband. But
1405 our members are focused on providing that high-speed service that
1406 rural Americans need.

1407 Mr. Lance. Thank you.

1408 Would anyone else on the panel like to comment?

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1409 Mr. Stroup. Yes, I would like to comment a minute.

1410 Mr. Lance. Yes, of course.

1411 Mr. Stroup. I would like to emphasize that last year alone
1412 two of our member companies, ViaSat and EchoStar, launched
1413 satellites with the advanced technologies that I talked about
1414 with 25/3 FCC-defined broadband speeds. Both of those companies
1415 have announced plans for their next satellites. And I talked
1416 earlier about the LEO systems that have been announced. So, our
1417 members are not looking for subsidies in order to provide these
1418 services. They are moving forward with launching this capacity,
1419 and certainly, as I noted earlier in my testimony, provide
1420 coverage across the entire country. So, certainly the industry
1421 is moving forward with launching additional capacity to provide
1422 service to all areas of the country without any subsidies.

1423 Mr. Lance. Yes. Thank you.

1424 I live in a state, New Jersey, that is the most densely
1425 populated in the nation. We are well served, by and large, but
1426 I want to assure the panel that I will continue to work on this
1427 issue, as the sponsor of one of the pieces of legislation that
1428 is important for this area.

1429 And to those from the great state of Tennessee, my wife and
1430 I met in law school at Vanderbilt, and I have a great affection

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1431 for your wonderful state, not only because the chairman is from
1432 that state, but also from personal experience.

1433 I yield back a minute, Chairman.

1434 Mrs. Blackburn. The gentleman yields back.

1435 Mr. Loeb sack, you are recognized.

1436 Mr. Loeb sack. Thank you, Madam Chair. I do, first, want
1437 to thank the Chair and the ranking member for holding this
1438 important meeting today. It has been great testimony.

1439 And thanks to all of you on the panel today for your testimony
1440 and for answering the questions.

1441 It is clearly no secret to those of us on the committee here
1442 that I do like to talk about rural broadband. I am from Iowa.

1443 I have 24 counties in Iowa. It is not quite a fourth of the
1444 state geographically, but it is quite a bit. And then, how to
1445 build out capacity in Iowa and the rest of rural America. At
1446 one point, the Chair even called me "Broadband Loeb sack," and
1447 that is a flag that I am very happy to fly while I am on this
1448 committee, while I am in the Congress.

1449 In my district, as many of you know, farming is a huge part
1450 of the economy. I thank Mr. May and John Deere for all the great
1451 work that those folks do with respect to the farming community
1452 in Iowa and around the country, and, indeed, around the world

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1453 for John Deere.

1454 Farmers across America are facing a lot of challenges right
1455 now. We don't need to talk about trade, but there are a lot of
1456 things that are facing these farmers right now, a lot of
1457 challenges. It makes it more important than ever I think for
1458 our communities in the rural areas and the agricultural
1459 communities to be as efficient and productive as possible.

1460 To help lend our farmers a hand, I joined with Representative
1461 Latta in introducing the Precision Agriculture Connectivity Act.

1462 I really appreciate the fact that you folks were behind that,
1463 obviously, Mr. May. That bill, as was stated, as you know, would
1464 create a task force to help the FCC figure out how to deploy
1465 broadband on agricultural land to promote more precise farming
1466 techniques.

1467 Mr. May, I would just like to ask you, from your company's
1468 perspective -- you did mention this already a little bit -- what
1469 would having robust broad access mean to so many of your customers
1470 who really need precise and efficient farming equipment? What
1471 does this technology mean for agricultural productivity as well?

1472 Mr. May. Sure. Thank you for the question.

1473 Maybe I will give you a couple of examples of products that
1474 will unlock a lot of productivity and, frankly, more

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1475 sustainability within agriculture. No. 1, I will go back to the
1476 sixties and where we saw a three times increase in productivity
1477 because of technology introduced at that time. That journey
1478 continues. Today, what is driving that journey is access to
1479 machines in the farm, on the farm field.

1480 For example, we have the ability today to stream
1481 computer-generated prescriptions directly to a planter based on
1482 the field conditions in that field and have the planter plant
1483 in the most optimum way. When the farmer is in combining, picking
1484 the corn in the field, we are sensing the environment that that
1485 combine is in and connecting back to the cloud to stream
1486 recommendations on how to optimize that combine, based on exactly
1487 what it is sensing within that field.

1488 Also, when we have a machine go down, you know what that
1489 means to a farmer. When that machine stops, it is dollars flowing
1490 out the window of the cab, and we need to get the machine up fast.

1491 With internet connection, we can connect remotely directly to
1492 that machine and diagnose the problem that is happening and get
1493 them back up and running quickly.

1494 So, we believe this phase of internet-based agriculture is
1495 going to unlock tremendous value and productivity and
1496 sustainability.

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1497 Mr. Loeb sack. Right, and feed America and feed the world.

1498 Mr. May. Absolutely.

1499 Mr. Lance. Just briefly, last September I went to visit
1500 a farmer in one part of my district. I got there and he was getting
1501 the corn in. And I knew how important that time was to him.
1502 So, I said, "Listen, we don't have to go in your house for an
1503 hour and talk about the issues. Do you mind if I get in the cab
1504 with you?" And that is what we did to bring the harvest in.
1505 And he was talking to me about the technology. It was really
1506 quite amazing.

1507 But this particular bill, I am proud. You know, I have
1508 worked with Congressman Latta on that. We have got to make sure
1509 that we have the information, so that these machines can operate
1510 as effectively as possible.

1511 Are there any other things you would like to add that we
1512 could be doing along those lines?

1513 Mr. May. First of all, thank you for your work on that.
1514 We believe that that will bring a significant amount of value
1515 to agriculture across the United States.

1516 I think one of the other things that could be helpful is
1517 maybe a joint study between the FCC and the USDA --

1518 Mr. Loeb sack. Right.

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1519 Mr. May. -- to truly understand where do we have the
1520 issues, where it is unserved, as was mentioned --

1521 Mr. Loeb sack. That is right.

1522 Mr. May. -- and underserved, so that we can attack these
1523 problem areas directly.

1524 Mr. Loeb sack. And that is connected to my other question,
1525 actually, too. I am probably just going to have to ask this
1526 question for the record of you, Mr. Aiken, but it has to do with
1527 mapping, obviously. I am very happy to get my mapping bill
1528 through.

1529 But I do have a letter, Madam Chair, from Chariton Valley
1530 Electric Cooperative. If I could put that in the record with
1531 unanimous consent?

1532 Mrs. Blackburn. Without objection.

1533 Mr. Loeb sack. Thank you so much.

1534 [The information follows:]

1535 ***** COMMITTEE INSERT 8*****

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1536 Mr. Loeb sack. And then, I will just submit a question to
1537 you, Mr. Aiken, for the record.

1538 Mr. Loeb sack. And I yield back. Thank you, Madam Chair.

1539 Mrs. Blackburn. The gentleman yields back.

1540 And next week, he will have the opportunity to ask the FCC
1541 about doing that study, and I am sure he will.

1542 Mr. Latta, you are recognized for 5 minutes.

1543 Mr. Latta. Thank you, Madam Chair, and thanks very much
1544 for having this hearing today. It is very, very needed.

1545 I represent the largest farming and producing district in
1546 the state of Ohio. It is important to our agricultural producers
1547 out here to have this technology.

1548 I have served and serve as the Co-Chair of the Rural Broadband
1549 Caucus and also Co-Chair of the Rural Telecommunications Working
1550 Group. We believe that it is absolutely important that we get
1551 the broadband out to our rural areas of our country. And it is
1552 not only the ag side, but from the testimony we have heard from
1553 the other witnesses, if you can't operate a business or you can't
1554 operate a hospital, you can't do certain things out there if you
1555 don't have that technology. So, it is absolutely important that
1556 we have that.

1557 My area is a little bit different from the chairman of the

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1558 full committee, where you saw the mountains in the background.

1559 If you look at my district, it is probably as flat as your table
1560 that you are sitting at. But we grow things and we are very
1561 productive there.

1562 But if I could ask my first question, Mr. May, does it matter
1563 to you what type of technology is used to deliver that broadband
1564 service to connect agricultural producers, customers, and vendors
1565 across America, as long as the service is safe, affordable, and
1566 effective at meeting the needs of those users?

1567 Mr. May. You know, there is lots of technologies that can
1568 be applied to make agriculture more productive. Frankly, we
1569 think each one of them has a place and we are open to all of them,
1570 whether you talk guidance, GPS systems, using satellite-based
1571 networks, to guide vehicles in the field within centimeters, that
1572 plays a critical role. Internet connections and the ability to
1573 stream large quantities of data is also significant. For us,
1574 we think there are several technologies that can be leveraged
1575 within agriculture, but, certainly, internet connectivity is
1576 critical from the data side of agriculture.

