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Thank you, Phil, for inviting me today to kick off the annual Silicon Flatirons Conference. This is my sixth appearance here speaking as the head of NTIA and, unless you move up the date of next year's conference, it will be my last. If I do come next year, it will be to apply to be a Dale Hatfield Scholar, so that I can find a new job.

As I went back and looked over my previous Silicon Flatirons speeches to prepare for today, I was struck by how much things have changed during the term of the Obama Administration. For example, when President Obama took office, the FCC still defined broadband at a speed less than 1 mbps. Now the Commission talks of 25 mbps as being the new standard for broadband. Global Internet users have more than doubled from 1.6 billion at the beginning of 2009 to an estimated 3.3 billion last December, 2015.[1]

And of course, there's the wireless revolution. When President Obama took office, iPhones had been on the market for six months and the iPad didn't exist until two years later. In 2011, only 27% of

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1. INTERNET.ORG, STATE OF CONNECTIVITY 2015: A REPORT ON GLOBAL INTERNET ACCESS, 4 (2016).

households used smartphones to go online.[2] Two years later, that number skyrocketed to 45%.[3]

Yes, we've come a long way in a short time. And it's still early—in many ways we are still realizing the full impact of the digital economy. The policy challenges will only intensify as we move to a world where our refrigerators create grocery lists through apps on our smartphones, and household smoke detectors are able to order batteries online that are delivered by drones.

This year's conference is focused on industry structure and I am looking forward to hearing our speakers talk about rivalry, bargaining power, barriers to entry, and switching costs. These are important factors for understanding industry competition; but at NTIA, we are focused on other values [and goals] in addition to promoting competition. For my remarks today, I will share some of those goals, describe what we have accomplished and then talk about what we need to do this year and beyond to ensure the sustainability of these values beyond the end of 2016. Where appropriate, I will link our work to classic industry structure analysis. But I hope it will be clear that to meet the challenges of the digital economy, we must take a broader view than just market structure and competition.

Over the past seven years we have been working hard to build a solid foundation for the digital economy by connecting communities to broadband, by making more spectrum available for commercial use, and by engaging stakeholders to solve pressing policy challenges when the legislative or regulatory processes cannot respond with the necessary speed and flexibility.

Our work is front and center in this digital revolution and I am proud of what we have been able to accomplish. But we are not going to coast in this last year of this Administration. We have a full agenda to ensure that we do not lose momentum. My goal is to strengthen the foundation we have built to ensure continuity and sustainability over time.

I will start with broadband. The Administration's goal from the start has been that all Americans should have access to broadband at a reasonable cost. From the start, we have known that improving broadband access and adoption would pave the way to the economic revitalization in communities across America. The 2009 American Recovery and Reinvestment Act assigned NTIA the task to create a

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2. Giulia McHenry, *Majority of Americans Use Multiple Internet-Connected Devices, Data Shows*, NAT'L TELECOMM. & INFO. ADMIN. (Dec. 7, 2015), https://www.ntia.doc.gov/blog/2015/majority-americans-use-multiple-internet-connected-devices-data-shows [https://perma.cc/229R-RJDN].

3. *Id.*; *see also* Brian Fung, *New Data: Americans are Abandoning Wired Home Internet*, WASH. POST: THE SWITCH (Apr. 18, 2016) https://www.washingtonpost.com/news/the-switch/wp/2016/04/18/new-data-americans-are-abandoning-wired-home-internet/ [https://perma.cc/9SK2-PBXV] ("As many as 1 in 5 U.S. households are now mobile-only, compared with 1 in 10 in 2013.").

$4 billion dollar grant program to build broadband infrastructure, to expand broadband adoption, and to map the availability of broadband in every state.[4] This program was a resounding success. It fully delivered on its pledges to create jobs; stimulate economic development; spur private-sector investment; and open up new opportunities in employment, education, and healthcare.

