FirstNet®

FY 2019 ANNUAL REPORT TO CONGRESS

CONNECTING COMMUNITIES

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

FirstNet®

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 Authority)[1] for fiscal year 2019.[2]

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[1] Public Law 112-96 established the FirstNet Authority as an independent authority within the United States Department of Commerce's National Telecommunications and Information Administration (NTIA).

[2] Fiscal year 2019 is the period from October 1, 2018 through September 30, 2019.

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LETTER FROM
BOARD CHAIR EDWARD HOROWITZ AND
EXECUTIVE DIRECTOR EDWARD PARKINSON

EDWARD HOROWITZ,
Board Chair

EDWARD PARKINSON,
Executive Director

When the First Responder Network Authority (FirstNet Authority) was established by Congress in February 2012, it was given a clear mission: **ensure the building, deployment, and operation of the nationwide wireless broadband network that equips first responders to help save lives and protect U.S. communities**. We take this responsibility very seriously and are pleased to report that the FirstNet Authority made significant progress in fiscal year 2019 to fulfill this mission. We remain dedicated to continuing to extend and enhance public safety's network in the years to come.

This report provides Congress with a clear snapshot of our progress as an organization and reiterates our objective to deliver an unrivaled mobile broadband communications experience to the public safety community. FirstNet is public safety's network. Provided by our contracted partner, AT&T, the FirstNet service is voluntary to adopt, and we are honored that so many public safety professionals across the country have put their trust in it. In fact, in December 2019, AT&T announced its one-millionth connection to the FirstNet network, marking a significant adoption milestone. To put that into perspective, subscribership to the nationwide public safety broadband network has grown 667% since the end of fiscal year 2018.[1]

In 2019, AT&T continued to evolve the FirstNet solution, adding new devices, applications, and capabilities. As of September 2019, 138 devices were approved and certified for use on the FirstNet network along with over 100 applications. AT&T also continues to build out the Band 14 Radio Access Network expeditiously, to bring better coverage for public safety across the country. Construction of the FirstNet network began in March 2018 and is not required to be complete until March 2023. In the short time since construction began, of the Federal Communications Commission's 734 cellular market areas throughout the country, over 650

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[1] As of September 28, 2018, there were more than 2,500 public safety agencies, and 150,000 device connections on the FirstNet network. *See:* https://www.firstnet.gov/newsroom/press-releases/firstnet-momentum-more-2500-public-safety-agencies-subscribed.

have now been deployed with Band 14 in rural, suburban, and urban markets. FirstNet has prioritized buildout in rural America. As of September 2019, the FirstNet Solution allows the public safety community to serve approximately 45% of the rural population; that is about 23 million of the approximately 51 million people who constitute the Nation's rural population. Our FY 2020 goal, identified as a Department of Commerce Agency Priority Goal, is to build on this success and further extend the network to serve 55% of the rural population.

The FirstNet Authority continued to lay the groundwork for future innovation and investment in the network. In August 2019, we released the FirstNet Authority Roadmap (Roadmap), designed to guide the growth, evolution, and advancement of the FirstNet network. Developed with direct input from public safety, industry, and government, the Roadmap provides a view of public safety's operational needs and technology trends for mobile broadband communications over the next five years. In FY 2019, the FirstNet Authority held more than 1,100 engagements, reaching nearly 33,000 public safety stakeholders across the country continuing to raise awareness of the program and gain valuable feedback on first responder's needs for the network. We then applied that feedback in our involvement with standards bodies and other fora to bring about positive change for public safety's technology, the manner in which their capability needs are met, and in our own investment decisions regarding the future of the network.

The Roadmap, combined with our ongoing consultation with public safety stakeholders, has provided a blueprint for our network investment strategy. For the first time, in September 2019, the FirstNet Authority Board directed management to begin the process of reinvesting in the FirstNet network to: 1) expand network coverage by growing the FirstNet Authority's fleet of dedicated deployable network assets; and 2) begin the process for ensuring the First-Net Core network is ready for 5G technology. The FirstNet Authority continues to pursue these opportunities and identify other areas for investment.

In the coming years, we will continue to work closely with public safety to extend and enhance their network. We believe through the experience of our Board, input from our Public Safety Advisory Committee, the network contract with AT&T, the Roadmap, and our continued engagements with public safety and other stakeholders, that we have the tools and expertise to continue to transform the future of public safety communications. Public safety has helped make the FirstNet network a reality, and we look forward to that continued collaboration.

Sincerely,

Edward Horowitz
Board Chair

Edward Parkinson
Executive Director

The First Responder Network Authority (FirstNet Authority) continues to make significant progress toward deploying the nationwide public safety broadband network (NPSBN) — also referred to as "the FirstNet network," "FirstNet," or "the network" — that Congress mandated in 2012. Through its public-private arrangement with AT&T, the FirstNet Authority continues to strengthen the network's capabilities, enabling our nation's first responders to react more quickly and effectively to their ever-changing needs in the field.

In fiscal year (FY) 2019, the FirstNet Authority focused on:

1. Managing our contract with AT&T to deploy and operate the FirstNet network;

2. Developing, releasing, and implementing the five-year FirstNet Authority Roadmap (Roadmap) for public safety; and

3. Creating a process and framework for reinvesting in public safety's network.

As we continued to manage our contract with AT&T, we oversaw:

- The continued deployment of Band 14 across rural and non-rural geographies of the 55 states and territories and the District of Columbia;

- The increased adoption and use of the NPSBN by public safety; and

- The ongoing evolution of FirstNet network products and services and the Band-14-enabled device ecosystem to meet the evolving needs of public safety.

The FirstNet Authority will continue to monitor and oversee the NPSBN buildout in accordance with contract terms and consistent with public safety needs; refine and enhance contract performance oversight processes, implement corrective action plans, and strengthen contract controls, as informed by Office of the Inspector General and Government Accountability Office recommendations and government best practices; and support transparent decision-making that is informed by data.