1577 Mr. Latta. What would you say especially on the GPS and
1578 being able to be within centimeters? About two years ago, I was
1579 out in the southwest part of my district. What we were doing

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1580 at that time, they were showing how -- you know, my mom grew up
1581 on a farm. My grandfather used horses back in the thirties.
1582 I saw in your testimony that Deere has been around now for 181
1583 years. My wife's family has been on the same farm in northwest
1584 Ohio for 185 years.

1585 Mr. May. Excellent.

1586 Mr. Latta. But that day that we were out, they were putting
1587 in fertilizer in furrows to keep from having runoff or anything
1588 like that. But in the spring, when they were going to go out
1589 and plant that corn, they were going to be able to put it within
1590 an inch of where that furrow was. That is what that technology
1591 does. So, we appreciate that.

1592 Mr. May. Absolutely.

1593 Mr. Latta. Mr. Stroup and Mr. Forde, if I can ask you, will
1594 both of you provide examples of how your industries are working
1595 to promote rural broadband for precision agriculture, and what
1596 are some of those broadband solutions?

1597 Mr. Stroup. I would like to start by noting that precision
1598 begins with GPS, as you noted. It is important to recognize that
1599 GPS is provided via satellite. Also, precision agriculture
1600 involves earth observation, weather information which is gathered
1601 via satellite, and the ability to take the imagery and refresh

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1602 it on a daily basis, all one of the capabilities of the satellite
1603 industry.

1604 But, to get to the communications aspect of it, the addition
1605 of the capacity that we have been talking about is an important
1606 aspect of what the satellite industry is doing. That, in
1607 combination with flat-panel antenna technology, which provides
1608 the ability to build it into every tractor/combine and provide
1609 continuous connectivity, because, ultimately, one of the great
1610 advantages of the satellite industry is ubiquitous coverage.
1611 So, we have complete coverage of rural America. The important
1612 thing that we are doing in terms of the capacity is adding
1613 additional satellites and the high technology that we have talked
1614 about.

1615 Mr. Latta. Thank you.

1616 Mr. Forde, I have got about 49 seconds, if you can answer
1617 that?

1618 Mr. Forde. Absolutely. One of the greatest examples is
1619 we have a small group of elevators, and the farmers in that region
1620 are now able to use Midco fiber running to some of those elevators
1621 and connecting that group of elevators through fixed wireless
1622 technology. So, the farmers are able to tell and direct their
1623 trucks when they are dumping out their grain and instantly be

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1624 able to see where their grain was going in, and being able to
1625 see those records immediately online. So, I think that tool has
1626 been great for that, that group of elevators and the farmers in
1627 the area to make sure they know how much grain was going and how
1628 much was unloaded.

1629 Additionally, we have grain dryers. Of course, drying corn
1630 takes a tremendous amount of stuff. You have folks and farmers
1631 that are monitoring grain dryers almost 24 hours a day to keep
1632 those things running. Well, fixed wireless technology allows
1633 them to do some of that from their easy chair in their homes and
1634 spend more time with their families

1635 Mr. Latta. Thank you very much. Madam Chair, my time is
1636 expired.

1637 Mrs. Blackburn. The gentleman yields back.

1638 Mr. McNerney, you are recognized.

1639 Mr. McNerney. I thank the chairwoman and I thank the
1640 panelists.

1641 Ms. Craig, state and local governments in California are
1642 doing important work right now with private industry to build
1643 out broadband in the state. I believe our state is leading the
1644 nation when it comes to forward-leading policies in this area.

1645 But I am worried about calls to preempt state and local government

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1646 in the name of streamlining wireless siting policies. In fact,
1647 California just rejected such a proposal on the state level.
1648 What we need, I believe, instead, is industry and cities working
1649 together to meet individual constituents' needs like what just
1650 happened in San Jose. Do you think the federal streamlining of
1651 local government siting policy will make meaningful progress for
1652 bringing high-speed fiber to unserved and underserved areas?

1653 Ms. Coker Craig. Well, I think if that streamlining would
1654 give us the flexibility in local areas to work with our partners
1655 -- and like I said, our partnership with Wilson was
1656 well-established. To me, it was a natural partnership. We
1657 trusted them. We knew that they were being fiscally responsible
1658 with this network. So, if that streamlining would simplify and
1659 give us the flexibility that we need, because rural areas are
1660 very unique. Some things may work for one area, but not in
1661 another.

1662 Mr. McNerney. Well, that is the point, isn't it, that you
1663 don't want a uniform federal policy that preempts local/state
1664 policies in some name of streamlining?

1665 Ms. Coker Craig. Right, but we also need to get past those
1666 barriers, those barriers that we had, and our response was the
1667 state government.

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1668 Mr. McNerney. Well, thanks. Rather than fighting against
1669 local governments, I think local governments and industry could
1670 work together to find meaningful solutions. The Broadband
1671 Finance, Investment, and Innovation Act that Congress Lujan
1672 introduced -- and I am cosponsor of -- would help public/private
1673 partnerships gain access to capital for deploying high-speed
1674 broadband. I think you could make a real difference in districts
1675 like mine and others. Do you think the use of PPPs, as this
1676 legislation envisions, would allow federal government to work
1677 constructively with local governments?

1678 Ms. Coker Craig. It sounds like it would. I am not terribly
1679 well-versed on that legislation, but it sounds like it would.

1680 Mr. McNerney. Okay. Thank you. I appreciate that.

1681 Mr. May, for some time now I have been raising concerns about
1682 cybersecurity and internet-connected devices. The LIFT America
1683 Act, which I am a cosponsor, would acknowledge these concerns
1684 by requiring that all broadband projects funded by the Act would
1685 have to work to meet network and security specifications. What
1686 might cybersecurity vulnerabilities mean to farmers who are using
1687 advanced agricultural technology?

1688 Mr. May. Farmers today that are utilizing these advanced
1689 technologies are streaming large quantities of data, not only

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1690 to their own farm, but to their trusted advisors to help them
1691 make better decisions.

1692 John Deere has been very transparent in our role to make
1693 sure that that data is as secure as possible, it is accessible,
1694 and it is easy to share. We have also tried to work with Farm
1695 Bureaus to develop more standards around what sort of security
1696 protocols should be in place. We believe that the security of
1697 data is critical and we support continuing to invest in that.

1698 Mr. McNerney. But what risks do farmers have, the ones that
1699 are actually using the technology?

1700 Mr. May. The risk the farmer could have is if their data
1701 gets in the hands of somebody they didn't intend it to. So, their
1702 yield data or how they planted the fields, what seed they used,
1703 that is their IP, and if that got in the hands of, you know, I
1704 planted this hybrid, I sprayed with this sort of application,
1705 and I created a yield 10 percent higher than you, that is IP.

1706 And if that were to get in the hands of somebody else, then it
1707 is a loss to the farmer.

1708 Mr. McNerney. Thank you.

1709 Ms. Word, in your testimony you point out that fewer than
1710 50 percent of households in the bottom income quintile use
1711 internet at home, and that narrowing this divide would become

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1712 even more important as healthcare moves to a value-based system.

1713 Can you expand on your testimony and talk about the health
1714 implications if lower-income middle Americans are unable to
1715 afford access to broadband at home?

1716 Ms. Word. Sure. Thank you for the question.

1717 Those patients at that lower socioeconomic status are often
1718 some of the less healthy patients or they don't access healthcare
1719 as frequently. So, there are ways that we could do in-home
1720 monitoring, whether it is video, phone, email, monitoring of their
1721 health conditions that would prevent readmissions maybe to the
1722 hospital, improve their health, get them regular visits with their
1723 doctor when maybe they can't even afford to drive in to the clinic.

1724 Mr. McNerney. Thank you, Madam Chairman. I yield back.

1725 Mrs. Blackburn. The gentleman yields back.

1726 Mr. Guthrie, 5 minutes.

1727 Mr. Guthrie. Thank you, Madam Chairwoman, for holding this
1728 meeting.

1729 I would like to start by thanking my Co-Chair from
1730 California, Doris Matsui. We have worked on the Spectrum Caucus
1731 together. It seems like every meeting we have here we talk about
1732 spectrum, but it is so important.

1733 I just want to point out, in the RAY BAUM Act, there was

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1734 also just nuances of technology policy. It is amazing. We had
1735 actually put in there the Spectrum Auction Deposits Act, just
1736 so they could deposit bank deposits for selling of spectrum.
1737 That was asked for by Chairman Pai. And the chairwoman was great
1738 to work with us and have this in the mark, so that we could move
1739 forward. And I appreciate you doing that.