Our broadband grantees deployed more than 115,000 miles of new or upgraded network miles, connected nearly 26,000 community anchor institutions such as schools and hospitals, and installed or upgraded more than 47,000 personal computers in public access centers.[5] In addition, our grantees enrolled more than 670,000 people as subscribers to broadband services.[6]

Since we are here in Colorado, I particularly want to mention that the EagleNet project we funded in this state successfully brought the first fiber-based broadband service into the tiny mountain community of Silverton, which had gone for years without adequate broadband service.[7] Now the sixty-seven students at Silverton School have access to educational resources they only used to dream about.[8]

These projects have already had a significant impact on economic development. We commissioned an independent study from ASR Analytics to assess the social and economic impact of our broadband grant program and released that report last year. The report showed that on average, in only two years, communities that received our broadband grant funds experienced an estimated two percent greater growth in broadband availability than non-grant communities.[9] The report also concluded that the additional broadband infrastructure built by our grantees could be expected to create more than 22,000 long-term jobs and generate more than 1 billion dollars in additional household income each year.[10]

In our broadband work, we have learned several important lessons. First, by focusing our grants on building the important middle mile, as opposed to last mile connections to homes and businesses, we have reduced barriers to entry for providers who otherwise would have faced higher costs to connect their customers to an Internet exchange point. This has been borne out in the hundreds of interconnection agreements that our grantees have

4. American Recovery and Reinvestment Tax Act of 2009, Pub. L. No. 111-5, § 1305, 123 Stat. 115 (2009).

5. NAT'L TELECOMM. & INFO. ADMIN., FINAL REPORT: SOCIAL AND ECONOMIC IMPACTS OF THE BROADBAND TECHNOLOGY OPPORTUNITIES PROGRAM 2 (2014).

6. *Id.* at 15.

7. *Bringing Broadband to Silverton*, NAT'L TELECOMM. & INFO. ADMIN. (Jan. 5, 2016), https://www.ntia.doc.gov/blog/2016/bringing-broadband-silverton [https://perma.cc/B3AG-FXLR].

8. *Id.*

9. NAT'L TELECOMM. & INFO. ADMIN., *supra* note 5, at 3.

10. *Id.* at 33–34.

signed with other providers seeking to take advantage of the dark fiber or lit services that the grantees provide on a non-discriminatory basis.

Second, we have learned the importance of focusing on empowering communities as key customers and enablers for broadband services. We developed the concept of comprehensive community infrastructure projects and targeted our grants into communities that had done the necessary planning to assess the broadband needs of its citizens and businesses, and had developed the organization and resources to ensure the success of a Recovery Act grant.[11]

Third, we have come to appreciate the importance of broadband adoption, and learned how to design programs that increase adoption on a sustainable basis. If we are going to reach the goal of affordable broadband for all Americans, we have to reduce the barriers that prevent more people from subscribing. Cost is one of those barriers and we support the work of the FCC to allow Lifeline support for broadband. Our grants collectively demonstrate the need for digital literacy training programs that are tailored to the specific needs of the community and the individual. In many cases, we find that who provides the training, such as family members or neighbors, is as important to the success of the program as the content of the training.

Today, we are building on these lessons by providing technical assistance to communities through our BroadbandUSA program, which will be a focus for us throughout 2016.[12] By supplying communities with the tools they need to understand their broadband needs, to work with incumbent providers or others to increase investment in broadband infrastructure, and to deliver tailored adoption programs to their citizens, we are making the community the focal point for broadband access and adoption. In industry structure terms, we are increasing the bargaining power of communities by empowering them to set the course for investment in their communities and not just accept what existing providers want to offer.

President Obama continues to emphasize the importance of broadband and has initiated a series of initiatives aimed at closing the digital divide and fostering investment in our nation's broadband infrastructure.

In 2013, the President launched ConnectEd, a public private partnership to connect 99% of America's students to the Internet

11. American Recovery and Reinvestment Tax Act of 2009, Pub. L. No. 111-5, § 1305, 123 Stat. 115 (2009).

12. *See generally BroadbandUSA: About*, NAT'L. TELECOMM. & INFO. ADMIN., http://www2.ntia.doc.gov/about [https://perma.cc/8SHP-79BE] (last visited Oct. 19, 2016).

through high-speed broadband within five years.[13] Since the President's announcement, the public and private sectors have committed more than $10 billion of total funding and in-kind commitments.[14] Last year, the President announced ConnectHome—a new initiative with communities, the private sector, and the federal government, specifically the Department of Housing and Urban Development, to expand high-speed broadband to low-income families across the country.[15] The pilot program is launching in twenty-seven cities and one tribal nation, and will initially reach over 275,000 low-income households.[16]

Last March, the President created the Broadband Opportunity Council, made up of more than twenty federal agencies, and directed it to determine what actions the federal government could take to eliminate regulatory barriers to broadband deployment and to encourage investment in broadband networks and services.[17] In August, the White House released the Council's report, which describes concrete steps that twenty-five federal agencies will take in 2016 to eliminate regulatory barriers and promote broadband investment and adoption.[18] As part of this effort, NTIA will create a portal for information on federal broadband funding and loan programs to help communities easily identify resources as they seek to expand access to broadband.

