



FirstNet®

F Y 2 0 1 7 : A N N U A L R E P O R T T O C O N G R E S S



Advancing Public Safety Broadband Communications

Submitted to the
United States Senate Committee on Commerce, Science, and Transportation
and the
United States House of Representatives Committee on Energy and Commerce

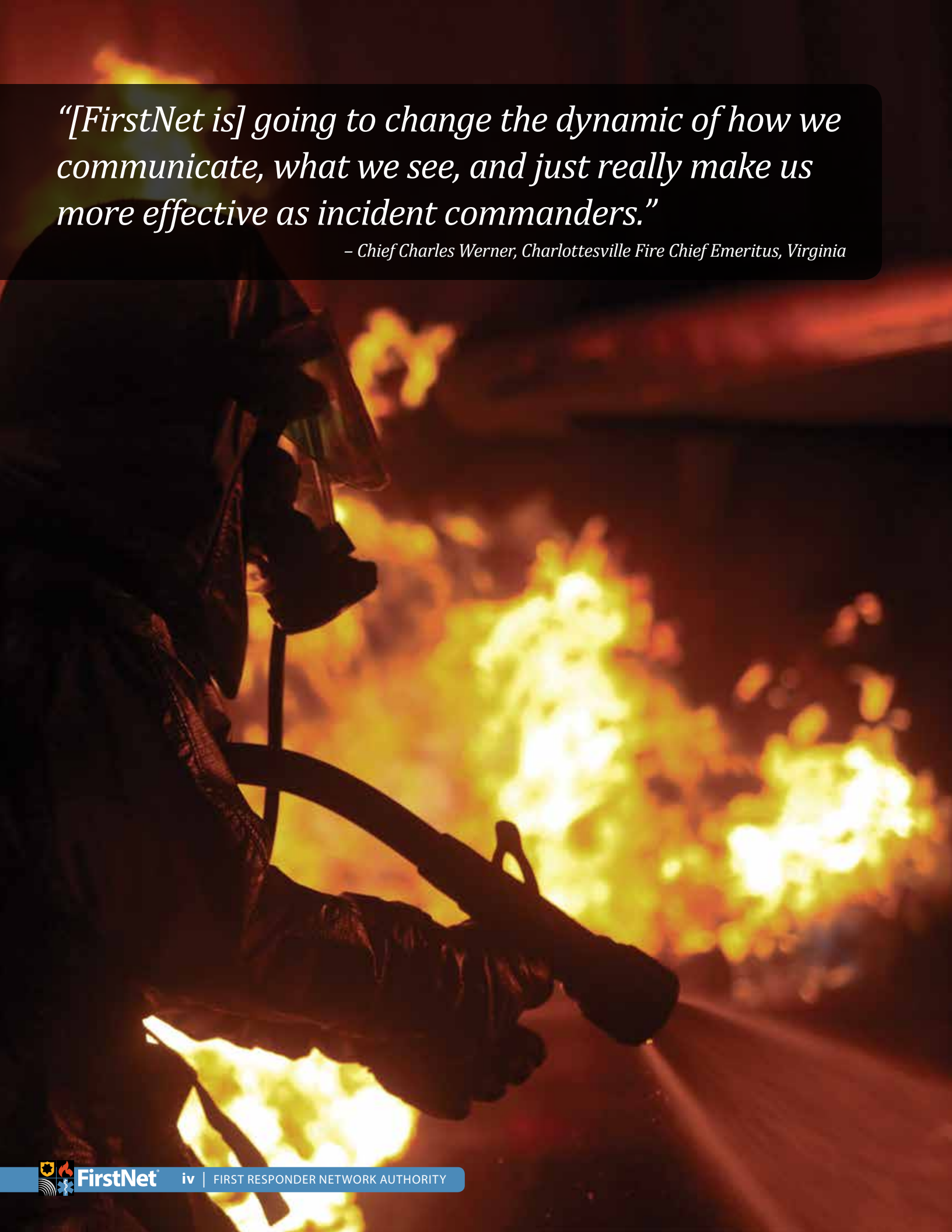


The New Orleans Police Department and Louisiana National Guard on patrol together high above the Crescent City.



This Annual Report to Congress is issued pursuant to Section 6210 of Public Law 112-96 and reflects the **operations, activities, financial condition, and accomplishments** of the First Responder Network Authority (FirstNet)¹ for fiscal year 2017.²

- 1 Public Law 112-96 established FirstNet as an independent authority within the United States Department of Commerce's National Telecommunications and Information Administration (NTIA).
- 2 Fiscal year 2017 is the period from October 1, 2016 through September 30, 2017.

A dramatic photograph of a firefighter in silhouette, wearing a helmet and holding a hose, fighting a large fire at night. The fire is bright yellow and orange, with thick smoke rising. The firefighter is in the foreground, and the fire is in the background.

“[FirstNet is] going to change the dynamic of how we communicate, what we see, and just really make us more effective as incident commanders.”

– Chief Charles Werner, Charlottesville Fire Chief Emeritus, Virginia

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“That is the beauty behind FirstNet and having this independent, separate network from the public’s network.”

– Captain James Sarkos, Atlantic City Police Department, New Jersey



FirstNet

vi | FIRST RESPONDER NETWORK AUTHORITY

LETTER FROM BOARD CHAIR SUE SWENSON AND CHIEF EXECUTIVE OFFICER MICHAEL POTH

February 2018



We are proud to report that the First Responder Network Authority achieved three major milestones in fiscal year 2017 toward fulfilling Congress's objective to make the Nationwide Public Safety Broadband Network (NPSBN) a reality for public safety.



First, in March 2017, FirstNet awarded AT&T a 25-year contract to build, deploy, maintain, and operate the NPSBN. In this unique public-private partnership, FirstNet will leverage its 20 MHz of spectrum and its federal position

to bring scale and resources to the marketplace, including up to \$6.5 billion in success-based payments. AT&T will bring operational expertise, financial stability, and network assets valued at up to \$180 billion. This financial model is so innovative that the FirstNet team that developed the request for proposal (RFP) for the NPSBN, was awarded the highest Department of Commerce honor, the Gold Medal, for its accomplishment.

Second, FirstNet and AT&T issued State Plans for the radio access network (RAN) deployment three months ahead of schedule. The State Plans were informed by the extensive data collected from four years of consultation and cooperation with states and territories (States), tribal outreach engagements, federal agencies, and work with rural and metropolitan areas to understand public safety's needs for coverage, capacity, and broadband applications. The plans provided Governors with the information necessary to make an informed decision as to whether an "opt-in" or "opt-out" decision would best meet the needs of their State. Based on these efforts, 56 States³ decided to opt-in to the FirstNet network. We thank the States for their cooperation and recognition of what the FirstNet program will mean for public safety.

Third, in cooperation with AT&T, we began the work necessary to drive true competition and innovation in the marketplace. For too long, public safety has been unable to take advantage of the highly competitive marketplace. With FirstNet and AT&T providing a dedicated broadband network, our nation's first responders can take advantage of competition, the development of highly innovative and strategic tools that will improve their response capabilities, and open standards. Ultimately, we and AT&T are creating the communication platform for 21st-century first responders. Tools such as the "Doing Business with FirstNet" web page and initiating technical and operational functions to promote innovation in public safety communications, have encouraged industry take notice of the scale and competition that we are bringing to the marketplace. For example, we already see competitive service plans and improved device and application offerings from multiple vendors.

We have taken many steps to further our status as an independent authority for our own purposes and to facilitate the NPSBN, creating the environment to transition from planning and creation to operation and oversight. We are also pleased to share that we published our Tribal Consultation Policy to ensure federally recognized tribes have direct access to FirstNet as we continue to evolve the network to include the tribal communities' needs and points of view.

We look forward to continuing our work with AT&T to deploy the network and provide the mission-critical, reliable, and interoperable communications that public safety needs and deserves.

We are thankful for the opportunity to lead the First Responder Network Authority during this particularly exciting time.

Sincerely,

A handwritten signature in blue ink that reads "Sue Swenson".

Sue Swenson
Chairwoman, FirstNet Board

A handwritten signature in blue ink that reads "M. S. Poth".

Mike Poth
Chief Executive Officer

³ This includes five U.S. Territories and the District of Columbia (DC). For DC, it is the Mayor that makes the decision.

EXECUTIVE SUMMARY

The First Responder Network Authority made tremendous strides in fulfilling our mission to provide ubiquitous wireless broadband to public safety entities. We maintained the pace and course we discussed during the House and Senate oversight hearings to ensure we meet Congress's mandate to deploy, operate, and maintain a wireless broadband network dedicated to public safety. This course was embodied by transparency, fairness, and engagement with public safety.

This year's report highlights several significant milestones we met in fiscal year (FY) 2017. First, we awarded the NPSBN contract to AT&T. This milestone launched what we believe will be a revolution in public safety communications. Public safety will now be able to take advantage of a dynamic marketplace to demand better coverage, solutions, and service than ever before. Our success in meeting this milestone generated significant interest from other federal agencies as to how we were able to execute a contract of this size with such speed and efficiency, establishing a new standard for public-private partnerships.

Second, we met the important milestone of consultation with the States and public safety community to create and deliver unique State Plans for the RAN deployment. This intensive stakeholder engagement was necessary to ensure that the State Plans we and AT&T created reflected public safety's needs. Governors needed to be confident they had the right information to make an informed decision on whether to proceed in accordance with the proposed State Plan, or seek to deploy their own State-built RAN.

Third, we and AT&T are working together to bring change to the public safety communications landscape. This partnership allowed us to start working together on technical and functional areas to facilitate the NPSBN, particularly with regards to the evolving market and ecosystem.

And finally, we took organizational steps to support our mission. These are significant because they create the environment for FirstNet to transition from planning and creation, to operation and oversight.