1740 I am also pleased with the Commission's work on midband,
1741 licensed and unlicensed bands, that can help us keep the U.S.
1742 on the cutting edge of 5G, rather than letting China or any other
1743 person try to beat us to that.

1744 Mr. Forde -- and also Mr. Aiken, I might ask you to comment
1745 on the question for Mr. Forde, but if you would comment? --
1746 starting with the spectrum question, I know that you are trying
1747 to provide service for unserved areas by using fixed wireless
1748 technology. And you say in your testimony that you need access
1749 to more spectrum in order to accomplish that. Charter is doing
1750 similar things in Kentucky. So, thanks for your efforts.

1751 And for Mr. Forde and Mr. Aiken, how much spectrum do you
1752 think is needed for fixed wireless and what would be the results
1753 for consumers? And what more can we do on this front? We can
1754 start with Mr. Forde and, then, Mr. Aiken.

1755 Mr. Forde. Yes, I mean, certainly, access to more spectrum,

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1756 most importantly, the type of spectrum that works best for our
1757 customers and our people in rural areas. We need to make sure
1758 that the spectrum is offered, provides interference protection
1759 out there. I know the C-band has been talked a little bit about
1760 today, but we are, of course, an existing cable television
1761 provider and we use that C-band to provide television service
1762 to tens of thousands of customers across all the states that we
1763 serve. And that is the only option that we have. So, if we were
1764 to look at that band for fixed wireless, we need to make sure
1765 that that is also protected.

1766 And one of the bands that isn't being used as much in our
1767 area is the 2.5, the educational broadband. One of the reasons
1768 we really like that spectrum is because it is able to go penetrate
1769 dense forests, tree lines, things like that, and get through those
1770 obstacles. Obviously, it does have a certain educational
1771 benefit. I mean, I live in a very rural area. My kids go to
1772 a school out in the country 5 miles from my house. And I am amazed,
1773 even at their young age, how much work that is destined on having
1774 that good, reliable internet connection.

1775 So, yes, I think we need more spectrum in all these areas
1776 to accomplish it, but let's make sure it works for everybody.

1777 Mr. Guthrie. Thank you.

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1778 Mr. Aiken?

1779 Mr. Aiken. Thanks for the question, Congressman.

1780 Yes, I would echo what Mr. Forde said. We are looking at
1781 a lot of midband spectrum, so the same sort of spectrum bands
1782 that Mr. Forde mentioned, the EBS spectrum at 2.5 gigahertz, the
1783 3.5 gigahertz spectrum, the CBRS band which the FCC is currently
1784 considering, as well as the 3.7 to 4.2 spectrum band. That
1785 midband spectrum has great characteristics to be able to go a
1786 long ways and carry a significant amount of bandwidth, which is
1787 perfect for radios that have to go many miles to houses in rural
1788 America.

1789 Mr. Guthrie. Thanks.

1790 Another concern, I have a district that could be a little
1791 bit of -- Bob Latta just said his is as flat as a table, some
1792 of the best farmland in the country. And I have some that doesn't
1793 have the mountains quite that my friend from Oregon has, but
1794 beautiful mountains and lakes, and Mammoth Cave, if anybody wants
1795 to visit, is there as well. So, it is a beautiful place, but
1796 it is rural and, also, it is suburban and urban.

1797 I live in Bowling Green, which is kind of a boon, tied in
1798 with the work our chairwoman has done in Middleton, such a boon
1799 town. We are kind of tied in with that. I am hour from Nashville.

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1800 If you look at mapping, so I am talking about if you look
1801 at mine, you would say Bowling Green is covered with broadband.

1802 And we have some friends out here from Connected Nation which
1803 is a local hometown group that does the mapping. But it depends
1804 on where you live. I have very rural counties that is exactly
1805 what we are talking about. But, even where I live, some people
1806 won't develop; they can't move forward because people don't want
1807 to buy a home that doesn't have broadband access moving forward.

1808 So, just in mapping, getting more specific in mapping, I think
1809 we are talking about it is just too broad to say that one county
1810 is covered or not.

1811 My question is for the panel. I didn't leave you much time.

1812 But what recommendation do you have to improve the granularity
1813 and accuracy of the data collected? And what recommendations
1814 do you have to improve it? Should NTIA coordinate with the
1815 Commission or are there other ideas about giving it to NTIA solely?

1816 Anybody? I only have two seconds, so if one of you wants to
1817 get that? Just making mapping better, NTIA.

1818 Mr. Stroup. Certainly, I would start with ensuring that
1819 the information is up-to-date. We have recognized that, given
1820 the advances in the satellite industry, the fact that we do provide
1821 25/3 coverage is not included in the current map.

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1822 And one other technology that I would acknowledge that I
1823 think will be useful in terms of the broadband mapping is
1824 technology that is being deployed that allows for RF mapping from
1825 space. Ultimately, I would recommend that that company's
1826 technology -- they are launching their first three satellites
1827 this year -- be considered to be able to identify where there
1828 is actually a signal, rather than just identification of hopes
1829 that there is a signal.

1830 Mr. Guthrie. Thank you. We are out of time. I yield back.

1831 Mrs. Blackburn. Ms. Matsui, you are recognized.

1832 Ms. Matsui. Thank you very much, Madam Chairman.

1833 We talked about spectrum is absolutely necessary to meet
1834 the coverage requirements of rural broadband networks. In 2004,
1835 Congress created the Spectrum Relocation Fund to assist federal
1836 agencies relocating or sharing spectrum for wireless broadband
1837 use. And in 2015, Congress made improvements to the SRF by
1838 allowing agencies to use SRF funds for engineering research and
1839 development. But current law limits how much of these funds can
1840 be used by agencies to fund the research and related activities
1841 necessary to potentially reallocate or share their spectrum.
1842 Last month, my spectrum partner, Congressman Guthrie, and I, along
1843 with Senators Wicker and Schatz, introduced the SPECTRUM NOW Act

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1844 to fix this problem. Specifically, the framework of the SPECTRUM
1845 NOW Act could provide a pathway for NTIA and DoD to make additional
1846 100 megahertz of spectrum available in the 3.4 gigahertz band.

1847 Mr. Aiken, what potential does a 3.4 gigahertz band have
1848 for WISP networks, and how could the SPECTRUM NOW Act help meet
1849 the growing demand for networks across rural America?

1850 Mr. Aiken. Thank you, Congresswoman, and thank you for your
1851 leadership on this issue. We are incredibly supportive of that
1852 legislation, and it could make a real difference in rural
1853 broadbands, particularly if the FCC gets the rules right on the
1854 3.5 gigahertz or CBRS rulemaking, because that would allow these
1855 fixed wireless radios to just simply have a software upgrade and
1856 be able to utilize the spectrum in that band as well.

1857 Ms. Matsui. Right. Okay. Thank you.

1858 Narrowband IoT networks are particularly useful for
1859 long-range, low-power applications. Specifically, these
1860 networks improve capacity, spectrum efficiency, and power
1861 consumption levels of user devices. Narrowband IoT networks have
1862 potential both nationwide and particularly for rural coverage.

1863 These networks can co-exist with commercial mobile networks,
1864 and their propagation characteristics provide better range and
1865 reduce coverage costs for consumers in both rural areas and across

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1866 the country.

1867 The entire panel, what potential benefits do narrowband IoT
1868 networks have in rural areas from a spectrum efficiency, cost,
1869 and deployment perspective?

1870 Mr. Stroup, would you like to start?

1871 Mr. Stroup. Certainly. I think, as you noted, narrowband
1872 signals are more spectrum-efficient and you can put them in
1873 smaller allocations. Companies like Iridium, which is a
1874 satellite-based company that has been providing IoT services in
1875 rural America for some time. So, those services are already
1876 deployed. They tend to be more cost-effective just because they
1877 do not have the same power requirements, either, that broadband
1878 systems do.

1879 Ms. Matsui. Thank you.

1880 Mr. Forde?

1881 Mr. Forde. We would be happy to get back to you on that.

1882 Ms. Matsui. Oh, certainly. Ms. Matsui. Mr. Aiken?

1883 Mr. Aiken. Sure. We generally view those networks as
1884 incredibly complementary to fixed wireless networks. It enables
1885 a lot of connectivity on farms that have a lot of benefit to
1886 precision agriculture efforts. We view those networks as
1887 complementary, and we see customers of our members who are farmers

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1888 utilize both.

1889 Ms. Matsui. Okay. Fine.

1890 Mr. May?

1891 Mr. May. That technology we believe will play a role in
1892 machine-to-machine communication --

1893 Ms. Matsui. Yes.

1894 Mr. May. -- but very limited capability if you have to
1895 upload data to the cloud. So, where we are sharing maps within
1896 a field between planters, it makes a lot of sense. But if we
1897 need to transfer data to or from that machine, it has limited
1898 capability.