Turning to spectrum, NTIA continues to play a vital role in fueling innovation as manager of the federal government's use of spectrum. Spectrum is the enabler of everything from smartphones to weather satellites, personal fitness monitors to the space station. At NTIA, we are working closely with other federal agencies, the FCC, and industry to explore how to best ensure widespread and effective spectrum access. We are committed to ensuring that

13. Press Release, The White House Office of the Press Sec'y, President Obama Unveils ConnectED Initiative to Bring America's Students into Digital Age (June 6, 2013), https://www.whitehouse.gov/the-press-office/2013/06/06/president-obama-unveils-connected-initiative-bring-america-s-students-di [https://perma.cc/Y9W7-NBVH].

14. Press Release, The White House Office of the Press Sec'y, FACT SHEET: ConnectED: Two Years of Delivering Opportunity to K-12 Sch. & Libraries (June 25, 2015), https://www.whitehouse.gov/the-press-office/2015/06/25/fact-sheet-connected-two-years-delivering-opportunity-k-12-schools [https://perma.cc/KP48-FAYA].

15. Press Release, Cameron French, U.S. Dep't of Hous. & Urban Dev., President Obama and Sec'y Castro Announce Initiative to Extend High Speed Broadband Access for Students in HUD-Assisted Hous. (July 15, 2015), http://portal.hud.gov/hudportal/HUD?src=/press/press_releases_media_advisories/2015/HUDNo_15-090 [https://perma.cc/J6CC-KLRU].

16. *Id.*

17. *See* Press Release, The White House Office of the Press Sec'y, Presidential Memorandum—Expanding Broadband Deployment and Adoption by Addressing Regulatory Barriers and Encouraging Inv. and Training (Mar. 23, 2015), https://www.whitehouse.gov/the-press-office/2015/03/23/presidential-memorandum-expanding-broadband-deployment-and-adoption-addr [https://perma.cc/84VN-X2ZT].

18. *See* U.S. DEP'T OF COM. & U.S. DEP'T OF AGRIC., BROADBAND OPPORTUNITY COUNCIL REPORT & RECOMMENDATION (2015).

industry has the spectrum it needs for its innovative new products. But at the same time, federal agencies need spectrum to perform their missions to protect the health, safety, and security of our citizens.

Recognizing the importance of spectrum to our innovation economy, President Obama, in 2010, directed NTIA to work with the FCC to make an additional 500 megahertz of spectrum available for commercial use by 2020.[19] We're about halfway there to achieving that goal, and Chairman Wheeler and I are committed to identifying, before the end of this year, the remaining spectrum necessary to meet the 500 megahertz goal.

Our key learning on spectrum [early] in this Administration was that we needed to find a new way to make spectrum available for commercial broadband, and that new way had to embrace sharing of spectrum between federal agencies and industry.

In 2012, the President's Council of Advisors on Science and Technology [PCAST] validated what we had been saying about the need for sharing. As the PCAST report concludes, the old method of clearing spectrum of federal users and then making it available for the exclusive use of commercial providers is no longer sustainable. We have moved the easy systems. To continue the old method of spectrum reallocation costs too much money and takes too long. The industry and their customers, as well as our economy, cannot afford the cost and delay. Moreover, over the years the critical missions performed by federal agencies have required systems of greater and greater complexity, and have increased the agencies' needs for spectrum. The opportunities to find spectrum to which to relocate federal operations are rapidly dwindling.

Two key achievements last year, that propelled us closer to the President's goal, depended on the recognition that spectrum sharing is the new paradigm.

First, was the successful AWS-3 auction, which raised more than $41 billion in net proceeds for the government.[20] This outcome was only made possible by the intensive collaboration between federal agencies and industry to evaluate how spectrum in the 1755-1780 megahertz band could be shared. Our Commerce Spectrum Management Advisory Committee, CSMAC, really stepped up to lead the work between industry and the federal agencies, by organizing and overseeing months of intensive

19. Press Release, The White House Office of the Press Sec'y, Presidential Memorandum: Unleashing the Wireless Broadband Revolution (June 28, 2010), https://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution [https://perma.cc/B8Q6-NZSQ].