FY 2017 was another year of growth for FirstNet, with many successes achieved and challenges addressed. The organization continues to learn and evolve, and we are excited for the work ahead to serve public safety.



“If we can get to the scene more efficiently with better information, it’s only going to make for better results.”

– Captain Phil Perry, Alexandria Fire Department, Virginia

An Alexandria (VA) Fire Department fireboat testing equipment on the Potomac River.

“Today is a landmark day for public safety across the Nation and shows the incredible progress we can make through public-private partnerships.”

– U.S. Department of Commerce Secretary Wilbur Ross



FirstNet CEO Mike Poth, AT&T Chairman, Chief Executive Officer and President Randall L. Stephenson, and U.S. Department of Commerce Secretary Wilbur Ross at the partnership ceremony.

CONTRACT AWARD AND PARTNERSHIP

After nearly four years of consulting with the States and public safety stakeholders, FirstNet awarded the NPSBN contract to AT&T in March 2017. The NPSBN contract delivers on public safety's objectives, as described in the NPSBN RFP released in January 2016.⁴ These objectives are codified in the NPSBN's indefinite delivery/indefinite quantity (IDIQ) contract with AT&T, which will result in FirstNet achieving self-sustained operations for the next 25 years. AT&T has committed to invest \$40 billion in the FirstNet network over the life of the contract above what FirstNet will provide. AT&T will also include its existing commercial LTE network, in addition to deploying the coveted Band Class 14⁵ - 700MHz spectrum nationwide, as a pipeline to a dedicated public safety core network, delivering services on the dedicated core network as early as spring of 2018.

⁴ The RFP contained the following 16 objectives: Build, Deploy, Operate & Maintain the NPSBN; Financial Sustainability; First Responder User Adoption; Device Ecosystem; Applications Ecosystem; Accelerated Speed to Market; User Service Availability; Service Capacity; Cyber Security; Priority Services; Integration of Opt-out State RANs; Integrate Existing Commercial/Federal/State/Tribal/Local Infrastructure to Support NPSBN Services; Life-cycle Innovation; Program and Business Management; Customer Care and Marketing; and Facilitate FirstNet's Compliance With the Act & Other Laws.

⁵ Band Class 14, or Band 14, is a part of the 20 MHz of spectrum in the 700 MHz band that Congress allocated to FirstNet in Public Law 112-96 to deploy the nationwide public safety broadband network.





First responders join with the FirstNet and AT&T teams to unveil the public-private partnership on March 30, 2017.

AT&T's solution allows public safety immediate access to AT&T's network without having to wait for a green-field build of the nationwide wireless network. The multiband solution provides public safety with expanded capacity beyond Band 14, with end-to-end security, along with priority and preemption services across the entire network. Public safety will also be able to take advantage of AT&T's existing roaming agreements, across the country and internationally, for voice and data services.

In addition to the contract, three Day-One task orders were awarded:

1. Delivery Mechanism for State Plans
2. State Plan Development and Refinement
3. NPSBN Functions, which includes, but is not limited to, the core network, application ecosystem, and device ecosystem.

The award was preceded by a three-month, pre-award protest filed in the U.S. Court of Federal Claims by an unsuccessful vendor. The court ruled in favor of FirstNet on all counts, finding that none of the protestor's claims had merit.⁶ The decision validated our steps to ensure an open, transparent, and competitive process, as required by Congress, and cleared the way for us to award the contract and issue three initial task orders to AT&T.

With the contract award in March 2017, work quickly began on deployment of the world's first public safety nationwide broadband network. The initial deployment of the NPSBN is divided into five phases, referred to as initial operational capabilities (IOCs) 1 through 5. The activities to support the IOC-1 milestones were completed in accordance with the requirements of the NPSBN contract, and consist of the following:

- In June 2017, we and AT&T released State Plans to State Single Points of Contact (SPOCs) and other authorized users through the State Plan Portal, and launched www.firstnet.com, a publicly available website with substantial information for potential users of the NPSBN.
- In September 2017, based on stakeholder feedback, revised State Plans were released on the State Plan Portal with official notice delivered to Governors, beginning the 90-day opt-in/opt-out review and decision period.
- In September 2017, all Phase One activities for the IOC-1 NPSBN core network and application and device ecosystems were completed.

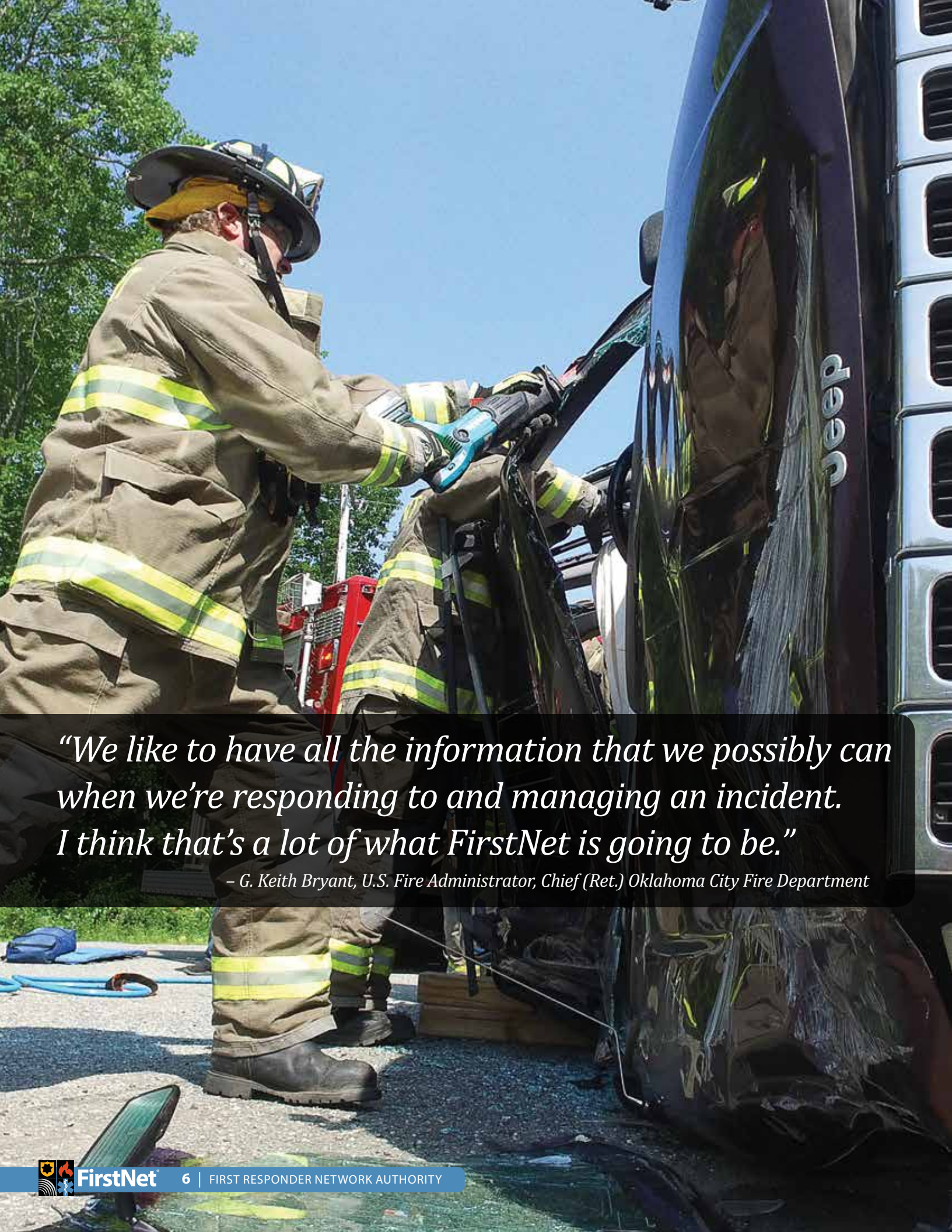
Work activities are ongoing for the IOC-2 milestones related to Phase Two of the NPSBN functions (due March 2018) and the release of the State RAN task order.



With first responders looking on, House Energy and Commerce Committee Chairman Rep. Greg Walden (OR-2) delivers remarks at the FirstNet partnership launch.

⁶ https://ecf.cofc.uscourts.gov/cgi-bin/show_public_doc?2016cv1559-87-0 accessed on December 27, 2017.





“We like to have all the information that we possibly can when we’re responding to and managing an incident. I think that’s a lot of what FirstNet is going to be.”

– G. Keith Bryant, U.S. Fire Administrator, Chief (Ret.) Oklahoma City Fire Department



STATE PLANS FOR GOVERNORS

Consultation with Stakeholders on the State Plan

In FY 2017, FirstNet continued extensive consultation with and outreach to public safety at the State, local, federal, and tribal levels to improve our understanding of public safety's communications needs and to prepare States for the delivery of the State Plan to the Governors.

SPOC Engagement

We engaged with SPOCs in a number of ways aimed at preparing States for the State Plan review and Governors' decision.

We held two in-person national meetings for SPOCs and their representatives. The first meeting was held in Phoenix, Arizona, in November 2016, and provided States with the opportunity to share best practices, hear from our leadership, provide feedback on our process, and have in-depth State specific discussions with our staff. The second SPOC meeting was held in conjunction with AT&T in Dallas, Texas, in June 2017. Representatives from each of the 56 states and territories interfaced directly with public safety communications leaders, AT&T executives, and FirstNet leadership on State Plan delivery and review.

We and AT&T also jointly held three webinars to introduce the AT&T FirstNet solution to States; walk through the content of the State Plan Guidance Package; demonstrate the State Plan Portal; and outline the responsibilities of the SPOCs, their teams, and FirstNet during the Governor's opt-in or opt-out review and decision period.