At the start of FY 2019 there were more than 2,500 public safety agencies, and 150,000 device connections on the FirstNet network. By the end of FY 2019, there were more than 9,000 public safety agencies and 750,000 device connections on the network.[1] FirstNet public safety users are using the service throughout the country every day in their efforts to save lives. Subscribing agencies have access to FirstNet-dedicated deployable network assets providing reliable Long-Term Evolution (LTE) coverage and increased capacity to support public safety during disasters, critical incidents, and planned events. FirstNet network deployment remains on track to meet its 2023 nationwide coverage goal. AT&T continues to deliver early, and **>**

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1   The public safety agencies and organizations using FirstNet range from small volunteer fire departments to large law enforcement agencies with thousands of sworn officers. For perspective on the size of the public safety market, according to the International Association of Chiefs of Police (IACP), there are over 17,000 state and local law enforcement agencies in the United States, along with 65 U.S. federal agencies and 27 offices of inspector general with public safety duties. *See:* https://www.discoverpolicing.org/explore-the-field/types-of-law-enforcement-agencies/ (last visited Feb. 28, 2020). The National Fire Protection Association (NFPA) estimated there were 1.1M career and volunteer firefighters in the U.S. from 29,705 departments, in 2018. *See:* https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Emergency-responders/osfdprofile.pdf (last visited Feb. 28, 2020). Estimates of the Emergency Medical Services (EMS) market conducted by the U.S. Department of Transportation cited over 21,000 EMS agencies in the U.S. in 2014, with about forty percent of those based within or attached to fire departments. *See:* https://www.ems.gov/pdf/National_EMS_Assessment_Demographics_2011.pdf (last visited Feb. 28, 2020).

< as of the end of FY 2019, Band 14 has launched in 650 markets[2] across the country. The FirstNet Authority verifies and validates AT&T's progress on the network buildout, including the achievement of rural milestones.[3]

In August 2019, the FirstNet Authority released its Roadmap to guide the future enhancements of the FirstNet network. The Roadmap, driven by direct consultation with public safety, documents the FirstNet Authority's priorities over the next five years to evolve and improve public safety broadband communications for the FirstNet network. It builds upon the organization's nationwide engagement with public safety to gather feedback on the most important communications capabilities for their missions. In FY 2019, the FirstNet Authority conducted over 1,100 engagements, reaching nearly 33,000 stakeholders across all public safety disciplines and in all 50 states, 5 territories, and the District of Columbia. These 1,100 engagements included over 75 engagements with tribal stakeholders and 150 engagements with federal stakeholders. Informed by these engagements, the FirstNet Authority developed prioritized technology areas to ensure the Roadmap reflects their specific communications needs. Additionally, the Roadmap incorporates industry trends through market research and outreach to private sector, academia, and industry associations.

In FY 2019, the FirstNet Authority developed and executed a structured, transparent, and rigorous investment process that drives disciplined investment of the FirstNet Authority's financial resources. As a result of the investment process, the FirstNet Authority presented investment opportunities during the September 2019 Board Meeting for approval. The FirstNet Authority Board approved initiating investments in the following areas: 1) Expansion of the FirstNet network fleet of deployables; and 2) Initial generational upgrades to the FirstNet Core to enable 5G network capabilities. These initial investments, as Congress envisioned, highlight the FirstNet Authority's innovative and sustainable business model, which allows public safety to help shape the future of their network.

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2   Markets are based on the Federal Communications Commission (FCC) 734 Cellular Market Areas (CMAs). *See:* https://www.fcc. gov/oet/maps/areas (last visited Feb. 28, 2020).

3   As required by statute, rural buildout milestones were included in the FirstNet request for proposals (RFP) and contract with AT&T to ensure coverage deployment in rural areas. The FirstNet RFP required that 20 percent of rural coverage be built in the first year, 60 percent in the second, 80 percent in the third, 95 percent in the fourth, and 100 percent by the fifth year. These milestones are achieved through rural carrier partnerships and new FirstNet buildout. As of September 2019, the FirstNet Solution allows the public safety community to serve approximately 45% of the rural population, that is about 23 million of the approximately 51 million people who constitute the Nation's rural population.

FIRSTNET IN ACTION: CONNECTING COMMUNITIES

FirstNet is the only nationwide public safety communications platform built with and for America's first responders. Through a public-private partnership, AT&T and the FirstNet Authority continually gather feedback from public safety to develop and enhance the network. FirstNet is bringing public safety a much-needed technology upgrade to help them connect to the critical information they need — every day and in every emergency. By the end of FY 2019, there were more than 9,000 public safety agencies and 750,000 device connections on the network.[1] Following are several success stories featuring the many ways first responders are using FirstNet to save lives and connect their communities.

Hurricane Dorian

FirstNet connectivity was available to public safety to coordinate storm response and aid in recovery before, during, and after the storm. For example, a FirstNet Satellite Cell on Light Truck (SatCOLT) was deployed to Columbia, South Carolina, to provide primary communications support at the staging location of all active Urban Search and Rescue teams from across the Nation responding to the storm. FirstNet also supported Pennsylvania Task Force 1's mutual-aid response with FirstNet Ready™ tablets and installed network equipment at the Virginia Department of Emergency Management's emergency operation center (EOC). Located in a base-

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1   In FY 2019, federal users of the FirstNet Network included the Federal Emergency Management Agency (FEMA); Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF); U.S. Coast Guard; Department of the Navy; Department of the Air Force; and the U.S. Department of Health and Human Services.

ment, the Virginia EOC had limited service, so this provided quick and reliable access to FirstNet connectivity as they prepared for the storm. Additionally, FirstNet provided portable generators to support public safety and the communities on Martha's Vineyard and Nantucket Island in preparation for Hurricane Dorian's potential landfall along the New England shoreline.

Everyday Use connecting Public Safety in Florida

The Riviera Beach Police Department and Fire Department subscribed to FirstNet in April 2019 and use FirstNet every day in their mission to keep Floridians safe. Riviera Beach Fire Chief John Curd emphasized the importance of FirstNet's priority and preemption feature, saying "This new capability will prove to be essential during

times of hyper telecommunication activities which would otherwise limit access to the network."

Similarly, Riviera Beach Police's adoption of FirstNet is part of the organization's push to use technology in order to better serve the public. Chief Michael Madden said "In conjunction with our recent body camera deployment, we issued each of our Police Officers a smartphone on FirstNet, causing a major shift in the way we collect and share information imperative to our mission. It bridges many gaps on the technology forefront and drastically improves communications between first responders and with our community at large."

Other Florida police departments joined FirstNet in FY 2019, including the Port St. Lucie Police Department and the Panama >

< City Police Department.

Mountainous Connectivity and Productivity in the Field – Signal Mountain Police Department, Tennessee

Signal Mountain is a small town outside of Chattanooga, Tennessee, with mountainous and remote areas. The Signal Mountain Police Department became the first police department in Tennessee to install FirstNet into the agency's 12 patrol cars. Officers are now better equipped to handle daily operations and emergency response because their police vehicles support advanced digital displays and upgraded computer equipment. Connected patrol cars also mean that officers can now fill out police reports electronically while in the field, saving valuable time and resources and spending more time patrolling their communities.