20. *See Auction of Advanced Wireless Services (AWS-3) Licenses Closes Winning Bidders Announced for Auction 97*, DA 15-131, Public Notice, 30 FCC Rcd. 630 (2015), https://apps.fcc.gov/edocs_public/attachmatch/DA-15-131A1.pdf [https://perma.cc/XL25-9JRQ].

discussions.

The second achievement was the FCC's decision to make 150 megahertz of spectrum available for shared small cell use in the 3.5 gigahertz band, 100 megahertz of which is used today for naval radar systems.[21] NTIA collaborated closely with the FCC and the Department of Defense to lay the groundwork for this move, which establishes the innovative Citizens Broadband Radio Service and represents an important pivot point to the new paradigm of increasingly dynamic sharing. Again, we will continue the collaboration as implementation continues in order to ensure that incumbent military users are protected as new players start operating in these systems.

For this year, in addition to completing the identification of the remaining spectrum to meet the President's goal, we are focusing on how to build sustainable processes to keep the spectrum pipeline flowing. We are greatly helped in that regard by the legislation Congress passed last year to make important changes to the Spectrum Relocation Fund. The so-called "Spectrum Pipeline Act" allows agencies to use funds from the Spectrum Relocation Fund to pay for research and development activities that promise to increase spectrum efficiency and that may lead to repurposing of spectrum for commercial use.[22] We are moving quickly to implement the Spectrum Pipeline Act provisions, including recently updating our regulations so that the Technical Panel, which receives funding requests, will be in position to accept these new types of proposals in the near future.

Over the years, there has been lots of well-meaning talk of giving agencies more incentives to relinquish spectrum. But this change to make Spectrum Relocation Fund dollars available for research and development has the potential to do more in this area than any other proposal that has been made on incentives.

With the FCC and our other agency partners, along with members of industry, we continue to evaluate the feasibility of increased sharing by unlicensed devices in up to 195 megahertz of the 5 gigahertz band. The challenges to making this work are significant in each of the two separate portions of the band at issue, and industry cooperation will be pivotal in reaching conclusions on these bands this year.

Beyond this, we are working with federal agencies to assess their spectrum use in another five bands, accounting for 960 megahertz of spectrum. Based on the results of these quantitative assessments that we expect to report soon, we will then be in a

21. *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550- 3650 MHz Band*, GN. Dkt. No. 12-354, Notice of Proposed Rulemaking & Order, 27 FCC Rcd. 15594, para. 80 (2012).

22. Spectrum Pipeline Act of 2015, Pub. L. 114-74, § 1001, 129 Stat. 621 (2015).

position to prioritize some of those bands for more detailed sharing feasibility studies.

Meanwhile, as we all hear about how industry plans to evolve to 5G technologies, we are working with the FCC to open up bands much higher in the spectrum range for innovative new uses, from ultra-high definition video delivery to applications for the Internet of Things. Interestingly, because of the types of uses envisioned along with advances in technology, industry now covets the higher bands once deemed unattractive, including in the millimeter wave range. The FCC is eager to take the next steps in its associated Spectrum Frontiers proceeding and release some of this spectrum into the market and let the industry innovate and keep the U.S. at the forefront of mobile broadband deployment and use.

To build the sustainability of the effort to identify spectrum beyond the President's original 500 megahertz goal, we must also do the following:

First, we must develop advanced spectrum sharing technology and tools. These include smart radios that can sense which frequencies are available for use in real time, and spectrum access databases that can dynamically track who is using which bands to avoid interference with protected incumbents.

Second, as our airwaves become more crowded, we need to establish processes and policies to ensure that everyone—public and private sector alike—plays by the rules. After all, it won't matter how much spectrum we make available for sharing if the frequencies are too congested or too chaotic to be usable.

And third, we need to promote cooperation and collaboration—and build trust and buy-in—across the public and private sectors so that we can identify more sharing opportunities and make it work in practice.

To accomplish these goals, we will continue to rely on the CSMAC to provide us with excellent advice. The CSMAC has set a sterling example of effective government-industry collaboration, and we will take the necessary steps this year to ensure it remains an important asset in future administrations.