1899 Ms. Matsui. Okay. Fine.

1900 Ms. Word. I will claim a little bit of ignorance, being
1901 a healthcare practitioner and not as much on the technology side.
1902 But I can say, with our diverse terrain in our county, I think
1903 we take advantage of just about every opportunity that is out
1904 there.

1905 Ms. Matsui. I am sure.

1906 Ms. Word. Certain technologies are going to work better
1907 in different areas.

1908 Ms. Matsui. Absolutely.

1909 Ms. Craig?

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1910 Ms. Coker Craig. I will also claim ignorance in this,
1911 proudly. But it sounds to me like it is just another option,
1912 and it points again to the flexibility that small communities
1913 need to have in working with whatever tools they can get.

1914 Ms. Matsui. Okay. I don't have much time, but I want to
1915 ask the question on the C-band, about the particular clearing
1916 mechanism that could be used to allow additional terrestrial use
1917 in the 3.7-4.2 gigahertz band. In particular, NRPM has sought
1918 comment on whether market-based or the auction approach could
1919 be utilized to clear the spectrum that could, then, be made
1920 available for terrestrial mobile use.

1921 Mr. Stroup, I am interested in how a voluntary market-based
1922 mechanism would function for the very services currently being
1923 utilized in the C-band.

1924 Mr. Stroup. I think one of the most important things to
1925 keep in mind with respect to the C-band is just how heavily used
1926 it is. As part of the NOI process that the FCC went through,
1927 there were a number of users that came forward, and there are
1928 thousands of earth stations serving over 120 million people for
1929 video distribution services. Ultimately, if the FCC does decide
1930 that they are going to make any of that spectrum available, a
1931 market-based approach where they have an opportunity to work with

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1932 a customer base, meaning the satellite companies have an
1933 opportunity to work with the existing customer base, is more
1934 likely to achieve the goals in the short term.

1935 Ms. Matsui. Okay. Thank you very much, and I have run out
1936 of time. Thank you very much.

1937 Mrs. Blackburn. The gentlelady yields back.

1938 Mr. Olson, you are recognized.

1939 Mr. Olson. I thank the Chair.

1940 And welcome to our six witnesses. Not to mislead you all,
1941 Texas 22 is two-thirds the suburbs of Houston, Texas, and
1942 one-third rural. That means corn, milo, cotton, and cattle.
1943 Our smallest farms and ranches are doing just fine. They have
1944 the broadband access that greater Houston has, but that access
1945 can disappear in a few hours in a natural disaster, like Hurricane
1946 Harvey.

1947 We learned a lot from Hurricane Ike that hit us in 2008.
1948 We bury our lines deep in the soil, so that stayed up a lot.
1949 We still lost some connectivity during the storm. And as you
1950 know, the most precious, lifesaving commodity in a disaster is
1951 information. We found out, too, our process for permits needs
1952 to be streamlined to provide that lifeline.

1953 And that is why I introduced H.R. 4045, the Connecting

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1954 Communities Post Disasters Act. This legislation allows federal
1955 disaster areas to be exempt from the National Environmental Policy
1956 Act and the Historical Preservation Act. That just lets
1957 communities get going quickly to rebuild.

1958 Madam Chairman, I would like to ask unanimous consent to
1959 introduce two letters of support for my legislation, one from
1960 the NTIA and one from the WIA.

1961 Mrs. Blackburn. Without objection.

1962 [The information follows:]

1963

1964 ***** COMMITTEE INSERT 9*****

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1965 Mr. Olson. Mr. Stroup, a question for you, sir. What are
1966 your main considerations from your perspective in the industry
1967 that federal agencies can streamline disaster requirements and
1968 just streamline process for permits overall, especially in
1969 disasters? Any advice for federal government to act, so we don't
1970 have the problems we had with Hurricane Harvey?

1971 Mr. Stroup. Certainly, the satellite industry provides
1972 important capability in hurricane and natural disaster events
1973 because we have our infrastructure in the sky. From a permitting
1974 perspective, just the opportunity to be able to get our earth
1975 stations located, if they are not already in place, and work with
1976 existing customers like the cellular industry in order to be able
1977 to get their portable systems up and running. So, our
1978 infrastructures we don't need permitting with respect to that.
1979 It is the earth stations where we can benefit from a streamlined
1980 process.

1981 Mr. Olson. As a side note, DIRECTV addition to our home
1982 was basically weather radar. Without the TV, guess what is going
1983 to hit us in about 10 minutes? A big, nasty thunderstorm. So,
1984 thank you for that.

1985 My next question is for you, Mr. May. I saw the third
1986 generation of agriculture revolution in northwest Fort Bend

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1987 County a few years ago. The farmer was not a farmer. He was
1988 what I call a manager of farm technology. He had this massive,
1989 huge John Deere tractor, a big, self-contained cockpit, air
1990 conditioning. It had a little radio, a satellite radio. The
1991 tractor was driving itself. What made that so special is he was
1992 putting every seed down perfectly, the same distance apart, the
1993 same depth, making all the turns. And so, that is exciting.

1994 You talked about, also, 4G. It is just the fourth
1995 agricultural revolution which uses artificial intelligence and
1996 machine learning to allow farmers to be more productive, be better
1997 farmers. Can you discuss the benefits of AI in the agricultural
1998 sector?

1999 Mr. May. Absolutely. We are really excited. We call this
2000 the fourth generation, if you will, of farming. The new
2001 technologies that are available to us are going to bring -- the
2002 way I like to describe it is, today, a farmer, that farmer still
2003 relies heavily on his eyes for vision to see what is happening
2004 in the field. He relies on the 30 years of knowledge he has in
2005 head. And then, he makes adjustments with his fingers on the
2006 computer to optimize the machine. Computer vision, artificial
2007 intelligence, and robotics are going to help make that farmer
2008 even more better.

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2009 We recently acquired a company called Blue River that is
2010 focused on eliminating up to 90 percent of chemicals that are
2011 used in the field by only spraying the weeds that are located
2012 within the fields. So, it is a huge advantage to productivity
2013 and, more importantly, sustainability.

2014 Mr. Olson. Thank you. I have 18 seconds left. So, I would
2015 like to offer my help to you, Mrs. Coker Craig, the whole town
2016 of Pinetops, North Carolina. My dear friend, Mr. Butterfield,
2017 talked about having barbeque at Abrams. With all due respect,
2018 ma'am, if you want the best barbeque in America, that is in Texas,
2019 Texas barbeque.

2020 [Laughter.]

2021 I offer you to come to either Killen's in Pearland, Texas,
2022 or The Swinging Door in Fort Bend County to have the best barbeque
2023 in America.

2024 I yield back.

2025 Mrs. Blackburn. And I will challenge that.

2026 [Laughter.]

2027 Anybody ever heard of Memphis and the barbeque competition?

2028 [Laughter.]

2029 All right, Ms. Eshoo, 5 minutes.

2030 Ms. Eshoo. Well, I can't recommend a barbeque in Silicon

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2031 Valley, but --

2032 [Laughter.]

2033 Thank you, Madam Chairwoman, for having this. This is a
2034 very important hearing. When at least a third of our country
2035 is either underserved or not served in the second decade of the
2036 21st century, that is a major issue for our country. Our Founding
2037 Fathers knew that, to be a united country, that Americans needed
2038 a nationwide communication system. And so, this is a very
2039 important responsibility that we have.

2040 I want to thank the witnesses. Each one of you I think has
2041 been excellent. And you have touched, in a deep and broad way,
2042 either what your association members are doing, what your
2043 companies are doing, what is happening in healthcare, and what
2044 is happening in municipalities.

2045 I want to thank the chairwoman for, in her opening statement,
2046 making a positive comment about the dig-once policy that was in
2047 the RAY BAUM legislation. It is sensible, dig once. I don't
2048 know why no one ever thought of it before we did it. I guess
2049 it was, as my grandmother used to say, the most uncommon of the
2050 senses is common sense. But, at any rate, we got that one done.

2051 Now, at the same time, she was critical of the Community
2052 Broadband Act, and that undermines state legislatures. Now I

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2053 had very purposefully introduced that legislation because I think
2054 it is important to examine what is standing in the way, why are
2055 we not making headway, especially in rural areas. And I have
2056 that, too, in my district. Imagine, in Silicon Valley there are
2057 people that are either underserved or have no service whatsoever.

2058 I think most people would be stunned to realize that.

2059 There are today about 20 states that have outright
2060 prohibitions or bans relative to municipal broadband. Now I
2061 think that these state legislatures are undermining local
2062 municipalities from coming up with their own solutions. I come
2063 from local government, like you, Ms. Craig, and I really have
2064 a reverence for local government. I prefer a bottom-up than a
2065 top-down in many cases. Now there are some cases where I believe
2066 a national umbrella is very important relative to federal policy
2067 for our country.