FirstNet also makes it possible for the Signal Mountain Police Department to track fellow officers and other first responders with GPS technology loaded into each patrol car – providing valuable situational awareness across the entire 70-square-mile city with the integrated platform. "Within the first week of being mobile with the FirstNet product, we had a crime spree that occurred," recalled Officer Troy Kennedy, Signal Mountain Police Department. "We were able to actually track that and capture the individuals that were breaking into cars and stealing cars." Signal Mountain Police were also able to maintain wireless connection despite a local network outage impacting the surrounding area and causing non-FirstNet signal failure around the town.

EMS: Hattiesburg, Mississippi

In FY 2019, the Hattiesburg, Mississippi AAA Ambulance Service subscribed to FirstNet to help connect its 24-hour emergency and non-emergency medical transport service. FirstNet is helping the ambulance service to seamlessly communicate as they service 1.2 million residents living across 16 counties in southern Mississippi.

Andy Geske, Chief of Information Technology for AAA Ambulance Service, said, "What's important to me and my crew members is the ease of accessing FirstNet. [It] can put everybody on >

Signal Mountain, Tennessee

Hattiesburg, Mississippi

FirstNet

Red Cliff Reservation, Wisconsin

Sturgis, South Dakota

< the same page where that response is best for the patient." In facilitating the integration of tele-medicine capabilities, the FirstNet network has allowed the AAA Ambulance Service to swiftly and efficiently deliver care to its patients in rural Mississippi.

Consultation: Red Cliff Band of Lake Superior Chippewa (Red Cliff)

FirstNet Authority has worked closely with the Red Cliff Reservation in Wisconsin, and in FY 2019, FirstNet helped to boost access to broadband communications with the addition of a new, purpose-built cell site located on the reservation. Public safety stakeholders in consultation with the FirstNet Authority identified the location as a priority area for increased network coverage and capacity to better support emergency communications. "Breaking ground on this new cell site will not only support the public safety mission, but it will also pave the way for new technical capabilities and innovations — furthering economic opportunity and extending access to telehealth, online learning, and overall communications during emergencies," said Theron Rutyna, Red Cliff IT Director.

Law Enforcement: Sturgis, South Dakota

More than 500,000 attendees gathered for the annual Sturgis Motorcycle Rally in Sturgis, South Dakota in August 2019. This event puts tremendous demand on the commercial cellular network as it is filled with moments that people want to share via texts, photos, status updates, and phone calls. For the event, FirstNet provided use of its fleet of SatCOLTs, creating an LTE Band 14 "highway" dedicated to first responders. Two Cells on Wheels (COWs) were also brought in, boosting network capacity in the area by 51 percent.

South Dakota's Technical Administrator for the South Dakota Bureau of Information and Telecommunications and Statewide Interop-erability Coordinator Jeff Pierce said of the FirstNet network, "Troopers were able to work from their vehicles and put less congestion on the radio network. It was more convenient, and they had fast access to critical data used in the field."

Honolulu (HI) Police Department

Honolulu City and County encompass the Hawaiian island of Oahu, stretching approximately 596 square miles. Millions of tourists visit Oahu each year, drastically increasing the population served by the Honolulu Police Department. In late 2018, several big-name artists played at Aloha Stadium, drawing large crowds of up to 50,000 people. During one of the concerts, the police department used Band 14 FirstNet enabled devices and FirstNet hotspots, making communication between the officers possible when previously they had experienced challenges connecting over the existing commercial network.

Fire: Seattle, Washington

More than 350,000 people attended Seattle's Sea-Fair festival, and for the first time the Seattle Fire Department covered the event using the FirstNet network. Seattle Fire Department Chief Harold Scoggins said, "With FirstNet in place, we have increased confidence in our communication methods for use during highly attended public events. During this year's SeaFair activities, we were able to communicate important safety information without worry of encountering congestion issues."

Large Planned Events: Lake Race 2019 at the Lake of the Ozarks

On June 1, 2019, over 10,000 racing enthusiasts gathered in Missouri as boaters tested the limits at one of the most popular powerboat racing events in the Nation. The two-day event takes months of planning and preparation to ensure that competitors and spectators stay safe on and around the lake. During the event, the Lake Ozark Fire Protection, Osage Beach Fire Protection, Missouri State Highway Patrol, Rocky Mountain Fire District, Camden County Sheriff's Office, Lake Regional Hospital, Lake West Ambulance, and Eldon Fire and Rescue Department relied on the FirstNet network, including a Cell on Light Truck (COLT) deployable asset, to ensure robust capacity to support communication and data needs. "The event went very well. Communication with the EPTT [enhanced push-to-talk] devices was seamless, and to have the [COLT] on site made our communications between command and patrol boat work flawlessly," said Matthew Birdsley, Assistant Fire Chief, and Lake Ozark Fire Protection District.

Honolulu, Hawaii

Seattle, Washington

Lake of the Ozarks, Missouri

CONTRACT OVERVIEW

One of the FirstNet Authority's primary responsibilities is to manage and ensure the successful execution of the contract with AT&T for the building, deployment, and operation of the FirstNet network. Signed in March 2017, this 25-year indefinite-delivery/indefinite-quantity service contract was designed to ensure the FirstNet network meets the rigorous communication needs of our nation's first responders and continues to improve and evolve to meet their changing needs over time.

Per the contract, AT&T must build, operate, maintain, and upgrade the network for 25 years while achieving public safety user adoption targets, achieving and maintaining a minimum number of subscribed devices connected to the network. The contract also guarantees the FirstNet Authority's continued financial sustainability over the life of the contract through annual payments from AT&T to the FirstNet Authority.

The FirstNet Authority has issued five task orders under the contract.

- Task Order 1 (TO 1) required the development of a secure website (the state plan portal) that delivered individual state plans to the 56 states, territories, and the District of Columbia (states).

- Task Order 2 (TO 2) required development of the individual state plans referenced in TO 1. These plans detail the Radio Access Network (RAN) deployment and operations for each of the states. While the state plans procured via TO 2 are complete, the state plan portal (TO 1) is still available to allow Governors and designated state stakeholders to access their respective plans.