The recently established Center for Advanced Communications [CAC] here in Boulder will be another important player with its focus on cutting-edge research and development, experimentation, and testing. The CAC combines the research and engineering expertise of NTIA's Institute for Telecommunication Sciences here in Boulder, which has extensive experience conducting spectrum measurements and analysis with NIST, which performs world-class research related to advanced communications technology.

The key mission of the CAC is to serve other federal agencies and industry to solve some of the challenges of spectrum sharing

through our combined testing, measurement, and modeling and analysis capabilities. One initiative already under way, CAC's spectrum monitoring project to measure spectrum utilization, is important, since it can help identify the frequency bands of most interest for potential future sharing and lay the groundwork for the enforcement of rules to avoid interference once sharing is in place. We cannot talk about sharing the spectrum if we do not know how it's being used today.

Looking to the future, our bright minds at CAC are looking at whether there is a way to "crowdsource" spectrum monitoring. Monitoring spectrum use across the U.S. would be too costly for the government to take on, so is there an innovative way to get others involved? Several examples of crowdsourced funding already exist. For example, the Weather Underground is a network of over 180,000 members that send data from their own personal weather stations. Can we tap into the ever-increasing number of wireless devices in a similar way? ITS researchers are already experimenting with the software to enable sharing of spectrum monitoring data.[23]

In industry structure parlance, increasing the supply of a raw material such as spectrum can have major impacts on industry structure by enabling new entry or strengthening weaker rivals in a market. But whether it has these impacts is very much dependent on the regulatory decision as to how and to whom to allocate this spectrum—a topic that I am sure will be discussed in a later session of this conference.

The third area I want to cover is the process for solving policy questions in the digital economy space. And, of course, here I want to refer to the multistakeholder process and the role it can play in facilitating new business models which, as we have seen for years, can have major impacts on industry structure.

I have been preaching on the multistakeholder model since my first appearance at Silicon Flatirons in 2010.[24] When I first started talking about the multistakeholder model, our public affairs people at NTIA told me I needed to find a different label because the press would never print the term. Today, if you search on the term, you will find hundreds of references. It has its own Wikipedia entry. For the last two years, we have seen an untold number of people around the globe engage in multistakeholder discussions to plan for the transition of the U.S. government's stewardship of the Internet's domain name system. And just last December, at the United Nations ten-year review of the World Summit on the Information

23. *See generally* INSTITUTE FOR TELECOMMUNICATION SCIENCES, http://www.its.bldrdoc.gov/ [https://perma.cc/K3QC-TNP7] (last visited Oct. 24, 2016).

24. *See* Lawrence E. Strickling, *Remarks at the Digital Broadband Migration: Examining the Internet's Ecosystem*, 9 J. ON TELECOMM. & HIGH TECH. L. 255 (2011).

Society, the United States successfully negotiated language in the final outcomes document that affirms the primacy of the multistakeholder approach to developing the information society.[25]

What does this have to do with industry structure? Just as the Internet is constantly evolving and disrupting existing business models, our policy process also needs to evolve. We cannot leave issues untended—all that will do is slow down innovation on the Internet and perhaps leave our businesses at a disadvantage in the global marketplace.

We believe the most effective, most expedient way to tackle these issues is through multistakeholder processes because we have seen it work on the global stage over the past 20 years as academics, technical experts, civil society, and governments have come together on an equal footing to resolve technical and policy questions related to the Internet. In this time, the Internet has flourished. It has driven economic growth, innovation, and free expression around the globe. And a big part of its success can be attributed to this multistakeholder approach.

It is not hard to understand why this has been the case. Like the Internet itself, the multistakeholder model is characterized by its open participation and decentralized processes. The Internet thrives only through the cooperation of many different parties. The multistakeholder model reflects this fact by enabling a diversity of stakeholders to participate, fostering a diversity of opinions and ideas. The result is more creative problem solving. It is a nimble, flexible approach, much better suited to rapidly changing technologies, business practices, and markets than traditional regulatory or legislative models. It can be adapted based on needs, circumstances, and the evolution of the ecosystem.

In contrast, more traditional telecommunications regulatory processes, by their very construct, have a more limited set of stakeholders and are often designed to limit direct participation, or at least make it difficult for others to participate. Top-down regulatory models too often can fall prey to rigid procedures, bureaucracy, capture by incumbents, and stalemate.