2068 I want to ask you, Ms. Craig, why do you think anyone would
2069 do that? I mean, it has been proven to be effective. Cities
2070 like Chattanooga and Wilson were stopped -- stopped -- from
2071 deploying high-speed broadband access to people who want it.
2072 Now there is a whole variety of reasons that we can stitch together
2073 why we are where we are, one-third of the country. But who did
2074 this in your state?

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2075 Ms. Coker Craig. Well, the primary --

2076 Ms. Eshoo. Who are the interests? Who are the interests
2077 that went to the state legislature to make sure that this access
2078 was banned?

2079 Ms. Coker Craig. My understanding is it was the big telecom
2080 industry.

2081 Ms. Eshoo. You got it.

2082 Ms. Coker Craig. It was the large --

2083 Ms. Eshoo. That is my softball or hardball question to you.

2084 So, I think we need to put the facts on the table. And that
2085 is that the very large interests, very large money holds sway,
2086 and this is holding back local communities from creating a choice.

2087 In most cases, it is much cheaper, too. So, that is what is
2088 happening in the country. If people want to stay with, stand
2089 with their state legislature for especially screwing their local
2090 communities, so be it, but that is what is happening. That is
2091 what is happening, and that is a very big thing in our country,
2092 especially because one-third of the country is not getting what
2093 they need.

2094 I want to ask the panel -- well, I don't have enough time.

2095 So, I will put that question to the full panel. Your single
2096 one best idea on how we can advance? I will put that in writing

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2097 and look forward to your response.

2098 Thank you for being here today. I think you are all part
2099 of the solution.

2100 Ms. Eshoo. Again, I thank the chairwoman for having this
2101 hearing.

2102 Mrs. Blackburn. The gentlelady yields back.

2103 Mr. Johnson, you are recognized for 5 minutes.

2104 Mr. Johnson. Thank you, Madam Chairman.

2105 And thanks to our panel for joining us today.

2106 I represent a very rural part of the country, the entire
2107 eastern flank of the state of Ohio, all along the Ohio River.

2108 Broadband access is one of my top priorities. We must figure
2109 this out. A one-size solution doesn't work everywhere in the
2110 country. And the digital rural divide is very, very real. We
2111 are losing a tremendous amount of intellectual capital from young
2112 people to entrepreneurs, to you name it, kids that can't do their
2113 homework, businesses that won't come into a rural area because
2114 they can't get access to the internet to connect with their
2115 customers, their suppliers, manage their employees. There is
2116 a host of reasons why this is somewhat urgent, I would even say
2117 in many cases desperate, situation for economic development.

2118 And some people think that it is a pie-in-the-sky luxury

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2119 to have access to high-speed internet, and that is simply not
2120 true. In a digitized world that we live in today, where we do
2121 business across the oceans like we used to do business across
2122 town, you have got to have access to the internet. And I think
2123 that starts with being able to accurately identify those areas
2124 that are unserved and underserved. And that has been a
2125 complicated, and yet, inadequate effort up until now.

2126 That is why I was glad to introduce the MAPPING NOW Act,
2127 reasserting NTIA's authority to go do this. I am also pleased
2128 that the discussion draft to reauthorize NTIA tasks the
2129 administration with facilitating more accurate granular maps of
2130 broadband coverage, so that we can get on with this process.

2131 Mr. Aiken and Mr. Stroup, Administrator Redl recently stated
2132 in his testimony before the Senate Commerce Committee that, and
2133 I quote, "NTIA has long been a leader in gathering and analyzing
2134 broadband adoption and data, and on May 30th, 2018, NTIA published
2135 a Request for Comment to determine the most efficient path
2136 forward."

2137 Gentlemen, could you offer your thoughts as to what NTIA
2138 should consider when thinking about how to get the most accurate
2139 and reliable data to properly inform broadband investment
2140 decisions? I don't think it is rocket science, and I am really

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2141 frustrated with the length of time and the lack of progress.

2142 Mr. Aiken, let's go with you first; then, we will come down
2143 to Mr. Stroup.

2144 Mr. Aiken. Sure. Thank you, Congressman.

2145 We are actively engaged with NTIA on its rulemaking on
2146 mapping efforts and appreciate their work on this issue.

2147 We share the frustration at the lack of good data out there
2148 on broadband deployment. It means that folks who might be
2149 eligible for the Connect America Fund aren't. And there are a
2150 host of other problems that you accurately identified.

2151 One of the things that we think we can potentially do is
2152 move, particularly for a fixed wireless perspective, to a polygon
2153 method of characterizing deployment. That is something that we
2154 think we can do without unduly burdening our smallest members.

2155 Our association is made up of mom-and-pop companies. So,
2156 regulatory burden is a pretty significant concern. But we are
2157 actively working towards finding solutions that will work both
2158 for our members and for the data needs of our country.

2159 Mr. Johnson. Mr. Stroup?

2160 Mr. Stroup. We also have engaged with NTIA and encouraged
2161 them to take advantage or to reflect the most up-to-date
2162 capabilities, as I note with respect to the satellite industry,

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2163 the 25/3 capabilities. And also, the point that I had made
2164 earlier about utilizing new technologies to be able to do RF
2165 mapping, to be able to determine where there is, in fact, a signal.

2166 Mr. Johnson. Sure. Well, like I have said, I don't think
2167 it is rocket science, but guess what? Even if it is a rocket
2168 science, we have got rocket science in this country.

2169 [Laughter.]

2170 We ought to be able to figure this out, and it ought not
2171 to be this dadgum complicated.

2172 But, with that, Madam Chair, I yield back.

2173 Mrs. Blackburn. The gentleman yields back.

2174 Ms. Brooks, you are recognized for 5 minutes.

2175 Mrs. Brooks. Thank you, Madam Chairwoman, and thank you
2176 so much for holding this really important hearing.

2177 And thank you all. I am sorry some of us have been going
2178 back and forth between other hearings.

2179 But this is critically important. I represent Indianapolis
2180 suburbs and rural communities in central Indiana. Not too long
2181 ago, I had the opportunity with FCC Chair -- and one of the members
2182 of the committee -- Carr to visit Beck's Hybrids and saw something
2183 that was really quite amazing.

2184 And so, I guess, Mr. Aiken, and maybe Mr. May, they have

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2185 what they call FARMserver, where they have created their own
2186 server and service to help with precision ag. And it is
2187 simplified, but it allows their clients, not just their own
2188 customers, but others who are participating in FARMserve, to
2189 generate reports such as yield by soil type, yield by hybrid,
2190 yield by prescription. It is seed selection streamlined,
2191 field-focused recordkeeping, full support, taking information
2192 from a farm office out into the field very precisely, but, then,
2193 aggregating all of this data. And they have this massive server
2194 system data storage up in northern Hamilton County. I was not
2195 aware they were doing something of this level of sophistication,
2196 although they are an incredibly tech-savvy company, and always
2197 have been.

2198 But I am concerned about -- we talked about data security,
2199 and that is not what I am going to go into. But their customers
2200 and those who they are working with, I asked about whether or
2201 not 5G, which is now being implemented in Indianapolis and some
2202 of the surrounding areas -- you mentioned 4G. That is what, Mr.
2203 May, made me think about 5G. This type of service could have,
2204 I think, a dramatic impact on the ag industry. They used a WISP
2205 called On-Ramp.

2206 Can you all talk with us? Is this happening anywhere else

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2207 in the country or are they truly unique in the country? I am
2208 just curious, Reynolds Farm Equipment, a great John Deere dealer,
2209 is right down the road from them. Can you all talk about this
2210 a little bit, Mr. Aiken maybe, and you may or may not know about
2211 this, Mr. May, in 5G. Yes?

2212 Mr. Aiken. Sure. So, thank you, Congresswoman, and I
2213 really appreciate you going out to visit our member, On-Ramp
2214 Indiana, and see the work that they are doing as a really small
2215 company, but bringing big connectivity and enabling the kind of
2216 innovations that you just mentioned in your statement.

2217 I think this is indicative of what our members are doing
2218 across the country. A lot of our members are actually farmers,
2219 in addition to being broadband providers. So, they understand
2220 what farms need in order to be able to be successful, both in
2221 the broadband world and in the farming world.

2222 But, as far as 5G is concerned, I think we have to remember,
2223 when we talk about 5G, that 5G is not only mobile. 5G is also
2224 fixed wireless.

2225 Mrs. Brooks. Right.

2226 Mr. Aiken. And a lot of the same technical innovations that
2227 we see going into the mobile space also will be in the fixed space.

2228 So, our members, if we have adequate access to spectrum, can

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2229 provide these gigabit or multi-gigabit speeds to farms who
2230 desperately need the connectivity for big data.