Governance Body Meetings

In March 2017, we completed a more than 12-month effort with standing committees governing emergency communications, holding engagements with more than 50 individual state and territory governance bodies. Many of these meetings involved public safety communications subject matter experts and State leadership. During these governance body meetings, we exchanged information with the States and evaluated ways to improve and increase two-way information flow.

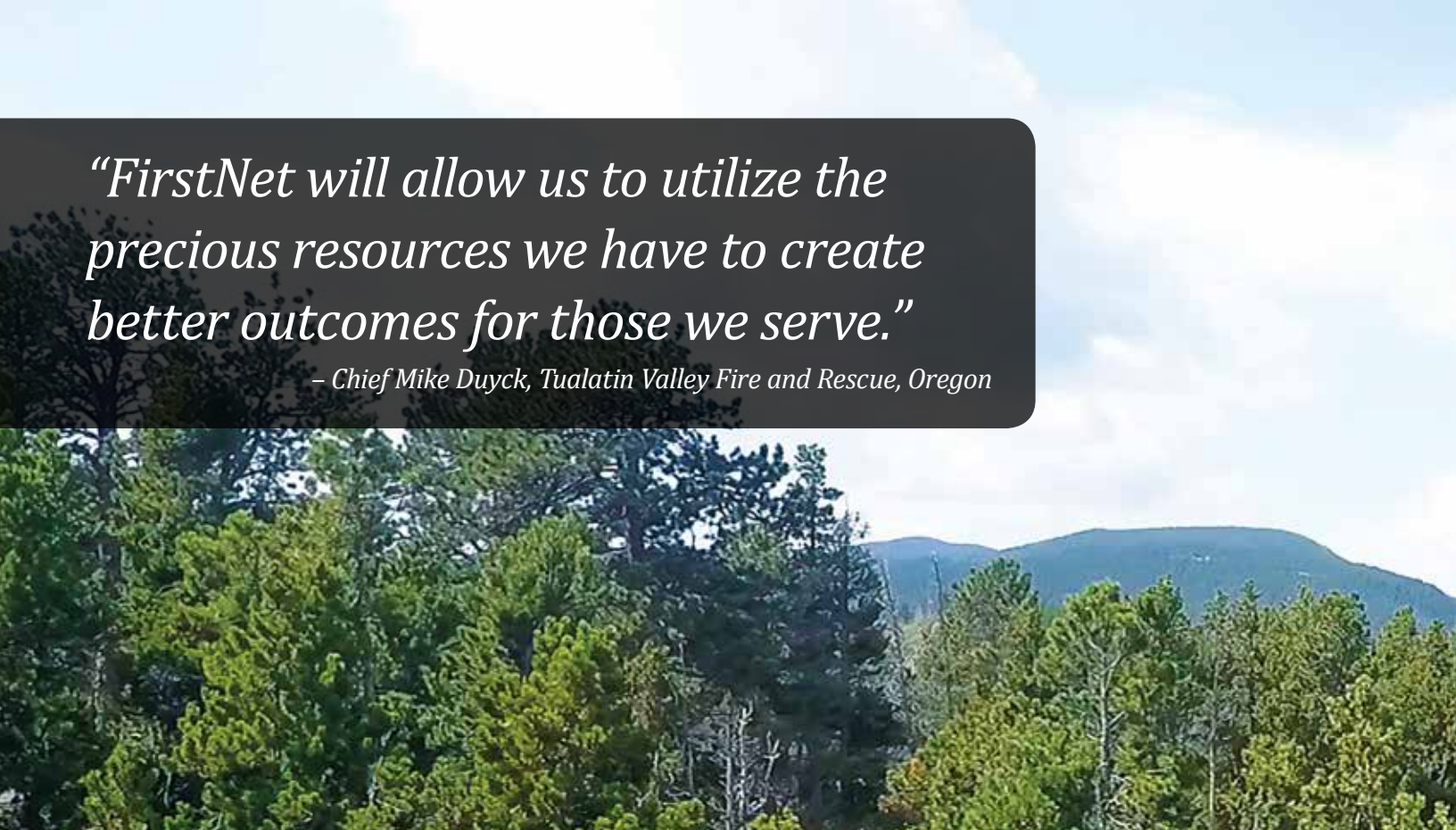
Metropolitan Engagements

During FY 2017, we conducted 40 metropolitan engagements with public safety leaders to share information about network planning, timelines, and network deployment. In these settings, police chiefs, fire chiefs, emergency management directors, sheriffs, elected officials, statewide interoperability coordinators (SWICs), and chief information officers (CIOs), among others, discussed how FirstNet could supplement public safety communications systems and practices, especially in large metropolitan areas where communications coordination and interoperability are being addressed. Topics like network management and policies, procurement, network user data management, applications, and user training were also discussed.

Tribal Government Engagements

In FY 2017, we were able to provide tribal partners with greater insight into the technical capabilities of the network, sharing information on the State Plan review and decision process, and how public safety agencies will be able to adopt the network. Our full-time tribal team is dedicated to creating and sustaining relationships with tribes across the country. Through close coordination and timely consultation, we are committed to providing timely, accurate information on the network's buildout and capabilities on tribal lands.

We participated in several conferences to engage tribal stakeholders, including the National Congress of American Indians (NCAI) Annual Convention, the International Association of Chiefs of Police, Missing and Unidentified Persons Conference, National Tribal Emergency



“FirstNet will allow us to utilize the precious resources we have to create better outcomes for those we serve.”

– Chief Mike Duyck, Tualatin Valley Fire and Rescue, Oregon

Management Council, Tribal-Interior Budget Council, Affiliated Tribes of Northwest Indians Mid-Year Convention, Texas Emergency Management Conference, Inter-Tribal Emergency Response Commission, Columbia River Inter-Tribal Enforcement Commission, and the Tribal Utility Gathering. These conferences allowed FirstNet to directly engage both larger and smaller tribes across the nation.

Other notable efforts include engaging the Navajo Nation and its Council (the largest tribal nation with territory in Arizona, New Mexico, and Utah) and the Ysleta del Sur Pueblo tribe in El Paso, Texas. These efforts allowed us to gain a greater appreciation of challenges faced by tribal communities, such as geographic coverage, low population density, and the lack of available infrastructure. We also engaged the National Indian Gaming Association and the Native American Finance Officers Association to discuss the role of broadband in public safety applications and opportunities for Indian gaming enterprises public safety operations.

Public Safety Association Outreach

We recognize the value that public safety associations bring to engage with the broader public safety community through their thought leaders and influencers. As we continue on the path to network deployment, engagement with national and State public safety stakeholder associations remains an essential focus.

This year, our outreach to public safety associations engaged key personnel and leadership across all disciplines. Our Board and leadership participated in more than 40 national association events, with our staff participating in hundreds more at the State, local, and national levels. Highlights from our participation at some of these events include:

- International Association of Chiefs of Police (IACP) Annual Conference and Exhibition. Following our participation, the IACP Communications and Technology Committee passed a resolution demonstrating its strong continuing support for FirstNet.
- National Sheriffs' Association Winter Legislative Conference. Board Member Sheriff Richard Stanek discussed FirstNet during an event at the White House led by President Donald J. Trump and Vice President Mike Pence.





- International Association of Fire Chiefs Fire-Rescue International Conference. Our workshop on Fire-Rescue-Medical Service Capabilities and Applications engaged fire and emergency medical service (EMS) leaders from across the country on what mobile applications firefighters and EMS personnel would most want to see created, as well as other uses for the NPSBN.
- National Association of State Technology Directors (NASTD) Annual Conference and Technology Showcase. NASTD Board members toured the FirstNet Boulder, Colorado facility and were briefed on the FirstNet solution by the FirstNet Chief Technology Officer.
- Association of Public-Safety Communications Officials (APCO) International Annual Conference and Expo. FirstNet Board Chairwoman Sue Swenson provided the keynote address at the Distinguished Achievers Breakfast; and FirstNet Board members, leadership, and staff answered questions about the State Plan review, Governor's opt-in/opt-out decision, and opt-in/opt-out processes.

Public Safety Advisory Committee (PSAC)

The PSAC is tasked with providing recommendations to assist FirstNet in deploying the FirstNet network. The PSAC consists of members who represent organizations from all disciplines of public safety as well as State, local, and tribal organization representatives, and offers us subject matter expertise and recommendations. We provide administrative support to the PSAC to help ensure its effective coordination with our consultation and technical staff.

The full PSAC membership met in person in December 2016 and June 2017, and by webinar in October 2016 and September 2017, to meet chartered requirements and support our efforts to ensure the network meets the needs of public safety. Meeting topics included updates from FirstNet and AT&T, discussion on working groups' accomplishments, and task team topics and findings. The First Responder Network Authority tasked the PSAC to address two topics:



More than 30 members of the PSAC join FirstNet Chair Sue Swenson and the FirstNet team to discuss public safety outreach in 2017 and strategies for 2018.

- **User Profiles.** The PSAC's User Profiles Task Team provided suggested templates to provision new users on the FirstNet network. The team created a profile template for each of the four primary public safety disciplines (law enforcement, fire services, emergency medical services, and 9-1-1/communications), using attributes and roles unique to each discipline.
- **Preparing for Adoption.** The PSAC's Preparing for Adoption Task Team developed recommendations that highlight the differentiators of the FirstNet network to help public safety agencies understand how the network is dedicated to serving public safety's unique needs.