The ongoing work of the Internet community to develop a plan to transition our stewardship role over the Internet domain name system—the so-called "IANA functions"—and to improve ICANN's accountability represents the largest multistakeholder process ever undertaken. Not only will ICANN be stronger as a result of this effort, but a successful outcome here will serve as a powerful example to the world that the multistakeholder model can solve difficult issues regarding the Internet.

Domestically, we are seeing examples of its success as well.

25. *See* WORLD SUMMIT ON THE INFORMATION SOCIETY, OUTCOME DOCUMENTS, WSIS + 10 OUTCOME DOCUMENTS (2014).

NTIA conducted a multistakeholder process that developed a code of conduct aimed at improving disclosures on mobile devices. As a result, enhanced privacy notices based on the code are now live in apps used by 200 million consumers and the numbers are growing. The multistakeholder model was also used to develop the cybersecurity framework. Spearheaded by our sister agency NIST, the framework is helping organizations align their policies, technologies, and day-to-day business operations to better protect their important data.

Because of the successes we have seen so far with this model, we continue to embrace it as the best tool to meet our mission at NTIA to preserve and protect the Internet as a platform for economic growth, innovation, and the free flow of information. This mission places us front and center at every major Internet policy debate today: privacy, Internet governance, cybersecurity, and more. We are committed to making progress where we can to ensure that our digital economy continues to grow and thrive.

We are putting our time and resources in the multistakeholder process because we know it can help build trust in the digital ecosystem. For the sustainability and continued growth of the Internet, it is imperative that we preserve the trust of all actors on the Internet. The multistakeholder process has the ability to produce—in a timely way—meaningful guideposts for industry and consumers in this rapidly evolving technological environment.

Now, reaching consensus in a multistakeholder process is not easy, and some people have raised concerns about how long it takes. The process that resulted in the code for mobile app disclosure lasted a year. But a one-year process to make substantial progress on a policy issue impacting millions of consumers is lighting speed in Washington. Complex policy issues typically take years to make their way through the regulatory and legislative morass of Washington. Most efforts end in failure. The few that do reach a conclusion inevitably solve a problem that no longer exists or has been overtaken by newer issues that themselves need to be addressed. The losers in this process are, more often than not, the disrupters—the entrepreneurs with new business models to upset the existing industry structure.

In 2016, we will continue to explore and promote use of the multistakeholder model in a number of environments.

On the privacy front, we have two multistakeholder processes underway—one to develop best practices on the privacy, transparency, and accountability of unmanned aircraft systems or drones; the other to develop best practices related to facial recognition technology. This past September we launched a third process looking at best practices for cybersecurity vulnerability disclosures.

We will continue to explore, with input from stakeholders, other policy challenges that these processes can tackle. For example, we plan to issue a request for comment shortly asking questions about whether there are policy areas related to the Internet of Things that could be appropriate for multistakeholder engagement.

I have asked my policy team to perform an evaluation of our use of the multistakeholder model to tackle other Internet policy problems—not just the global Internet governance ones—over the last five years. We are going to examine how we have approached the problems, what we perceive as our gaps in participation and implementation, and make recommendations on how we can enhance and sustain this model. We will be looking for feedback from you as we evaluate the model and formulate our recommendations. That's part of the beauty of the model: it is adaptable and flexible in a way that regulatory approaches could never be.

It is an exciting time to be involved in these issues. Our world is changing right before our eyes, perhaps at a faster pace than ever before in history, and the policy decisions we make in the next few years will have a profound impact on the digital landscape in the years to come.

To close my last speech at Silicon Flatirons as NTIA Administrator, I want to thank all the men and women on our staff who serve the public interest every day and congratulate them on these and other accomplishments of the last seven years. Several of our current and former staff are in the audience and I would like to have you recognize them now: Anna Gomez, our former deputy administrator; Tom Power, our former chief of staff; Glenn Reynolds, our current chief of staff; Keith Gremban, our new director of the ITS Boulder lab; not to mention Dale Hatfield, who we brought back on a part-time basis last year to help out with our Boulder operation. We will work tirelessly in 2016 to cement our advances of the last seven years, and we want to work with all of you to leave a framework for sustainable and continued progress in the future.

Thank you for listening.