2231 Mrs. Brooks. Mr. May, anything you would like to talk about
2232 5G?

2233 Mr. May. Yes. Yes, absolutely. First of all, 5G would
2234 bring additional capability in streaming larger sets of data.

2235 But, today, we have a similar system. It is the John Deere
2236 Operations Center, where a John Deere farmer today is streaming
2237 on a real-time basis from the field directly to our cloud-based
2238 ecosystem all of their agronomic data that, then, they can share
2239 with any of their trusted advisors in order to make better
2240 decisions and stream it directly back to the machine in the field.

2241 So, as we advance the internet connectivity, that is only going
2242 unlock more value within the field.

2243 Mrs. Brooks. Are there many companies like John Deere and
2244 Beck's doing this across the country or is it really just the
2245 largest? And the other thing I want to mention is, so many of
2246 these companies are also near small towns. We often think of
2247 urban and rural, but small towns like Pinetops and others. Do
2248 we think we are going to get 5G to small towns, to Pinetops, North
2249 Carolina? I mean, what are we going to do? Because I think we
2250 are going to be jumping to 5G very fast.

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2251 Mr. May. Yes, you know, our system is a global system that
2252 extends across the globe that uses multiple different internet
2253 capabilities. 5G, frankly, is a luxury from a data transmission
2254 standpoint, but we are leveraging today 3G and 4G as well to do
2255 the same thing.

2256 Mrs. Brooks. Thank you. Thank you all so much for your
2257 testimony. I really appreciate all your work.

2258 I yield back.

2259 Mrs. Blackburn. Yields back.

2260 Mr. Bilirakis, you are recognized for 5 minutes.

2261 Mr. Bilirakis. Thank you, Madam Chair. I appreciate it
2262 very much.

2263 I thank the panel for their testimony.

2264 One of the most important topics of discussion as we continue
2265 to build new connections and upgrade systems is resiliency. We
2266 saw what happened, of course, in Florida, Texas, and Puerto Rico.

2267 Now we are hurricane season, 2018 hurricane season. Similarly,
2268 other parts of the nation face their own natural disasters, not
2269 just hurricanes. They face the threats that can impact
2270 connectivity and slow emergency communications.

2271 Mr. Forde, as Midco continues to expand to unserved markets,
2272 as well as upgrade existing systems, what precautions are being

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2273 taken to help ensure that these systems are resilient to natural
2274 disasters, which for your area would be tornado threats, of
2275 course?

2276 Mr. Forde. Yes, the first thing is, obviously, we build
2277 a lot of redundancy into our system. Multiple fiber rings of
2278 sizes large and small allow that technology to go back around
2279 the ring. So, if we do have a fiber cut or an instance, that
2280 instantly reroutes, and is the first step in keeping up for lost
2281 service.

2282 Additionally, we have had some disasters in North Dakota
2283 and tornadoes and flooding. We have responded with providing
2284 free WiFi and things for those communities on an instant basis.

2285 We have some trailers and things that we do. They are our
2286 friends. They are our customers. We do the best we can to make
2287 sure their communications are always working and up and running
2288 as fast as possible. If, for some reason, the main lines aren't
2289 working, we provide alternate forms of technology to get them
2290 up and running right away.

2291 Mr. Bilirakis. Thank you.

2292 Continuing on the top of natural disasters, Mr. Stroup, in
2293 your written testimony you stated that satellite technology can
2294 deploy temporary-fix installations and very small aperture

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2295 terminal antennas in the aftermath of a disaster to help
2296 communities get reconnected. The question is, how long does it
2297 take to deploy these systems to an impacted area? And what
2298 actions need to be taken by consumers in order to use these
2299 temporary systems if they do not have a preexisting relationship
2300 with that satellite provider?

2301 Mr. Stroup. The systems can be deployed in a matter of
2302 hours, depending upon where the equipment is located. I think
2303 what happened in Puerto Rico is a good example, where carriers
2304 have come forward and noted that satellite needs to be considered
2305 an important part of the infrastructure for the rebuilding process
2306 because of the speed and capability of the industry. For
2307 consumers, very often it is a matter of going to a point where
2308 there is a satellite connection. A good example is in Puerto
2309 Rico where people lined up at a grocery store to be able to use
2310 satellite technology. So, it is something that very often is
2311 used in conjunction with cellular systems. So, they are
2312 providing the backhaul where the cellular system has gone down.

2313 With other technologies, point-to-point technologies, it is not
2314 necessarily as applicable in terms of providing the
2315 point-to-point technology, but more being able to provide the
2316 backhaul capability.

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2317 Mr. Bilirakis. Okay. Very good. I appreciate it very
2318 much.

2319 And I yield back, Madam Chair. Thank you.

2320 Mrs. Blackburn. The gentleman yields back.

2321 Mr. Cramer, you are recognized.

2322 Mr. Cramer. Thank you, Madam Chair.

2323 And thanks to all of you. My goodness, I am sitting here.

2324 As you know, I have sat here the whole time, and I have loved
2325 every minute of it because I see solutions. I have to agree with
2326 Ms. Eshoo. She said, you look at the six of you and you find
2327 the solution to the problem.

2328 I was thinking about the Precision Agriculture Connectivity
2329 Act, and what would that task force that the FCC will set up,
2330 should we pass this bill, look like. And I think it looks a lot
2331 like this, quite honestly.

2332 We do have competing technologies collaborating to create
2333 a ubiquitous network that is not reliant on any one of you. It
2334 is reliant on all of you and several others. That has, I think,
2335 been both the opportunity and the challenge, that we do have
2336 competing technologies. We didn't have that with the Interstate
2337 Highway System. We need a ubiquitous transportation system to
2338 move products to market and people from coast to coast. And so,

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2339 we have this very public highway system. When it was time to
2340 bring electricity to the farm, the REA did it beautifully, but
2341 there weren't competing technologies. Today, of course, there
2342 are more community-based power sources, things like that, but
2343 not at the time.

2344 But you all are in something where there is a lot of
2345 competition, and you all are in something that needs the product.
2346 How it gets there is not as relevant as that it gets there, right?
2347 So, I think we have the makings of a great collaboration among
2348 competitors.

2349 We hear a lot now today, of course, about satellite. We
2350 hear a lot about cable and fiber and fixed wireless and
2351 community-based, all of those things. And then, we haven't
2352 talked a lot about mobile, but some, and not a lot about nomadic,
2353 but, of course, some. All of that has got to work together to
2354 get it there.

2355 But I want to ask you, Ms. Word, as I hone in a little bit
2356 on the tremendous opportunity that I see in telemedicine in rural
2357 America. With 36 hospitals in North Dakota, and still a lot of
2358 space between them, the bill we were able to do a couple of years
2359 ago, it allowed Universal Service funds to be used, for example,
2360 to connect nursing facilities, which I think was a good step in

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2361 the right direction.

2362 One of the things, though, we always hear about -- and God
2363 bless Mr. Welch for raising the fact that some of this does cost
2364 money, right, particularly in unserved and underserved and maybe
2365 profit centers it requires some money. And we provided some and
2366 more, and probably need to do more.

2367 But, at the same time, we often don't talk about the savings
2368 or the opportunities. For example -- and this is what I want
2369 to get to you -- in your testimony you talked about that
2370 telemedicine, the benefit of it, the value of it. Has there ever
2371 been a cost-benefit analysis of people being able to stay at home
2372 longer or maybe be in a community-based health center longer
2373 because they have ubiquitous access to the experts somewhere else?

2374 Because we always talk about the cost, not necessarily about
2375 the savings.

2376 Ms. Word. I don't know about an official study. I am sure
2377 they have been done. I know our facility, and also Grande Ronde
2378 Hospital, the one that is 65 miles away, has looked at the number
2379 of miles saved. That translates to gallons of gas, the hotel
2380 rooms, the time off of work that, whether it is the patient or
2381 family member, don't have to take.

2382 Most of the savings I think is for the hospital and probably

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2383 our primary care providers. They are able to assist these
2384 specialists. Often, they will do their visits side-by-side with
2385 the primary care provider in the room.

2386 Mr. Cramer. Sure. What I wonder, because you talked about
2387 reimbursement issues, right --

2388 Ms. Word. Yes.

2389 Mr. Cramer. -- and what is not allowable. It would seem
2390 to me that we ought to take a real serious look at how, whether
2391 it is private insurance or Medicare in most cases, is reimbursing,
2392 how they might save by reimbursing something that they might not
2393 think is healthcare, if that makes sense.

2394 Ms. Word. Absolutely. Reimbursement is a huge issue, both
2395 for the originating site and the distant site. I will tell, we
2396 don't really even consider for us, being the originating site,
2397 reimbursement. We often don't even bill. Whoever we are working
2398 with on the other end, they pay us \$25 per patient, a max of \$100
2399 a day. We could do six, eight, twelve patients; we will get \$100.