- Task Order 3 (TO 3) requires AT&T to deploy, operate, and maintain the network's Core and all of its functions, and provide for the development of device and application ecosystem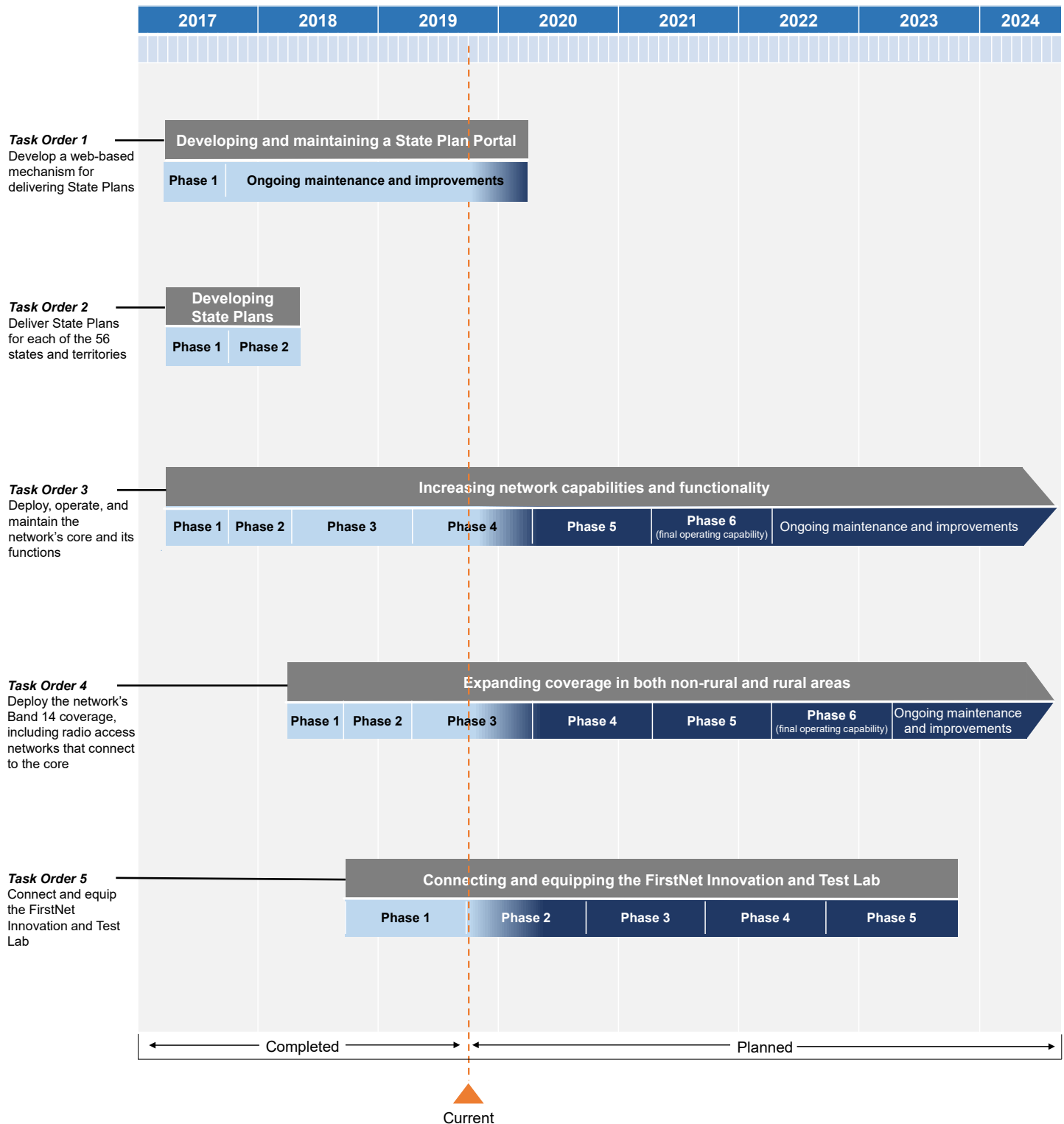s for the network. The FirstNet network has its own Core, separate from the AT&T commercial network, which processes and secures FirstNet users' traffic. AT&T deployed the FirstNet Core in March 2018 and continues to operate and maintain it under the terms of TO 3.

- Task Order 4 (TO 4) requires AT&T to deploy the network's Band 14 coverage nation-wide while fulfilling the specific commitments made in the individual state plans. TO 4 contains the requirements associated with constructing the RAN, which consists of cell towers, sites, and other elements that connect public safety's devices to the Core. The task order also requires AT&T to provide 72 transportable cellular assets dedicated solely to FirstNet (also known as Satellite Cell on Light Trucks, SatCOLTs or deployables), in addition to access to at least 300 other transportable cellular assets in AT&T's fleet that can provide additional network coverage when needed.

- Task Order 5 (TO 5) requires equipment and connectivity for the FirstNet Innovation and Test Lab.

Task Orders 1, 3, 4, and 5 are ongoing.

Contract Timeline

	2017	2018	2019	2020	2021	2022	2023	2024

Task Order 1
Develop a web-based mechanism for delivering State Plans

Developing and maintaining a State Plan Portal

Phase 1	Ongoing maintenance and improvements

Task Order 2
Deliver State Plans for each of the 56 states and territories

Developing State Plans

Phase 1	Phase 2

Task Order 3
Deploy, operate, and maintain the network's core and its functions

Increasing network capabilities and functionality

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6 (final operating capability)	Ongoing maintenance and improvements

Task Order 4
Deploy the network's Band 14 coverage, including radio access networks that connect to the core

Expanding coverage in both non-rural and rural areas

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6 (final operating capability)	Ongoing maintenance and improvements

Task Order 5
Connect and equip the FirstNet Innovation and Test Lab

Connecting and equipping the FirstNet Innovation and Test Lab

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5

◄——————— Completed ———————► ◄——————— Planned ———————►

Current

NETWORK DEPLOYMENT, OPERATION, AND MAINTENANCE

Under the contract, AT&T is required to deploy, operate, and maintain the FirstNet network.

The FirstNet network is a standards-based, interoperable, reliable, and forward-looking nationwide broadband network with the potential to redefine the way that the nation's public safety community communicates. With all 50 states, five territories, and the District of Columbia in the network, the FirstNet Authority has established a single, interoperable nationwide network as required by Congress. AT&T's dedicated network elements and the FirstNet Authority's Band 14 spectrum together deliver differentiated features for public safety that include:

- **Services:** The FirstNet network offers specialized services through a dedicated Core network, including data and voice services; Quality of Service, Priority, and Preemption (QPP); Identity, Credential, and Access Management (ICAM); and mission-critical services, systems, and operations. These features enable public safety users to be recognized and afforded different treatment than commercial traffic.

- **Applications:** AT&T is supporting an application ecosystem, offering over 100 applications (apps) for public safety users on the FirstNet network. Examples of apps currently under development include local control apps, over-the-top services like push-to-talk, and public safety home pages for direct access to FirstNet network services.

- **Devices:** Through AT&T's existing relationships with device and chipset vendors, and through general industry awareness of the FirstNet program, an increasing number of devices and accessories (well over 100)

are available to public safety.