The Government Accountability Office (GAO) examined the PSAC's role with respect to other federal organizations involved in public safety communications. In GAO Report 18-173R entitled "Emergency Communications: Overlap and View on Effectiveness of Organizations Promoting the Interoperability of Equipment," the GAO concluded that the missions of the Department of Homeland Security's (DHS) SAFECOM, Emergency Communications Preparedness Center, National Council of Statewide Interoperability Coordinators, and the PSAC were complementary and work together effectively, and that each organization has a specific focus and role. The report's sole recommendation was to examine the composition and function of the PSAC to determine whether all relevant stakeholder groups are adequately represented and their views adequately expressed and considered. Prior to release of the GAO report, we examined tribal representation on the PSAC, and will expand that review of the PSAC to consider whether all appropriate stakeholder groups have adequate representation.

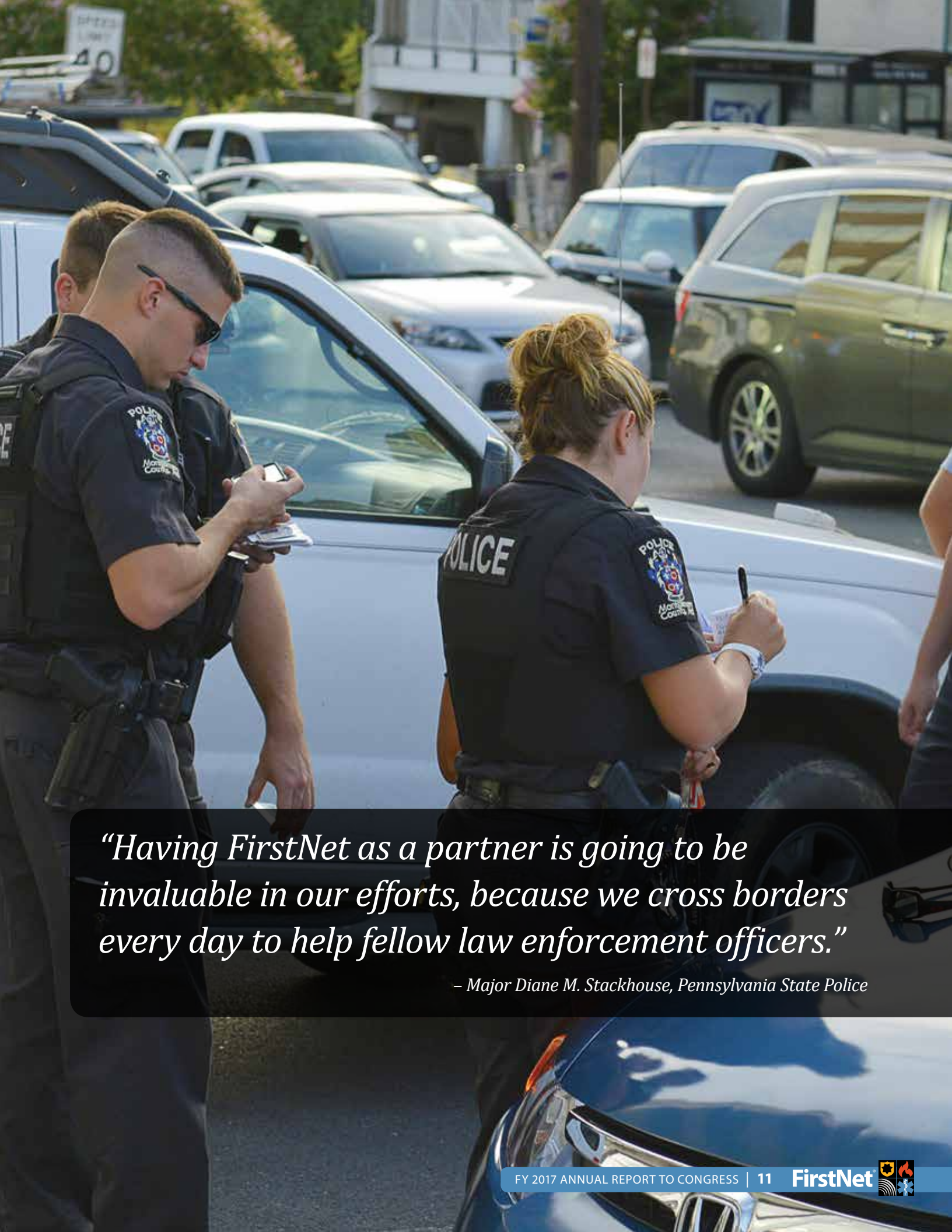
Delivering State Plans to Governors

State Plans were the culmination of years of consultation with the States and public safety stakeholders. Statutorily, FirstNet is required to provide details to Governors for the proposed build out of the network within each States' geographic boundaries. Governors then had 90 days to choose whether to opt-in to the FirstNet network deployment, in which case AT&T and FirstNet would bear the risks and costs associated with the NPSBN, or opt-out, in which case the State would assume responsibility for its RAN deployment, operation, maintenance, and improvement. In an opt-out situation, a State would be required to develop an alternative RAN plan and have that plan approved by the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA), in accordance with established statutory criteria, before negotiating a spectrum manager lease agreement (SMLA) with FirstNet.

The State Plan provided Governors with information on the history of FirstNet, past engagement and activities conducted with the respective State, coverage maps, pricing information, technical information, and the initial buildout schedule of the RAN in their State. The buildout schedule was presented at each of the IOC phases, ending roughly five years after contract award. The final phase, called Final Operational Capacity (FOC), shows the completion of the initial coverage footprint of the network. As the contract with AT&T is for 25 years, the coverage and capacity of the network will continue to evolve and constantly improve.

As part of our commitment to transparency and cooperation when working with the States, we and AT&T shared State Plans and met in-person with each State ahead of schedule so the States could provide feedback and ask questions about their plans before the official notice of the State Plans was sent to the Governors. This engagement was important to demonstrate FirstNet's and AT&T's commitment to public safety stakeholders and States.





“Having FirstNet as a partner is going to be invaluable in our efforts, because we cross borders every day to help fellow law enforcement officers.”

– Major Diane M. Stackhouse, Pennsylvania State Police

BRINGING ADVANCEMENTS TO THE PUBLIC SAFETY COMMUNICATIONS MARKET

FirstNet brings scale and financing to the public safety communications market that did not previously exist, making it possible for the industry to look at creating more products and services for a more defined market. Following the NPSBN contract award, FirstNet and AT&T launched two different public interfaces to encourage industry and stakeholder involvement with FirstNet.

We launched *Doing Business with FirstNet*⁷, which provides information to industry about how to potentially work as a contractor to the agency, or to demonstrate technologies that could be used to improve, enhance, or provide new capabilities for public safety communications leveraging the NPSBN. With this interface, we continue to look to industry for the most efficient ways of doing business and to bring innovative ideas to public safety communications.

Additionally, a public portal for potential users of FirstNet services was launched (www.firstnet.com) for those who have interest in the FirstNet network and want to understand how to obtain FirstNet services. In addition to these public interfaces, the First Responder Network Authority will continue to work with AT&T to deliver key features and services to enhance competition and choice to the public safety communications market.

Public Safety Applications Ecosystem

A game-changing set of tools for public safety will come with the availability of applications dedicated to public safety. Today, there are a small number of developers who provide public safety-specific applications relative to the entire market, because there were few incentives for developers to look at this specialized market segment. In addition, ubiquitous, reliable digital communications had never been available or used by public safety in a way that would create a market opportunity.

FirstNet is changing that landscape. The NPSBN will be a highly reliable network with nationwide coverage, and the resources we are bringing to the table will help kick-start work in this area.

Evolving an Applications Ecosystem

The vision and strategy of a vibrant, robust ecosystem for public safety applications and innovation centers initially on the development, monetization, interoperability, and publication of a growing portfolio of applications that enable public safety user adoption. We are leveraging the scale and technologies of the commercial market, and offering best-of-breed solutions. We explored and established new capabilities for mobile Identity, Credential, and Access Management (ICAM) solutions for multifactor authentication, mobile Single Sign-On (SSO), and integrity for federated FirstNet users. These are essential for future public safety users because of how they are expected to interface with their devices and applications in the field. Seeing a need for a more complete view of this market segment, we created a prototype knowledge base of public safety applications, developers, and vendors, providing visibility and prioritization of several hundred public safety applications for FirstNet and AT&T's application ecosystem. This effort has produced – and will continue to yield – valuable data about the type of features, tools, and use cases developers should expect when considering the public safety community.

At the same time, we continued to focus on the Internet of Things (IoT) market research, technology evaluation, and ecosystem design and developments. To validate our work on these relevant projects, we held numerous sessions with innovative software, platform, and applications vendors, as well as external groups like APCO, international delegations (i.e., United Kingdom, Sweden, Canada), and federal public safety stakeholders (i.e., DHS, FCC, the National Identify Exchange Federation [NIEF], National Highway Traffic Safety Administration

⁷ <https://firstnet.gov/about/doing-business-firstnet>





“The availability of services that FirstNet can provide in the rural areas will make a huge impact on the cost of health care.”

– Melvin Musulin, Assistant Director for Pennsylvania's Valley Ambulance Authority



[NHTSA], Department of Defense Innovation Unit Experimental [DoD-DIUx], Federal Emergency Management Agency [FEMA], Department of Justice [DOJ]).