2400 We are about the patient and what makes it better for them.
2401 Healthwise, they often feel better if they are at home and they
2402 are with their loved ones, their spouse, their children, more
2403 comfortable with being at home.

2404 Mr. Cramer. Excellent.

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2405 And I am just going to wrap up my last 10 seconds here with
2406 the aggies. Thank you, John Deere. We haven't talked about
2407 unmanned aerial vehicles and the opportunity for imagery there,
2408 and the ability to use -- the beautiful thing about rural America,
2409 besides the fact that they grow enough food for the world, is
2410 that they do have a lot of available spectrum. It might be owned
2411 by somebody or licensed by somebody else or just not available,
2412 but it is available. If we can find ways to enhance the imagery,
2413 there is no reason we shouldn't be able to change the world with
2414 precision agriculture, and I know that you all are about doing
2415 that.

2416 And I have overstepped my time, Madam Chair. I yield back.

2417 Mrs. Blackburn. The gentleman yields back.

2418 Mr. Long, you are recognized.

2419 Mr. Long. Thank you, Madam Chairwoman.

2420 As a point of personal privilege, just for the record, I
2421 would like to state that, as everyone knows, Arthur Bryant's
2422 Barbeque in Kansas City would make Memphis and Texas barbeque
2423 want to run and hide.

2424 [Laughter.]

2425 So, I just want to get that out.

2426 Mr. Aiken and Mr. Forde, in this Congress I have introduced

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2427 H.R. 4817, the PEERING Act. The focus is on improving broadband
2428 infrastructure in rural America. The bill would set up a matching
2429 grant program at MIT to make peering centers more resilient where
2430 ones already exist and create new ones where they are needed,
2431 mainly across the Midwest, where Arthur Bryant's Barbeque is.

2432 Do you think this bill would help combat the strain on rural
2433 providers having to deliver consistently increasing amounts of
2434 internet traffic, including high bandwidth video transmissions?

2435 Mr. Aiken?

2436 Mr. Aiken. Sure. Thank you for the question, Congressman.

2437 And I have to say, also, for the record, that I will be making
2438 a road trip through Tennessee, Missouri, and Kentucky this summer.

2439 So, I will have to sample the barbeque.

2440 Mr. Long. We will look for your report.

2441 [Laughter.]

2442 Mr. Aiken. I will submit that for the record.

2443 [Laughter.]

2444 But I appreciate the question. The cost of backhaul is a
2445 very significant cost for a lot of rural providers in terms of
2446 getting to that point where they can peer with other providers.

2447 So, I really appreciate your efforts to try to do things to reduce
2448 that.

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2449 Mr. Long. What else can be done in more rural areas? I
2450 have several rural areas in my 10 and a fraction counties. A
2451 lot of it is rural America, and I don't think that the kids trying
2452 to do their homework should be affected differently than the kids
2453 in the city. So, what else can we do in more rural areas to keep
2454 service high quality and the speed fast?

2455 Mr. Aiken. From our perspective, Congressman, the answer
2456 is spectrum, and spectrum done in a way that makes sense for small
2457 companies. We have a ton of small providers out there in rural
2458 America providing broadband now, but the spectrum they are using
2459 is crowded. Like I mentioned previously, we have folks who have
2460 customers within range, potential customers within range of
2461 radios right now, but insufficient spectrum to do it.

2462 Mr. Long. Okay. Thank you.

2463 And, Mr. Forde, do you think this bill that I have introduced
2464 would help combat the strain on rural providers having to deliver
2465 consistently increasing amounts of internet traffic, including
2466 high bandwidth video transmissions?

2467 Mr. Forde. Obviously, we are delivering gigabit speeds
2468 across all of our footprint from Bowman to Battineau and Williston
2469 to Wahpeton in North Dakota.

2470 So, I wanted to make sure I said "hi" to my Congressman Cramer

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2471 up there as well. Excuse me, Congressman Long.

2472 But, yes, we certainly really believe that increasing those
2473 speeds would be great. One of the ways that we can really do
2474 that is, again, as Mr. Aiken said, more spectrum. Again, we
2475 really like the 2.5 gigahertz band of spectrum to put out that
2476 speed because it allows for interference protections and also
2477 to get through some of those tough, hard-to-reach areas through
2478 trees and woods, and things like that. So, yes, we constantly
2479 have efforts to increase speeds all across our footprint.

2480 Mr. Long. And what else can be done in more rural areas
2481 to keep service high quality and speeds fast?

2482 Mr. Forde. I think that the continued deregulation to allow
2483 us to keep focused on investing in our networks is very helpful.

2484 Allowing us not to have teams in rooms and even a floor full
2485 of people working on some of those regulations allows us to do
2486 what we do, and we do real broadband and continue to invest for
2487 our customers.

2488 Mr. Long. Thank you.

2489 And I didn't realize Senator Cramer had joined us, but thank
2490 you for pointing that out.

2491 I appreciate everything this committee does, and has been
2492 doing, in promoting broadband deployment.

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2493 I would like to submit for the record a letter from the
2494 Missouri Electric Cooperatives about what they have been doing
2495 in Missouri.

2496 [The information follows:]

2497

2498 ***** INSERT 10*****

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2499 Mr. Long. And last, but not least, I would love to get
2500 bipartisan support for my bill, H.R. 4817, the PEERING Act, and
2501 hope to work with my colleagues on the other side of the aisle
2502 on this.

2503 Madam Chairwoman, I yield back.

2504 Mrs. Blackburn. The gentleman yields back.

2505 Mr. Costello, you are recognized, 5 minutes.

2506 Mr. Costello. Mr. Forde, as you state in your testimony,
2507 you acknowledge that government assistance is sometimes necessary
2508 to reach areas of the country where there is no business case
2509 for private investment. But, to efficiently leverage USF funds
2510 to the areas that need it most, we need the federal government
2511 to collect and disseminate data that more accurately reflects
2512 the digital divide. This is why Representative Loeb sack and I
2513 introduced the Rural Wireless Access Act, signed into law with
2514 the help of this committee in the spring. This bill directs the
2515 FCC to establish consistent data collection practices for mobile
2516 service coverage. Can you highlight some of the problems that
2517 arise from overbuilding with federal dollars and how this
2518 committee can steer agencies to more efficiently focus efforts
2519 on the truly underserved areas of the country?

2520 Mr. Forde. Yes. I think Midco, as a company that is already

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2521 providing robust service, and some of the communities already
2522 had multiple providers, and, of course, we had been overbuilt
2523 in many of those communities with those federal dollars. What
2524 we have seen is there are still areas just outside those fairly
2525 large communities -- places like Mitchell, South Dakota,
2526 population of approximately 15,000, had multiple providers there
2527 providing a high level of speed. But, yet, there are still people
2528 just not far from town that are unserved or underserved in that
2529 area. So, to the extent that we can focus on those first, that
2530 will be a much better use of those federal dollars, and let's
2531 make sure that we do that in a technology-neutral manner. Whether
2532 it is a fiber connection, whether it is the high-frequency cable,
2533 or the fixed wireless technology to reach those, let's use the
2534 best tool that we have in the toolbox.

2535 Mr. Costello. Mr. Stroup, I recently introduced the WIFI
2536 STUDY Act to highlight the economic benefits that result from
2537 unlicensed spectrum use in assisting internet traffic management,
2538 and how that will help us realize the benefits of an interconnected
2539 world with more efficient transmission of data. Can you talk
2540 about some of the roles that unlicensed spectrum can play in
2541 closing the digital divide in rural America? Second, can you
2542 also specifically touch on how unlicensed spectrum may play in

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2543 the satellite industry?

2544 Mr. Stroup. Yes. Certainly, at least one of our members
2545 is working to show the value of community WiFi connected by
2546 satellite systems. WiFi, as you know, utilizes unlicensed
2547 spectrum. I think it is a combination of those technologies that
2548 provides an opportunity to be able to provide low-cost services
2549 in many of the areas that do not otherwise have access to service,
2550 and that is a great combination of unlicensed spectrum and
2551 satellite backhaul capability.

2552 Mr. Costello. Mr. Aiken, do you have anything to add on
2553 the issue of unlicensed spectrum and the role it can play in
2554 closing the digital divide in rural America?

2555 Mr. Aiken. Absolutely. Thank you, Congressman.

2556 Unlicensed spectrum is absolutely critical in closing the
2557 digital divide. The large majority of our members who are small
2558 businesses who have been, for lack of a better word, locked out
2559 of the license spectrum play for too long, have utilized
2560 unlicensed spectrum in predominantly the 2.4 gigahertz and the
2561 5 gigahertz bands to provide service. So, as I said in my
2562 testimony, additional unlicensed spectrum would be an incredible
2563 boon for rural broadband.