- **Architecture and Infrastructure:** The design, operation, and maintenance of the FirstNet network encompasses the FirstNet Core infrastructure, infrastructure hardening, and security services, which ensure the safety and ongoing performance of the network.

In addition, the contract provides for completion of objectives developed specifically for each of the states during the first five years of the period of performance, 2018 - 2023. It also provides for ongoing maintenance and enhancements throughout the life of the contract.

The contract also provides for the procurement of contractor-provided equipment from AT&T to be incorporated into the FirstNet Authority's Innovation and Test Lab in Boulder, Colorado. This will ensure the lab has the same features as the FirstNet network for testing, oversight, and research into evolving technologies for public safety communications.

Measures for Success

In addition to key contractual deliverables, the FirstNet Authority uses standardized program management tools to track and evaluate AT&T's performance. The FirstNet Authority has also established a Procurement Office and a Network Contract Management office to oversee all activities associated with the FirstNet network contract. These entities have developed rigorous contract management and administrative processes and tools used throughout FY 2019 to track network-related contractual activities. As a result, the FirstNet Authority can minimize risk and improve quality of service, resulting in optimal performance and continuous improvement of the network.

Notable Successes

In the short time between contract signature and the close of FY 2019, there were notable successes, such as:

- **Launching the Core:** In accordance with contract requirements, AT&T timely launched public safety's dedicated FirstNet Core, giving FirstNet users a differentiated experience with QPP, and ensuring that public safety has their own dedicated and secure network

- **Nationwide Coverage from Day One:** Established nationwide coverage of Band 14 and non-Band 14 network operations, enabling public safety users' access to FirstNet network services. AT&T's "all-band" solution, which allows FirstNet customers to use AT&T's existing network with priority and preemption as well as Band 14 as it is built out, makes coverage and capacity available where needed in jurisdictions across the country.

- **Swift Deployment:** The build-out plan of contracted Band 14 coverage in non-rural and rural areas was achieved ahead of schedule in 2019, translating to more FirstNet coverage where public safety needs it.

- **Rural Partnerships:** Band 14 build-out with the use of AT&T rural carrier partnerships has begun, with contract and planning activities underway.

- **Subscribership:** AT&T is contractually required to meet nationwide device-connection milestones, which they met and exceeded in FY 2019. There has been significant adoption of FirstNet service by public safety, with the number of public safety agencies joining FirstNet increasing by approximately 6,500 and the number of devices connected to the network increasing by approximately 600,000 in FY 2019. Subscribership continues to grow across the country.

- **Public Safety Ecosystem:** Created a robust ecosystem for FirstNet devices and applications. As of September 2019, 138 devices, 90 of which are Band 14 capable, were vetted and published on the list of devices certified for use on the FirstNet network, as maintained by the National Institute of Standards and Technology (NIST).[1]

- **Deployables:** Offered access to a fleet of Band 14 deployables that provide additional, dedicated resources to extend communications during emergencies, major planned events, and response/recovery operations. Access was available at no extra cost to FirstNet subscribers. This fleet includes cells on light trucks (COLTs) with satellite connectivity and additionally, Flying Cell on Wings (COWS) (tethered drones) to support FirstNet public safety subscribers.

- **Security:** Launched the FirstNet network's dedicated Security Operations Center (SOC), providing continuous security monitoring across the network.

- **Financial Sustainability:** Through its self-sustaining model outlined in the contract, the FirstNet Authority continues to be funded through timely fees paid by AT&T per the terms of the 25-year contract.

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1   *See* NIST List of Devices Certified for Use on the FirstNet Network, which is continually updated at https://www.nist.gov/ctl/pscr/process-document-nist-list-certified-devices.

FIRSTNET AUTHORITY ROADMAP

In August 2019, the FirstNet Authority released a Roadmap for the future of the FirstNet network. The Roadmap outlines where the FirstNet Authority will focus its efforts over the next five years to evolve and enhance public safety broadband communications. The Roadmap builds on the organization's nationwide engagement with public safety to gather feedback on the most important communications capabilities for their missions.

Through more than 1,100 individual engagements, workshops, and summits with first responders, the FirstNet Authority developed prioritized technology areas to ensure the Roadmap reflects public safety's specific communications needs. Prior to publishing the first iteration of the Roadmap, the FirstNet Authority hosted a national public safety roadmap summit with more than 100 attendees from over 40 states and territories in June 2019 to review the draft Roadmap priorities. Through facilitated discussion, participants validated public safety feedback from previous Roadmap engagements and reviewed the draft priorities. Public safety's review and feedback were then incorporated into the Roadmap, to ensure their needs were reflected. Additionally, the Roadmap incorporates industry trends through market research and outreach to private sector, academia, and industry associations.

The Roadmap is organized around six domains representing technologies and capabilities that are vital to public safety operations now and in the future, including:

Network Core: provides the essential intelligence for the functioning of the network and is foundational to the network

Coverage and Capacity: enables robust and ubiquitous access to the network

Situational Awareness: envisions real-time access, collection, and distribution of critical information

Voice Communications: envisions high-quality, reliable voice communications nationwide working seamlessly across analog and digital platforms