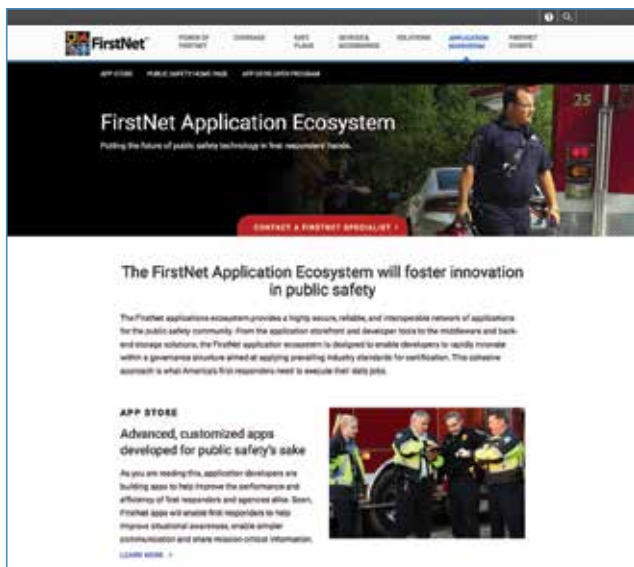
We believe that driving industry standards and best practices are an essential part of our mission to ensure interoperability, scalability, and adoption. The use of open, non-proprietary, commercially available standards are essential to meeting the requirements of the law and removing barriers to new entrants in the marketplace. This is reinforced by our direct participation in standardization bodies and through our contract with AT&T. Moving forward, we will create strategies to encourage and stimulate development and use of standards-based applications, while also aggressively promoting and advocating for the creation of new ones in collaboration with the PSAC, public safety users, agencies, developers, AT&T, academia, associations, and federal partners through our initiatives to create an applications interoperability and standards roadmap. Much of the initial groundwork for developing these strategies was completed in 2017.

Launch of Applications Ecosystem Components

On September 29, 2017, the initial components of the applications ecosystem were launched. These initial components include:

- **Applications Developer Portal**⁸, a public website focused on developer registration, development tools, application program interfaces (APIs), application submission, testing, certification, and publishing in the apps store
- **Public Safety Home Page**, a non-public landing page for FirstNet customers and administrators to access customized views of local control, the applications store, and network status
- **Local Control**, which provides public safety customers with several self-service functions to manage their FirstNet accounts and some of the features enabled on the network
- **FirstNet Applications and Solutions Store**, a non-public website for public safety customers to choose from vetted applications and software solutions that support their mission requirements, created by software developers and vendors participating in the FirstNet Developer Program.

The Public Safety Home Page will be a key differentiator for the FirstNet service. This platform will provide subscribing public safety agencies with control over and visibility into the FirstNet network, with specific details about weather, traffic, network alerts, and deployed network coverage. We have made efforts to ensure that the Public Safety Home Page is relevant and functional to public safety users.



Local Control is a key feature of the FirstNet applications ecosystem, providing a powerful capability to optimize the user experience through a single, convenient, and standardized home page management function and portal. This is another key feature that public safety said was a vital element to how they would use the FirstNet service. Local Control delivers the ability for public safety to immediately and intuitively manage devices, users, applications, rate plans, services, billing, and public safety solutions.

We also delivered the First Net Applications and Solutions Store component of the Application Ecosystem. It contains applications and software solutions that enable and enhance public safety's mission. The store serves as the home for an evolving and growing portfolio, consisting of applications developed for, and in some cases by, the public safety community, including tools to improve team communication, workflow, and situational awareness; device secu-

8 <https://developer.firstnet.att.com/firstnet>

urity and mobile device management to manage and protect mobile devices; secured connections for confidence when connecting to critical public safety applications; and cloud services to optimize agency computing, storage, and network resources.

Launch of Developer Program

FirstNet launched an application development platform that provides a strong and simplified development environment with tools and resources for testing, review, and distribution of targeted public safety applications to foster interoperability and increase the quantity, quality, usability, and efficacy of public safety applications. Through the Developer Program, we are encouraging developers to explore and embrace the Applications Developer Portal as a gateway into all resources required to successfully build, deploy, and maintain FirstNet applications. We have delivered tools for testing new applications, security, and APIs (e.g., IoT, short messaging service [SMS], data, enhanced push-to-talk [PTT], in-application messaging) and developed a new public safety application certification and review process that is unique to the FirstNet Application Developer Program. The Developer Program includes hackathons and workshops focused on outreach, and developing applications that support the mission-critical needs of first responders and the public safety community.



Device Ecosystem

The FirstNet device team is working closely with the National Institute of Standards and Technology (NIST), which is required by law to ensure the development of a list of approved devices for use on the NPSBN. FirstNet and NIST have clearly identified and documented our respective roles and the device approval methodology, which resulted in the publication of a NIST document⁹ defining the process for generating the approved device list. We also coordinated with NIST to provide support in the test case development efforts for key public safety feature areas within the 3rd Generation Partnership Project (3GPP) standards development process.

In addition, our device team collaborated with AT&T's device team on the development of the FirstNet device approval program, which will leverage AT&T's existing device type approval process and incorporate FirstNet-specific feature/function testing. We plan to use a combination of audit, verification, and test execution activities with special focus on public safety features and services in support of the device approval program.

Innovation and Testing Lab to Build Confidence in Devices and Applications

Testing and demonstrations of devices and applications will be a way for us to build confidence with public safety users regarding FirstNet's products and services. This testing will be done in addition to AT&T's own network acceptance testing process. On November 9, 2016, we officially opened our Innovation and Testing Lab in Boulder, Colorado. One of the primary uses for this lab is to conduct validation and verification testing for the network, services, and features and demonstrate those to public safety. This work will help reduce the time to initially field test and

⁹ <https://www.nist.gov/publications/process-document-nist-list-certified-devices>

deploy public safety features of the FirstNet network, including quality of service, priority and pre-emption (QPP), as well as other future mission-critical services and applications.

For instance, the FirstNet IOC-1 public safety focused feature demonstrations were performed for public safety officials and other stakeholders in September 2017. Demonstrations included commercial PTT, drones, deployables, satellite communications, the device portfolio, the FirstNet application home page, the FirstNet Application developer portal, AT&T Messaging Solution, public safety applications, and Public Safety Communication Research (PSCR) projects. These demonstrations illustrate the pivotal role FirstNet plays in bringing advanced and dependable life-saving tools and capabilities to public safety.

The lab facility will be a key component of our efforts to push innovation and encourage future research and development related to public safety broadband technologies. By bringing public safety practitioners into a lab environment where different operational scenarios can be simulated, FirstNet engineers will better understand how FirstNet's technological solutions need to evolve to better meet public safety's needs. In FY 2017, much of the information, technology, and telecommunications tools and infrastructure were integrated into the lab to make this vision a reality as we move into FY 2018.

Standards Successes on behalf of Public Safety

As required by Congress, FirstNet uses technology based on commercially available open standards to achieve interoperability, speed to market, economies of scale/cost efficiency, and other benefits. Using commercial standards leads to an increased number of vendors who can build devices for public safety, thereby increasing competition and lowering public safety device costs.



We are leading the effort to drive public safety requirements into standards development organizations, focusing on 3GPP, the standardization development organization responsible for the creation of LTE ("4G") technology as well as the next generation "5G" technology specifications. In coordination with AT&T, we have been successful ensuring that 3GPP standards address the needs of first responders. To date, our focus has been on the development of global standards for mission critical services and the support of the interworking of these services with legacy public safety technologies and continuity in case of network congestion or loss of coverage. The current standards for mission-critical services were originally targeted for LTE technologies, and we are now working to evolve these services to ensure support for the planned 3GPP 5G technology.

This work will ensure capabilities exist for public safety personnel to safely complete their missions. For example, we are focused on QPP capabilities for LTE that allow prioritization based on a user's role. Other work includes supporting the basic functionality for device-to-device (D2D) direct communication, as well as user equipment relay to support continuity of public safety communication in case of network coverage loss. We are supporting the current 3GPP work to enhance these capabilities and technologies in order to provide increased reliability and functionality for public safety users.

Cybersecurity

Congress was clear in the law that created FirstNet that securing the network from cyber threats was fundamental to the successful implementation of the NPSBN. End-to-end cybersecurity is critical to the network and its users. In partnering with AT&T, we are realizing years of planning and experience to create the secure environment that first responders expect. Since the contract award, we and AT&T have been working closely with respect to the design for the NPSBN cyber solution and the overall security of the network.

Among the key components of the enhanced cybersecurity of the NPSBN design is the nationwide dedicated core network AT&T is implementing. Rather than simply treating public safety



as another customer, FirstNet subscribers will be handled by a separate core, which will ensure higher levels of reliability, redundancy, and protection through the dedicated processing of its network traffic. Another essential enhancement will be the establishment and operation of a dedicated Security Operations Center (SOC) to monitor, detect, and mitigate efforts in cybersecurity for the NPSBN. The SOC will provide 24/7/365 coverage and support for all cybersecurity considerations and will be backed up by the full global network visibility of AT&T to ensure proactive security for public safety.

Our cybersecurity team is also working cross-functionally to ensure that future users understand our cyber solution and have trust in the tools used on the FirstNet network. Fundamental to these efforts is objective oversight of the cybersecurity solution for the NPSBN. This oversight will include an independent verification and validation of the solution's compliance with the objectives set forth in the RFP and associated contract. This ongoing process will be extensive and dynamic, and will include specific reporting, real-time access to incident tracking, onsite meetings, and other avenues as the system evolves.



The FirstNet Innovation and Test Lab opened in November 2016 to test public safety features, devices, and apps on the Nationwide Public Safety Broadband Network.

FROM CONSULTATION TO MISSION SUPPORT

Mission Support

With the award of the NPSBN contract, we evolved our capabilities to deliver the network for public safety. We have recruited and hired talented people from within the federal government, public safety organizations, and private industry to achieve our mission. With a staff of approximately 200, we are well-positioned to serve and meet the needs of the public safety community throughout network implementation.

The Network Program Office (NPO) performed essential contract and program management functions now that AT&T is serving as our network contractor. This enables us to oversee the building, deployment, and operation of the NPSBN without the need to obtain contract administration services from other federal agencies. Additionally, the Office of the Chief Procurement Officer (OCPD) was granted unlimited warrant authority, which means the First Responder Network Authority will be able to support our own acquisition needs to provide administrative services. With this authority, contract administration for the NPSBN contract was transferred from the Department of Interior to the First Responder Network Authority, meaning we are now fully responsible for executing the contract management and administration plan to support the contract activities of the 25-year period of performance.