2564 Mr. Costello. Very good. Thank you. I yield back.

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2565 Mrs. Blackburn. Mr. Flores, you are recognized.

2566 Mr. Flores. Thank you, Madam Chairman, for hosting this
2567 great panel.

2568 And, Panel, I appreciate your testimony. I echo what Mr.
2569 Cramer said. It has been a fascinating discussion so far.

2570 In terms of what Congress has done in this area to look at
2571 rural broadband, we have helped auction off spectrum for 5G
2572 deployment; we have streamlined the permitting processes; we are
2573 hoping to change the regulations, so we can put more broadband
2574 satellites in the sky; we are encouraging technological
2575 innovation, and we are simply funding government agencies and
2576 programs that drive broadband development. With that said, it
2577 is reassuring to see you all get together, as Mr. Cramer said,
2578 and offer us what we think are the solutions, what could possibly
2579 be the solutions for the future.

2580 My district, 90 percent of the population lives in about
2581 5 percent of the footprint. So, in terms of population, it is
2582 mostly urban and suburban. On the other hand, 10 percent of the
2583 population lives in 95 percent of the land area and it is rural.

2584 And so, broadband rollout is incredibly important to me in terms
2585 of representing that 10 percent of the population that has more
2586 limited access to broadband.

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2587 Congress last year was working hard to deal with this when
2588 it took my Radio Broadband Consumer Protection Act, which ensured
2589 that broadcasters were protected in the repack to follow the first
2590 of its kind broadcaster incentive auction. In 2012, the
2591 broadcast incentive auction, which was raised \$19 billion, was
2592 part of Congress' effort to grow broadband development and access,
2593 but that legislation had an unforeseen impact, because at the
2594 time nobody realized that the radio broadcasters had not been
2595 protected. So, our legislation took care of that part of the
2596 repack of the spectrum, so that the wireless rollout for 5G and
2597 advanced 4G could continue on time. And that became part of the
2598 RAY BAUM'S Act, and that has become law now.

2599 Moving on to the next section, which has to do with
2600 regulations, last January I introduced H.Res. 701. That called
2601 for environmental and historic reviews conducted by the FCC or
2602 any entity regulated by the FCC to be limited to the area of impact.

2603 This resolution was part of this committee's effort to build
2604 out broadband. It promotes a more practical and efficient model
2605 for the modern deployment of broadband while respecting the
2606 oversight of historical and environmental impacts.

2607 I would like to start with that last issue first regarding
2608 regulatory reform. So, I would like to go through the entire

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2609 panel. And this is the question: how important is it for
2610 broadband buildout that federal requirements be proportional to
2611 the actual area being disturbed?

2612 Mr. Stroup, we will start with you. It is probably not as
2613 important for you as it is for the other folks on the panel.

2614 Mr. Stroup. Yes, certainly because the satellite
2615 industry's issues are somewhat different than the terrestrial
2616 systems.

2617 Mr. Flores. Right.

2618 Mr. Stroup. Our infrastructure is in the sky.

2619 Mr. Flores. Right.

2620 Mr. Stroup. So, for us, it is more a matter of ensuring
2621 that there is access to spectrum and that any technology that
2622 is adopted be technology-neutral. In terms of deployment of the
2623 infrastructure, certainly we utilize fiber systems, but that is
2624 not typically an impediment to the deployment of our systems.

2625 Mr. Flores. That is what I thought. How about in terms
2626 of your ground-based stations? Have you had any regulatory
2627 impacts in this regard?

2628 Mr. Stroup. So, we do have issues, but it is not a major
2629 impediment to the industry.

2630 Mr. Flores. Okay. That is good to hear.

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2631 Mr. Forde?

2632 Mr. Forde. Certainly we have, as I may have mentioned
2633 earlier, we have had some issues with the Army Corps and the
2634 permitting process in those environmental issues in reaching
2635 those tough areas. We also do feel that the fixed wireless tool
2636 can be very helpful in reaching some of those. So, those rules
2637 are also allowing us to do that without too much burden on our
2638 company. But, certainly, those regulations do slow us down in
2639 doing rural broadband.

2640 Mr. Flores. Okay. Mr. Aiken?

2641 Mr. Aiken. Yes, I would agree with what Mr. Forde said.
2642 It is tough for a mom-and-pop business to have to pay \$5,000
2643 for a permit in order to hang a small radio on an existing tower.
2644 So, we appreciate the help that Congress and the FCC have been
2645 affording us on permit streamlining.

2646 Mr. Flores. Mr. May?

2647 Mr. May. Yes, we would agree. I think that speeding up
2648 the process would certainly help reach the areas that don't have
2649 service, and I think it is broader than we think. And we do those,
2650 but we are doing it in a sustainable way.

2651 Mr. Flores. Okay. I would like to go to the next question.

2652 I will ask you all to answer supplementally.

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2653 Ms. Coker Craig, you may have a response to that. Ms. Word,
2654 I don't know if it impacts you or not.

2655 Mr. Stroup, I suspect the satellite industry faces its own
2656 very unique regulatory impediments. Can you address the
2657 hindrances for deployment that the satellite industry faces?

2658 Mr. Stroup. Can you repeat that?

2659 Mr. Flores. Yes. Can you address the hindrances for
2660 deployment that the satellite industry faces?

2661 Mr. Stroup. Issues for deployment that the industry --

2662 Mr. Flores. Yes, hindrances.

2663 Mr. Stroup. Again, going back to the point that I made
2664 before, in terms of deployment, the biggest issue that we have
2665 is access to spectrum. We have a number of companies that have
2666 announced plans for deployment of their next generation
2667 technology, both GEO systems and LEO systems. So, the processing
2668 at the Commission is certainly an issue. We are going through
2669 a process with expediting small satellite licensing. But I think
2670 that the key points for us, again, are technology neutrality and
2671 access to spectrum.

2672 Mr. Flores. Okay. Thank you, Madam Chairman. I yield
2673 back the balance of my time.

2674 Mrs. Blackburn. The gentleman yields back.

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2675 Seeing that there are no further members wishing to ask
2676 questions, I thank all the witnesses for being here today. We
2677 appreciate your participation so much.

2678 Before we conclude, I ask unanimous consent to enter the
2679 following documents into the record:

2680 And I will start with you, Mr. Doyle. You have some to enter?
2681 Mr. Doyle. Yes. Thanks, Madam Chair.

2682 I know that it has been pointed out, the money that Congress
2683 has given to the Department of Agriculture's Rural Utility
2684 Service, and the FCC on the Rural Health Care Program. I just
2685 want point out that the problem in rural America is way bigger
2686 than those efforts.

2687 I want to submit for the record an FCC study here that shows
2688 it will take \$40 billion to build out 98 percent of the country.

2689 So, if we give the Agriculture Department the same amount we
2690 gave them this year, \$600 million, it would take 66 years before
2691 we got to 98 percent of the country. So, that is just a drop
2692 in the bucket, and we need to do a lot better.

2693 So, I would like to submit this study for the record.

2694 Mrs. Blackburn. Without objection, so ordered.

2695 [The information follows:]

2696

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***** COMMITTEE INSERT 11*****

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2698 Mrs. Blackburn. Unanimous consent to issue this following
2699 list of documents: a letter from ITTA; Wireless Industry
2700 Association; American Hospital Association; USTelecom; NTCA; the
2701 Rural Broadband Association; ACT, the App Association; CCA;
2702 Advanced Communications Law and Policy Institute; CTIA; a blog
2703 post from NCTA; a letter from Rural Broadband Caucus members to
2704 House appropriators; Chairman Walden's slides; a letter from
2705 several associations supporting the AIRWAVES Act, from Mr. Lance;
2706 a letter to Mr. Olson from NTCA, submitted by Mr. Olson; a letter
2707 to Mr. Olson from the Wireless Industry Association, submitted
2708 by Mr. Olson; a letter to Mr. Long from the Association of Missouri
2709 Electric Cooperatives, from Mr. Long, and a letter to Mr. Loeb sack
2710 from the Chariton Valley Electric Cooperative, from Mr. Loeb sack.

2711 Without objection, so ordered.

2712 [The information follows:]

2713

2714 ***** INSERT 12*****

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2715 Mrs. Blackburn. Pursuant to committee rules, I will remind
2716 the members that they have 10 business days to submit additional
2717 questions.

2718 And to you, our panel, if you will respond to those in writing
2719 within 10 business days of receipt?

2720 Mrs. Blackburn. Seeing that there is no further business
2721 to come before the committee this morning, the subcommittee is
2722 adjourned.

2723 [Whereupon, at 12:32 p.m., the subcommittee was adjourned.]