Secure Information Exchange: provides the ability to access, exchange, and manage data securely and conveniently within and across public safety agencies and jurisdictions
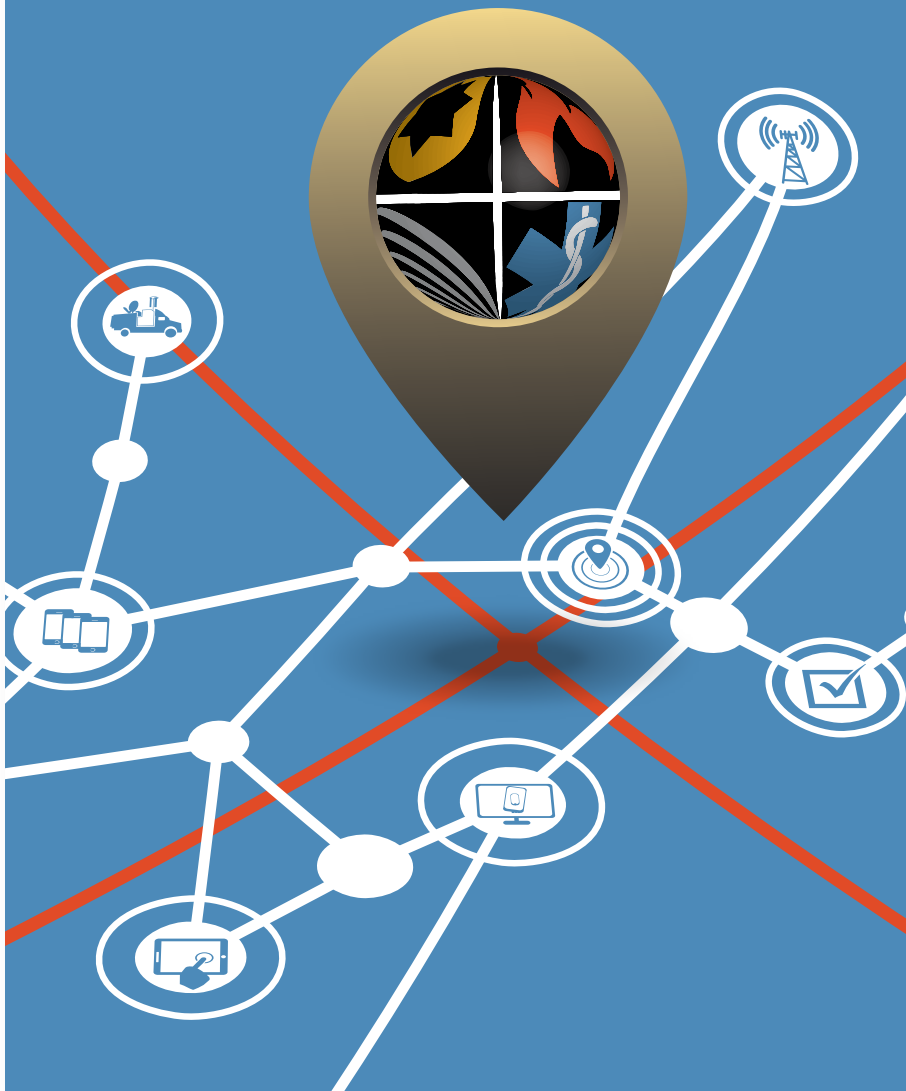
User Experience: seeks to ensure interfaces are designed for specific public safety users' operational challenges

The Roadmap will guide the FirstNet Authority's engagement with stakeholders across public safety, the industry ecosystem, government, and AT&T. The FirstNet Authority will identify and pursue opportunities that promote technology innovation, policies, procedures, and programs that benefit public safety users. As we gather input through future engagements and Roadmap summits, we will update the Roadmap so that it remains current with public safety's needs and technology developments. The FirstNet Authority will use the Roadmap to help prioritize its programs, activities, and investments in network improvements to ensure first responders have the communications tools they need to save lives and protect communities.

First Responder Network Authority

ROADMAP

INVESTMENT PROCESS AND RECOMMENDATIONS

The FirstNet Authority is committed to being a responsible steward of its investment resources and ensuring transparency with respect to how those resources will be used to advance the FirstNet network in a way that helps public safety perform their mission. The Middle Class Tax Relief and Job Creation Act of 2012 requires the FirstNet Authority to reinvest in the FirstNet network to support its continued operation and improvement.

In FY 2019, the FirstNet Authority developed and executed a structured, transparent, and rigorous investment process that drives disciplined investment of the FirstNet network's financial resources. Additionally, to guide the FirstNet Authority's investment, the FirstNet Authority Board adopted Resolution 98, "The FirstNet Authority's Investment Principles," which states that investments must:

- Be derived from and benefit public safety;

- Maintain and advance the foundation of the FirstNet network;

- Consider a balanced approach and provide value to public safety; and

- Be fiscally responsible and reflect strong financial management.

Public safety is at the center of our investment process, which is guided by the law, our investment principles, and the priorities that public safety outlined in the Roadmap. The investment process helps the FirstNet Authority:

- Identify and select investment opportunities that will best support the evolving mission and needs of the public safety community;

- Evaluate the investment opportunity to ensure it addresses FirstNet Authority legal, financial, and program requirements for investment; and

- Identify and analyze the investment opportunity costs and proposed benefits.

Following the investment process, thoroughly vetted investment opportunities were presented during the September 2019 FirstNet Authority Board Meeting. The FirstNet Authority Board approved the FirstNet Authority to pursue investments in the following areas: 1) Expansion of the FirstNet fleet of deployables; and 2) Initial generational upgrades to the FirstNet Core to enable 5G network capabilities.

- **Expansion of the FirstNet Fleet of Deployables:** Through public safety engagement and feedback, we heard the value of having deployable assets available at no additional cost to FirstNet network subscribers. FirstNet deployables have supported hundreds of operations, including natural disasters, large emergencies, and planned events. Public safety's requests for deployables are on the rise. As FirstNet adoption grows, this investment is intended to allow this program to expand to meet public safety's needs.

- **Initial Generational Upgrades to the FirstNet Core:** As part of the FirstNet Authority's statutory mission, we have established a dedicated FirstNet Core. The Core is foundational to the network and thus a critical domain of the FirstNet Roadmap. It gives public safety a highly secure, robust network — separate from commercial traffic — with the public safety functions and features they need, including priority and preemption. This investment is intended to allow FirstNet network technology to evolve and remain current with commercially available solutions, while retaining priority and preemption capabilities and mission-critical services. This investment opportunity will also set us on a path to enable 5G capabilities when they are ready for public safety's use.

In FY 2020, FirstNet Authority will continue to engage with public safety as we pursue these two investments and develop future proposals for reinvesting back into their network.

TECHNOLOGY AND INNOVATION

As part of the mission to deploy the FirstNet network, the FirstNet Authority serves as a conduit between public safety users and the industries that develop innovative communications tools to advance public safety operations. The FirstNet Authority's efforts help industry recognize the value and potential of the public safety communications market through:

- Direct telecommunications **standards development organization** engagement to move industry and interoperability for public safety forward. Examples include the 3rd Generation Partnership Project (3GPP) and Telecommunications Industry Association (TIA) standards contributions;

- **Devices** and **application** portfolio growth;

- **Spectrum management** to ensure the efficient utilization of the 700 MHz Band 14 Public Safety Broadband Spectrum in support of the NPSBN; and

- **Technology evolution** of the FirstNet network to include migration toward 5G.

Standardization

As required by Congress, the FirstNet network uses technology based on commercially available, open standards to achieve interoperability, speed to market, economies of scale, and cost efficiency. Using commercial standards makes it easier for device manufacturers to participate in the public safety device market, thereby increasing competition and lowering public safety device costs.

The FirstNet Authority continues to prioritize inclusion of public safety requirements in standards development. Our efforts are particularly focused on 3GPP, which unites seven telecommunications standards **>**

< development organizations to produce reports and specifications for the creation of 4G LTE technology as well as next generation 5G specifications. In coordination with AT&T, we have been successful at ensuring that 3GPP specifications address the needs of first responders.