In addition to efforts to support management of the NPSBN contract, we are evolving our consultation mission from engaging with public safety stakeholders to facilitate opt-in/opt-out decisions, to expertly representing public safety's needs as the FirstNet network deploys and continues to operate. To deliver on the promise of the network, we will solicit regular and consistent feedback and input from public safety. We are moving forward with steps to gather that feedback and ensure it is incorporated into the NPSBN and solutions.

We continue to work closely with NTIA as we evolve into the next phase of the project. NTIA will have a significant role to play in the future of the organization, and we welcome NTIA's continued cooperation and support.

Tribal Consultation Policy

We honor the nation-to-nation relationship between the federal government and federally-recognized tribal nations. A GAO report released in June 2017¹⁰ recommended that we explore and propose actions, as appropriate, to improve our relations with the tribes and ensure that FirstNet is leveraging the expertise of members of the PSAC's Tribal Working Group (TWG). Following our statutory consultation requirements and in recognition of the GAO recommendations and input from the TWG, we directed the PSAC Chair to explore the relevant issues and propose improvements, as needed, and ultimately adopted an organization-wide Tribal Consultation Policy.

Our tribal consultation policy¹¹ commits us to meaningful and responsive consultation through the involvement of an appropriate level of decision-making. The policy goes into effect at the start of calendar year 2018 (following com-

10 GAO Report 17-569, "FirstNet Has Made Progress Establishing the Network, but should Address Stakeholder Concerns and Workforce Planning" (June 2017).

11 <https://www.firstnet.gov/consultation/tribes>.





“If we are having a wildland fire... that’s when more attention would be needed to the quality of coverage we have.”

– Josh Garcia, Emergency Management Coordinator for Ysleta del Sur Pueblo tribe, Texas

“During emergencies, it is critical for us to have a fully functional network to communicate with one another and coordinate our response. There is no doubt FirstNet better equips us with the modern technology needed to save lives.”

*– Captain Joey Hartley, City of Moultrie Fire Department,
Georgia and Georgia State Firefighters Association President*



pletion of the statutory State opt-in/opt-out process), and will provide a formal mechanism for federally-recognized tribes to request consultation from the organization.

Environmental Compliance

We are required to comply with all applicable environmental and historic preservation laws, regulations, treaties, conventions, agreements, and executive orders, and have established a robust National Environmental Policy Act (NEPA) compliance program to understand and help mitigate the potential effects of constructing the NPSBN. NEPA requires federal agencies to undertake an assessment of the environmental effects of their proposed actions prior to making a final decision and implementing the action.

To support NEPA compliance, we elected to prepare regional Programmatic Environmental Impact Statements (PEIS) that covered the States. The regions were divided into East, Central, West, South, and Non-Contiguous. During FY 2017, we completed the PEIS process and issued a Record of Decision for the Non-Contiguous region, with the remaining regions (South, Central, West, and East) scheduled to be completed in early FY 2018.

Consistent with administrative directives, we also identified the need to modify NEPA implementing procedures and revise its list of categorical exclusions and extraordinary circumstances. This ensured that such procedures better align with our statutory mission and activities related to the deployment of the NPSBN, and better assist us in complying with NEPA, the Council on Environmental Quality (CEQ), and FCC regulations. More specifically, as both an independent federal authority and a licensee of the FCC, the First Responder Network Authority must satisfy our own NEPA obligations, as well as comply with FCC-promulgated environmental rules. As a result, consistent with CEQ regulations, we sought to streamline its NEPA review process and avoid duplicative NEPA analysis by modifying our existing NEPA procedures to more closely align with those of the FCC.¹² Accordingly, in coordination with CEQ, we published for comment proposed revisions to our NEPA implementing procedures and categorical exclusions.¹³ We anticipated responding to comments and finalizing our revised NEPA implementing procedures in FY 2018.

Spectrum Relocation

In the spring of 2016, we launched the Band 14 Incumbent Spectrum Relocation Grant Program to assist eligible public safety entities in relocating their affected radios and systems from Band 14 in advance of developing and deploying the NPSBN. Aside from clearing the Band 14 spectrum ahead of the NPSBN deployment, our grant program ensured public safety incumbents were able to continue to operate their communications systems without interruption to service while transitioning to other narrow-band public safety spectrum allocated by the FCC.

Band 14 spectrum relocation grants totaling almost \$27 million were awarded to 10 public safety spectrum licensees operating narrowband systems on the FirstNet-licensed Band 14 spectrum under previously issued FCC authorizations. We established the Band 14 Incumbent Spectrum Relocation Grant Program to support the incumbent relocation costs, including the retuning and reprogramming of communications equipment.

To date, eight of the grantees have successfully completed Band 14 relocation. The remaining two grantees include the two largest relocation efforts and are expected to complete relocation by August 2018, which meets the expectations of nationwide Band 14 deployment.

¹² See generally 40 C.F.R. § 1507.3 (stating federal agencies with overlapping NEPA requirements related to the same project are encouraged to streamline their NEPA implementing procedures to avoid duplicative NEPA review).

¹³ FirstNet, Revisions National Environmental Policy Act Implementing Procedures and Categorical Exclusions, 82 Fed. Reg. 28,621 (June 23, 2017).

FINANCIAL CONDITION

One of our most important efforts in FY 2017 was working to ensure a strong financial position to help make the FirstNet network sustainable for public safety. As of September 30, 2017, we had a cash balance of \$5.60 billion, which will be used for our ongoing operations and to stand up the FirstNet network. We incurred operating expenses in FY 2017 from items such as compensating our staff, conducting extensive outreach and consultation, opening our Innovation and Test Laboratory in Boulder, and issuing State Plans for review and consideration by each State as to whether to opt into the FirstNet network.

The organization's operating results highlighted in the table below, and the narrative that follows, summarize our FY 2017 (unaudited) and FY 2016 (audited) financial statements, which will be published at a later date.

| | (\$ in Thousands) | | |
|--|--------------------------------|------------------------------|---|
| <i>As of September 30:</i> | <i>FY 2017 (Unaudited)</i> | <i>FY 2016 (Audited)</i> | <i>Percentage Change FY 2017 vs FY 2016</i> |
| Financial Data | | | |
| Operating Revenues | - | - | n/a |
| Operating Expenses | 134,224 | 83,999 | 60% |
| Net Deficit | (134,324) | (83,901) | 60% |
| Capital Contributions Received | 6,877,490 | 6,877,490 | 0% |
| Total Assets | 6,581,777 | 6,714,565 | (2%) |
| Net Position | 6,569,089 | 6,703,413 | (2%) |
| Operating Data | | | |
| Administrative Expenses Subject To Statutory Limitation ¹⁴ | \$8,585 | \$8,937 | (4%) |

Operating Results

The First Responder Network Authority continued to operate pre-revenue and reported an operating deficit of \$134.2 million and a net deficit for the year of \$134.3 million. This increase in deficits is directly related to activities preparing the organization to select a private-sector partner and stand up the NPSBN.

Limitation on Administrative Expenses

The organization spent \$8.6 million on administrative expenses in FY 2017. As of September 30, 2017, we have available \$68.0 million of the originally allocated \$100.0 million for administrative expenses.

Changes in Assets, Liabilities, and Net Position

The organization had \$6.58 billion in total assets as of September 30, 2017, compared to \$6.71 billion for FY 2016 – a decrease of \$132.8 million or 2 percent.

Our net position decreased \$134.3 million or two percent. Retained Deficit increased \$134.3 million, or 77 percent, reflecting continuing operating deficits until the NPSBN generates revenue from the payments from AT&T, which are projected to begin in early 2018. As per FirstNet's enabling statute, revenues generated in excess of operating expenses, must be reinvested back into the network or to advance public safety communications.

¹⁴ FirstNet's administrative expenses are statutorily limited to \$100 million during the 10-year period beginning February 22, 2012, Public Law 112-96. 47 U.S.C. § 1427(b).



Altogether, our financial position is strong, and we stand ready to ensure delivery of a reliable, secure, and financially sustainable FirstNet network that meets the needs of public safety. With our commitment to maintaining a strong financial condition, public safety personnel will gain access to innovative next generation technology, enabling them to better serve their communities.



The First Responder Network Authority consulted with public safety officials in the territory of Puerto Rico to get their feedback on the Nationwide Public Safety Broadband Network.

CONCLUSION

In the next fiscal year, we will continue to operationalize the network and interface with public safety. We have already begun work on service offerings like priority and preemption, and new capabilities will come as the FirstNet core network is launched in the first half of calendar year 2018. In addition, we will see new device, application, and service offerings. We also will see the first phases of our RAN buildout to reflect increased coverage across the country.¹⁵

We remain driven by our mission for public safety and our desire to exceed the expectations of Congress and our stakeholders. We are staffed with the best people for this mission, and with AT&T's partnership, we are embracing this once-in-a-lifetime opportunity to transform public safety communications. This public-private partnership, with the support of Congress, the FirstNet Board, our stakeholders, dedicated FirstNet and AT&T staff, and our industry partners, sets a path to deliver the innovation that public safety deserves. We look forward to continuing our efforts to transform the future of public safety communications.

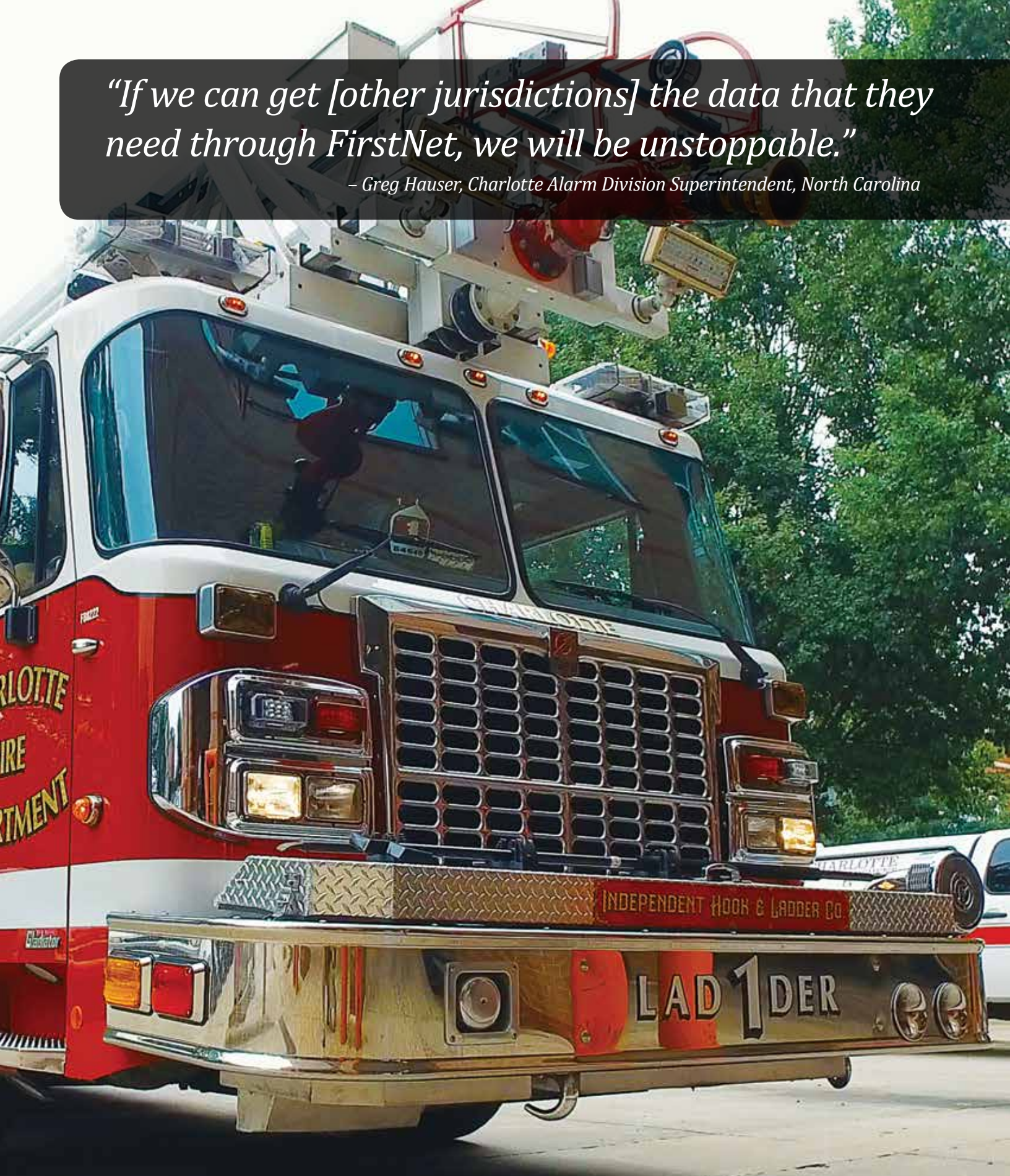


¹⁵ This annual report only covers up to the end of the fiscal year 2017, September 30, 2017, at which point 24 Governors accepted the FirstNet State Plan. At the time of publication of this report, all 56 states' and territories' Governors have accepted FirstNet State Plans.



“If we can get [other jurisdictions] the data that they need through FirstNet, we will be unstoppable.”

– Greg Hauser, Charlotte Alarm Division Superintendent, North Carolina



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APPENDIX A: FIRSTNET BOARD MEMBERS (FY 2017)

Board Members as of September 30, 2017 – A current list of the Board members is located at www.firstnet.gov/board



Susan Swenson (Chairwoman)
Telecommunications/technology executive



Mick Mulvaney
Director, Office of Management and Budget



Jeffrey Johnson (Vice Chairman)
Fire Chief, retired; CEO Western Fire Chiefs Association; Former Chair, Oregon State Interoperability Executive Council



Kathleen Kraninger
Office of Management and Budget Designee



Chris Burbank
Chief of Police, Salt Lake City, UT (retired)



Annise D. Parker
Former Mayor, City of Houston, TX



Neil E. Cox
Telecommunications / technology executive



Ed Reynolds
Telecommunications executive (retired)



James H. Douglas
Former Governor, Vermont



Jeff Sessions
Attorney General of the United States



Edward Horowitz
Venture capital / technology executive



Christopher M. Piehota
Department of Justice Designee



Elaine C. Duke
Acting Secretary of the Department of Homeland Security



Richard W. Stanek
Sheriff, Hennepin County, Minnesota



Ron Hewitt
Department of Homeland Security Designee



Teri Takai
Government information technology expert; former CIO, states of Michigan and California



Kevin McGinnis
Chief/CEO, North East Mobile Health Services

APPENDIX B: EARLY BUILDER PROJECTS AND KEY LEARNING CONDITIONS

We executed five spectrum manager lease agreements (SMLAs) to permit Early Builders to deploy LTE on FirstNet's licensed Band 14 spectrum for public safety. In return, each Early Builder project provides valuable insights into the specific needs and challenges of providing wireless broadband service to first responders. The five Early Builder projects continue to progress and provide important lessons that support and influence our efforts toward network deployment. As FY 2018 progresses, we intend to work closely with the Early Builders, and with NTIA for those projects funded by the Broadband Technology Opportunities Program (BTOP) to migrate their user bases, devices, and select network infrastructure to the NPSBN. Planning discussions with AT&T and the projects commenced during FY 2017 and continue with States.

Working closely with each Early Builder project, NTIA, and the PSAC, we observed and documented lessons learned from the Early Builders and used these lessons to support development of the RFP content, network design, deployment considerations, and network policies. Lessons learned are derived both from progress on the Key Learning Conditions (KLCs) as defined in each project's SMLA and from observations of each project's daily activities, their successes, and the challenges they faced. As of September 30, 2017, we have documented 216 specific lessons learned and communicated them to our staff. Most FY 2017 lessons learned focused on operational observations as the projects continued to add and support first responder agencies and users. Select KLC reports were also completed by FirstNet and the Early Builders, with the remainder of reports scheduled for completion during the first half of FY 2018.

The following sections summarize Early Builder project progress along with KLC status.



State of California (LA-RICS)

The Los Angeles Regional Interoperable Communications System (LA-RICS) Authority project team constructed 63 LTE cell sites and deployed an additional 14 Cell-On-Wheels (COW) trailers at targeted locations. During the Rose Parade in Pasadena, California, in January 2017, the project team successfully tested and demonstrated usage of the Public Safety Broadband Network (PSBN) in support of law enforcement and fire service first responders assigned to the event. The LA-RICS project team is also preparing a proposal that describes its plan to construct additional cell sites using NTIA's BTOP grant funds available through FY 2020, as well as its plan to integrate existing assets and planned expansion sites into the NPSBN.

The LA-RICS project, through its extensive network demonstration exercises with its public safety members, has demonstrated the priority first responders put on their accessibility to streaming video for both situational awareness and evidence gathering. Fixed video cameras and mobile video units (both in-vehicle and body-worn) have been tested at every event, and throughput monitoring and network settings have been closely analyzed. Additionally, the LA-RICS team has learned the importance of ensuring that proper network configurations are established, and ensuring access to network performance data and analytics tools to facilitate real-time identification of impairments and outages.

The LA-RICS PSBN became fully operational in calendar year 2017, and currently serves more than 1,200 user devices deployed in support of public safety personnel from the Los Angeles County Sheriff's Department, the Los Angeles County Fire Department, and other LA-RICS member agencies.

| California | |
|---|---|
| Key Learning Conditions (KLC) | Highlights of Progress Made on KLCs |
| Establish partnerships with utilities and secondary responders | Five potential secondary use partnerships were identified and evaluated, but none of the relationships materialized. Lessons learned from this activity were captured and KLC documentation is under development. |
| Explore Quality of Service, Priority and Preemption (QPP) techniques. | Limited QPP functionality was available in the LA-RICS network, thus experience with this technology was limited. Lessons learned from this activity were captured and KLC documentation is under development. |
| Evaluate network monitoring tools used to alert operators of congestion | Evaluation is completed, and key learning activity testing was performed. KLC documentation is under development. |

State of New Jersey (JerseyNet)

The JerseyNet project team began operational service using five unique configurations of deployable assets to support in-state public safety communications initiatives. Such initiatives included Atlantic City, New Jersey, concerts and public events, Urban Search and Rescue (USAR), emergency response exercises, and heavily attended public events. The JerseyNet network now supports more than 600 active users, and the project continues its focus on operational readiness and active user support.



This project continues its consistent outreach to agencies to ensure understanding and acceptance of the PSBN, and continues to provide first responder training on devices and applications. The project made tremendous strides in FY 2017 to deliver its commitments relative to its KLC deliverables. As of September 30, 2017, its first KLC (deployable assets) was completed, with the balance of its deliverables on target for completion in the first quarter of FY 2018.