We have employed a two-pronged focus in this work: 1) developing and evolving global specifications for mission-critical services (e.g., push-to-talk, video, and data), and 2) developing specifications for interworking LTE with legacy public safety technologies, such as land mobile radio (LMR). The current specifications for mission-critical services were originally targeted for LTE technologies. The FirstNet Authority is engaging in efforts to help these standards reflect 5G technologies as well.

More specifically, in FY 2019, the FirstNet Authority worked together with suppliers and global public safety partners during 3GPP Release-17 priority discussions to voice support for features essential to public safety, including Device to Device (D2D) and enhanced Multimedia Broadcast Multicast Services (MBMS) for 5G. As a result of our efforts, both features are now formally included as work items in Release-17 and are critical to public safety. Neither feature was supported for 5G in 3GPP Releases 15 nor 16. The D2D feature provides first responders with the capability to communicate when they are out of network wireless coverage. MBMS is critical to avoid network congestion. In disasters and major incidents, first responders can utilize push-to-talk technology to communicate in groups of various sizes, even in a small area covered by only one cell. When utilizing the MBMS

capability, each communication group in a cell will utilize the radio resources of about two people communicating to one another, regardless of the number of users in the cell on that group. As we move to video group communications (which consumes significantly more radio bandwidth than voice), this MBMS feature will be even more important for conserving radio resources.

Additionally, in FY 2019, the FirstNet Authority worked with 3GPP, the Alliance for Telecommunications Industry Solutions, and the TIA to support standards work involving the interworking between LTE-based mission-critical push-to-talk (MCPTT) and legacy LMR-based systems, such as Project 25. Through this effort, a wider adoption of LTE MCPTT will be possible as these interworking standards will permit an LMR user to talk to a

FirstNet LTE MCPTT user and vice versa.

Devices

The FirstNet device ecosystem continued to evolve during the past year to provide public safety with an expanding choice of devices for use on the FirstNet service. NIST is required by law to ensure the development of a list of certified devices for use on the FirstNet network.

In FY 2019, FirstNet Authority continued working closely with NIST to build upon the established device review process. Throughout the year, the collaboration with NIST resulted in ten updates to this list. As a result, by the end of FY 2019, the number of device manufacturers contributing to the FirstNet network device ecosystem grew from four **>**

‹ to a total of 27 offering over 100 devices for public safety. The certified device list reflects an effective collaboration among device manufacturers, the FirstNet Authority, AT&T, and NIST to enable a robust, diverse device ecosystem for public safety users.

Particularly significant additions to the device ecosystem occurred in the areas of mobile data terminals, rugged smartphones and tablets, and specialized devices, which previously contained only a limited number of certified devices. The availability of "First-Net Ready" (Band 14-enabled) devices from a wide range of leading manufacturers is a significant accomplishment for the benefit of public safety users.

In addition, the FirstNet Authority continued to collaborate with AT&T on evolving the device, accessory, and Internet of Things (IoT) ecosystems that included capabilities such as D2D communications and MCPTT. The collaboration resulted in the first "FirstNet Embedded" IoT devices being released during the year, including a cellular-connected body camera. It also resulted in the expansion of approved device categories, which now include:

- Standard commercial smartphones

- Specialized rugged smartphones

- Mobile routers

- Mobile data terminals/tablets

- Body cameras and vehicle telematics

Applications

FY 2019 was a year of tremendous growth for the application (app) ecosystem, with the number of FirstNet certified apps growing to over 100. Collectively, the catalog now includes solutions supporting six service domains and eight functional categories. The domains include: critical infrastructure, dispatch, emergency medical services (EMS), fire and rescue, hazmat, and law enforcement. The functional categories address public safety needs in the areas of cloud solutions, cybersecurity, device security, public safety communications, secure connections, situational awareness, and video surveillance.

FirstNet Developer Portal

The FirstNet Developer Portal is a website targeted at developers of public safety applications. The portal plays a crucial role in encouraging new entrants into the marketplace for public safety apps by providing information, education, and technical resources, including Software Development Kits and Application Programming Interfaces (APIs). A Software Development Kit is a set of software routines, protocols, and tools for building software that typically specifies how software components should interact and communicate with one another. APIs include the software building blocks that implement routines and protocols. The APIs currently available to developers through the FirstNet Developer Portal allow developers to customize apps for public safety users on the FirstNet network. During FY 2019, FirstNet Authority continued to expand this list of participating vendors to over 50 and the number of APIs **>**

< to over 20, attracting more brainpower from the software and app developer community to focus on creating new solutions for the public safety market.

Identity, Credential, and Access Management

Many public safety users cannot access their devices and equipment in the same way as commercial consumers. Certain job functions may limit their ability to use fingerprints or other biometric inputs (e.g., a firefighter wearing gloves), or there may be restrictions on how certain devices can be used in the line of duty. The unique needs of public safety users require a focused effort on identity, credential, and access management (ICAM) to ensure they can safely access their devices while in the field.

The FirstNet Authority is working to deliver an integrated solution incorporating identity management services at the user, device, and application levels. By addressing all three levels, we will enable secure, single-sign-on access to FirstNet network websites, management portals, and mobile applications that support federal and state security requirements.

In FY 2019, we continued to pursue a comprehensive identification solution through product strategy, planning, testing and identifying user ICAM needs through our Roadmap engagements. Our goal is to produce an ICAM ecosystem that offers public safety agencies differentiated integration between themselves and the FirstNet network, as well as application interoperability among agencies and between jurisdictions. A key component to achieve this is through the FirstNet Developer Portal (described above), which now offers 25 APIs to enable unique interaction between apps and the network.

Spectrum Management

The FirstNet Authority continued to actively manage spectrum sharing and the efficient utilization of the 700 MHz Band 14 Public Safety Broadband Spectrum in support of the NPSBN deployment and operation. During FY 2019,

FirstNet and AT&T coordinated the technical assessment of 42 commercial experimental license applications and 12 federal entity spectrum use requests seeking access to FirstNet Authority-licensed Band 14 on a secondary, not-to-interfere basis in support of public safety wireless technology research and national defense training and readiness initiatives.

The FirstNet Authority's spectrum stewardship was also evident on the international front. We provided significant input and support to the Federal Communications Commission and U.S. State Department in their efforts to develop updated border area 700 MHz broadband spectrum use agreements with Canada and Mexico. This cross-border work continues into FY 2020.