We expect JerseyNet growth to remain relatively flat as the State has opted-in to the FirstNet solution and has decreased device installations in anticipation of user and agency migration to the NPSBN. During FY 2018, we and AT&T will work closely with JerseyNet users to understand and implement service transition options.

| New Jersey | |
|---|--|
| Key Learning Conditions (KLC) | Highlights of Progress Made on KLCs |
| Demonstrate and document the use and capabilities of rapidly deployable assets | Deployable assets fully deployed and tested. Project supported field exercises and operational events documenting capabilities of the deployable assets and operational lessons learned. This KLC and documentation is complete. |
| Conduct emergency management exercises and training activities with deployable assets | User and operational training activities and materials are now in place. State outreach activities included and leveraged deployable assets to demonstrate service. Supporting documentation was received. KLC documentation is under development. |
| Document best practice Network Operations Center (NOC) notification approaches, including trouble ticketing, prioritization, reporting, and ticket close-out. | Network operations visibility was enabled via the project NOC. Trouble ticketing, prioritization, reporting, and close-out processes were established and implemented. This KLC and documentation is complete. |





State of Colorado (ADCOM)

The Band 14 LTE network covering Adams County, Colorado, deployed 19 LTE cell sites and serves 490 user devices, with more than 90 devices in active daily use as of September 30, 2017. In FY 2017 the ADCOM911 project team completed a major upgrade to the LTE core, adding redundancies and additional features to the network. Additionally, a broadband test center was constructed for onsite device testing at an ADCOM911 facility.

Some of the challenges the project team faced over the past year highlighted the need for dedicated technical personnel managing daily operations of the LTE network and driving continual improvement. The ADCOM911 project team also observed that scheduled network maintenance times for public safety can differ from commercial standards due to differences in peak usage and user needs, meaning that, for example, maintenance windows may need to be scheduled during daytime hours instead of late at night.

The ADCOM911 team will continue to support operation of the 19-site network in FY 2018 until its public safety users are completely transitioned to the NPSBN.

| Colorado | |
|---|--|
| Key Learning Conditions (KLC) | Highlights of Progress Made on KLCs |
| Provide a real-world test system to include a hosted and redundant core node for another LTE PSBN project. Examine the complexity of remotely hosted core deployments and intersystem operations. | Redundant core network is in stable operation serving both ADCOM911 and State of New Mexico LTE PSBN users. System testing validated the predicted countywide coverage to the public safety user base. KLC documentation is under development. |
| Conduct device testing and document processes needed to adequately test and certify devices before use on a public safety network. Develop and conduct user training and capture recommendations about deploying devices to users from a user standpoint. | A broadband test center was constructed for onsite device testing at ADCOM911 facility. The project team continues to provision and add public safety users to the ADCOM911 LTE PSBN. KLC documentation is under development. |
| Develop and document operational processes for managing and maintaining a PSBN. Document how project ensures effective visibility of end user performance and effective management of user service issues. | Network performance and utilization reports provided insight into application use, data consumption by agency, and user service issues. KLC documentation is under development. |



State of Texas (Harris County)

The Texas project team, including Texas Department of Public Safety and Harris County Central Technology Services (CTS), supported by a 2011 DHS Port Security grant and the Harris County, Texas, general fund, are providing LTE coverage to the majority of Harris and Brazos Counties with 37 Band 14 LTE cell sites. The network currently supports law enforcement wherever the LTE PSBN is available, including more than 300 active user devices. The Texas PSBN was used to support public safety wireless broadband communications at many large public events, including the Houston Rodeo and Livestock Show and NFL football games at Houston's NRG Stadium, including Super Bowl LI.

We worked closely with the Texas project team to enable the detection of interference sources potentially impacting Band 14 LTE operations. The results demonstrated that interference monitoring should be part of all future FirstNet and private sector partner processes. It was also observed that the public safety adoption of smartphones is highly dependent on availability of PTT applications, but since PTT applications are not yet standardized and interoperable, their use presents an interoperability risk.

The Texas team actively engaged public safety agencies to implement broadband services at large public events, focusing on applications such as PTT functionality on LTE cell phones to reduce non-critical use of Land Mobile Radio (LMR), improving multiagency information flow, and enhancing situational awareness. Following Texas's decision to opt-in to the FirstNet solution, discussions with AT&T started in FY 2017 and will continue in FY 2018 to address user migration. CTS and state teams continue to work closely with us to ensure the project transition is seamless and that user service continuity is maintained.

| <i>Texas</i> | |
|---|---|
| <i>Key Learning Conditions (KLC)</i> | <i>Highlights of Progress Made on KLCs</i> |
| Develop operational training materials. | Harris County documented the lessons learned and operational improvements developed during Super Bowl LI to help support multiagency communications requirements going forward. KLC documentation is under development. |
| Identify and demonstrate operational advantages the PSBN provides public safety during scenarios in which the commercial networks can experience capacity limits. | In addition to supporting the 2016 and 2017 Houston Rodeos, Harris County created a variety of successful mission improvements in support of Super Bowl LI. KLC documentation is under development. |
| Develop data analytics using user and network usage statistics. | Significant network and user performance reporting was developed and is being used to improve network performance and user experience. Outages during Hurricane Harvey were tracked and addressed in real time. KLC documentation is under development. |
| Document the operational planning necessary to transition users off of a local core network to the FirstNet network. | Discussions with AT&T occurred to identify and plan for best approaches to user transition. |
| Evaluate and document the technical performance and operational benefit of an extended LTE coverage feature for rural areas. | All test cases are complete and network data analysis and test reports are being finalized. KLC documentation is under development. |

State of New Mexico

The New Mexico project team has completed PSBN construction, including construction of sites adjacent to the Mexican border. The New Mexico LTE PSBN continues to support public safety communications requirements during large public events, including the New Mexico State Fair, the Albuquerque International Balloon Fiesta, and the Zozobra Festival in Santa Fe, New Mexico. Additionally, the New Mexico RAN, which uses a remote LTE core located in the ADCOM911 Early Builder PSBN network, has been operational for more than two years.

Events supported by the New Mexico project have evolved from network demonstrations to more typical operational support during special events. During these public events, a variety of law enforcement agencies used handheld broadband devices for suspect identification and interdiction and lost child recovery efforts. We look forward to working closely with New Mexico in FY 2018 to complete its Early Builder project efforts and to leverage its early opt-in decision to deliver public safety broadband services to its first responder community.



| New Mexico | |
|--|--|
| Key Learning Conditions (KLC) | Highlights of Progress Made on KLCs |
| Develop and document processes and lessons learned from identification of and response to cross-border interference issues experienced along southwest border. | New Mexico constructed RAN sites next to the Mexican border near Las Cruces, New Mexico. Although no direct interference was introduced by Mexican wireless operations, the project observed and documented valuable lessons learned from operations along the border. KLC documentation is under development. |
| Explore and document lessons learned surrounding use of New Mexico PSBN by federal and local government users. | Operations coordinated with local public safety agencies during the Zozobra festival, New Mexico State Fair, and Albuquerque International Balloon Fiesta. KLC documentation is under development. |
| Document lessons learned from integration and operation of the New Mexico RAN with a remote core located outside of the state. | New Mexico team supported its RAN using a remote core located at the ADCOM911 Early Builder project in Colorado. Evaluation is complete and KLC documentation of remote core operational complexities is in progress. |

APPENDIX C: FIRSTNET COLLABORATION WITH THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) PUBLIC SAFETY COMMUNICATIONS RESEARCH (PSCR) PROJECTS

The collaboration between the First Responder Network Authority and PSCR for the research and testing of public safety communications capabilities continued during FY 2017, partially sponsored by FirstNet with funds extended from the FY 2016 Interagency Agreement through the second quarter of FY 2017, and by the funds allocated by PSCR as a part of its Public Safety Innovation Accelerator Program.

The major areas of interaction supported by these projects are: Quality of Service, Priority and Preemption (QPP), Local Control, Mobile Application Security, and Band 14 Radio Frequency Characterization. The following projects were FY 2017 efforts:

- Fiscal Year 2017 Completed Projects (initiated in FY 2016)
 - Establishment and Modification of LTE Bearers with Specific QPP Requirements
 - Prioritization of Traffic across Backhaul with Limited Bandwidth or Congestion
 - Prioritization of Encrypted Traffic (e.g., mobile Virtual Private Network [mVPN])
 - Prioritization of Traffic processed through In-Vehicle Routers
 - Technologies and Methods for the Interface between Local Control and the Network QPP Systems
 - Analysis of Mobile Application and Data Isolation Techniques
 - Analysis of Adjacent Channel Power Effects in the 700 MHz LTE Downlink
 - Analysis of Out of Band Emissions between Bands 13 and 14
- Public Safety Innovation Accelerator Program (initiated in FY 2017, but set for completion by FY 2020)
 - Analysis of Identity Management Techniques (i.e., Mobile Single-Sign-On)
 - Analysis of Static and Dynamic Application Security Validation
 - Assessment of EPS Bearer Capabilities to Prioritize Encrypted Traffic
 - Analysis of Band 14 and LMR Interaction
 - Measurements of Band 14 and A Block Interaction

In addition, we participate in the discussion of other areas of interest to public safety as researched and fully funded by NIST, including mobile application security, identity management, Location-Based Services (LBS), data analytics, device-to-device Communication, Multimedia Broadcast Multicast Services (MBMS), and Mission-Critical Push-to-Talk (MCPTT). The work on mobile application security and identity management started as FirstNet-funded in FY 2016 and turned into NIST's own research and development.

Finally, we collaborated with NIST in various interactions with 3GPP (specifically through the efforts of the SA3 Security Working Group), and drafting and endorsing contributions to standards that impact public safety communications and FirstNet's mission.

The results of the above activities have a direct impact on the design and implementation of mission-critical services and applications for the NPSBN.



ADDITIONAL INFORMATION

Please visit our website for additional resources at
www.firstnet.gov

For further information or questions,
please contact FirstNet Office of Government Affairs at
governmentaffairs@firstnet.gov

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IN MEMORIAM



Tom Sorley, PSAC Chair



FirstNet®