5G Overview

The FirstNet network was launched with innovative communications tools that advance public safety operations. With the super high speeds, enhanced capacity, and ultra-low latency facilitated by a 5G network architecture,

the Internet of Life-Saving Things — such as remote bomb disposal, real-time gunshot detection and localization, and remote surgery — may eventually be enabled. As discussed above, in preparation for these potential 5G capabilities, the FirstNet Authority Board approved a plan in FY 2019 to pursue an investment for initial generational upgrades to the FirstNet Core. We expect this investment to enable the following public safety services (through technology stemming from associated standards work):

- MCPTT, video, and data over 5G technologies

- Higher 3-D positioning accuracy in 5G location services

- QPP capabilities across all AT&T 5G bands (allowing prioritization based on a first responder's role)

- D2D direct communication, which facilitates off-network communication between two devices, over 5G networks

STAKEHOLDER ENGAGEMENT

The FirstNet Authority continues to educate and gather input from the public safety community to ensure stakeholders receive the latest information about FirstNet during implementation and inform the enhancement and evolution of the network. Throughout FY 2019, meetings with public safety stakeholders gave the FirstNet Authority an opportunity to update stakeholders on the network deployment, discuss the FirstNet network and services, and begin engagements on FirstNet's Roadmap to discuss current and future needs for the network.

In FY 2019, we held more than 1,100 engagements, reaching nearly 33,000 public safety stakeholders. This included outreach, education, and consultative engagements of various types of public safety entities across the country and at all levels of government (i.e., local, state, tribal, and federal jurisdictions).

Public Safety Advisory Committee

The FirstNet Public Safety Advisory Committee (PSAC) continues to provide valuable operational and technical subject matter expertise in support of the FirstNet network and the FirstNet Authority's organizational priorities. The PSAC consists of over 40 members, who represent local, state, tribal, and federal public safety associations and government entities, and is chaired by Todd Early, representing the National Council of Statewide Interoperability Coordinators (SWICs).

The PSAC meets twice a year in-person typically, holds webinars, and engages in other activities to advise the FirstNet Authority on public safety's needs for the network, provide feedback, and stay updated on FirstNet's progress.

FY 2019 In-Person Meetings

- In December 2018, PSAC members met in Tysons Corner, Virginia to discuss the FirstNet Authority strategic plan, network products, coverage, and the FirstNet Authority's 2019 public safety engagement strategy. The PSAC also outlined its 2019 webinar series and shared updates from its Tribal Working Group (TWG).

- In June 2019, the PSAC met in Bedminster, New Jersey to discuss the development of the FirstNet Roadmap and to tour AT&T's Global Network Operations Center (GNOC). The GNOC also houses the FirstNet dedicated Security Operations Center (SOC), providing monitoring of the network at all times. Participants also received updates from AT&T leadership, NIST's Public Safety Communications Research Division (PSCR), and FirstNet Authority leadership.

FY 2019 Webinars

The PSAC participated in regular webinars to collect information for dissemination to their association and public safety colleagues. PSAC members provided critical feedback to the FirstNet Authority on topics such as:

- Current definitions and standards for mission critical video, with a focus on future applications of the technology and development for use on the FirstNet network

- Roadmap domain topics, with an analysis of potential technology areas of focus within the domains, short- and long-term impacts to public safety, and how best to prioritize investments in each domain

- FirstNet Authority 3GPP standards team work

- The future of telehealth and emergency medical care on the FirstNet network

Strike Teams

In FY 2019, the PSAC utilized "Strike Teams"

to further support the FirstNet Authority's mission. These teams bring together PSAC members to advise the FirstNet Authority on time-sensitive topics, such as the formulation of the Roadmap and guidance on future investment planning. Strike teams in FY 2019 addressed the following:

- In May 2019, the PSAC organized a Strike Team on the FirstNet Experience Center in Boulder, Colorado. PSAC members discussed the physical space requirements and programming necessary for the Experience Center to effectively capture public safety feedback on network features, services, technologies, capabilities, and future innovations. The Strike Team provided input from a public safety user perspective on how to engage fellow public safety on the FirstNet network and user experience.

- In August 2019, the PSAC convened a Strike Team on telehealth to discuss how to provide information to the EMS community around the use of telemedicine. Telehealth and, in particular, the Centers for Medicare and Medicaid Services (CMS) Emergency Triage, Treat, and Transport (ET3) program are current discussion topics of the team. The ET3 program is a voluntary program to provide greater flexibility to ambulance care teams to address emergency health care needs of Medicare Fee-for-Service beneficiaries following a 911 call.

Tribal Working Group

The Tribal Working Group (TWG) provides advice to the FirstNet Authority on tribal outreach, education, and consultation that drives adoption and use of the FirstNet network by tribal communities. The working group is comprised of 11 delegates from various tribal organizations, and is chaired by Danae Wilson, representing the National Congress of American Indians. In FY 2019, the TWG supported the PSAC by providing input on the Roadmap and developing a tribal-specific guide to help tribes prepare for public safety broadband.

In FY 2019, the TWG held two in-person meetings to discuss and provide input on the Roadmap, share use cases, and continue to address the tribal community's specific public safety broadband needs. Additionally, the TWG held monthly teleconferences, among other things, to:

- Review member organizations, outline yearly priorities, and begin discussing the creation of products specific to tribal public safety using broadband for communications

- Hear feedback directly from delegates who attended the June 2019 FirstNet Roadmap Summit in Phoenix, Arizona, and further engage others on Roadmap development

- Finalize plans for creating a "Preparing for Public Safety Broadband" document, planned for release in FY 2020

FINANCIAL CONDITION

In FY 2019, the FirstNet Authority maintained a strong financial position and continued to exercise sound fiduciary stewardship over our financial resources. As of September 30, 2019, we had a cash balance of $4.7 billion. Throughout FY 2019, funds were used to support our ongoing operations and execution of our strategic vision, which included developing the Roadmap and determining initial investment recommendations to enhance the FirstNet network. We incurred operating expenses during FY 2019 related to personnel compensation, contractual services for strategic and operational support, extensive stakeholder engagement, and the development of the Roadmap.

The FirstNet Authority's audited FY 2019 Financial Report, including Independent Auditors' Report, is posted on the FirstNet Authority website at https://firstnet.gov/newsroom/resources/reports.

Collections Data

The FirstNet Authority receives annual payments from AT&T for access to 20 MHz of spectrum and associated capacity for the 25-year term of the NPSBN contract. These annual payments from AT&T are the FirstNet Authority's source of revenue. As payments are received from AT&T, they are recognized as a contract liability and amortized on a straight-line basis over the applicable fiscal year. On September 12, 2019, the FirstNet Authority received $120 million from AT&T as the FY 2019 payment due under the contract, to fund FY 2020 operations.
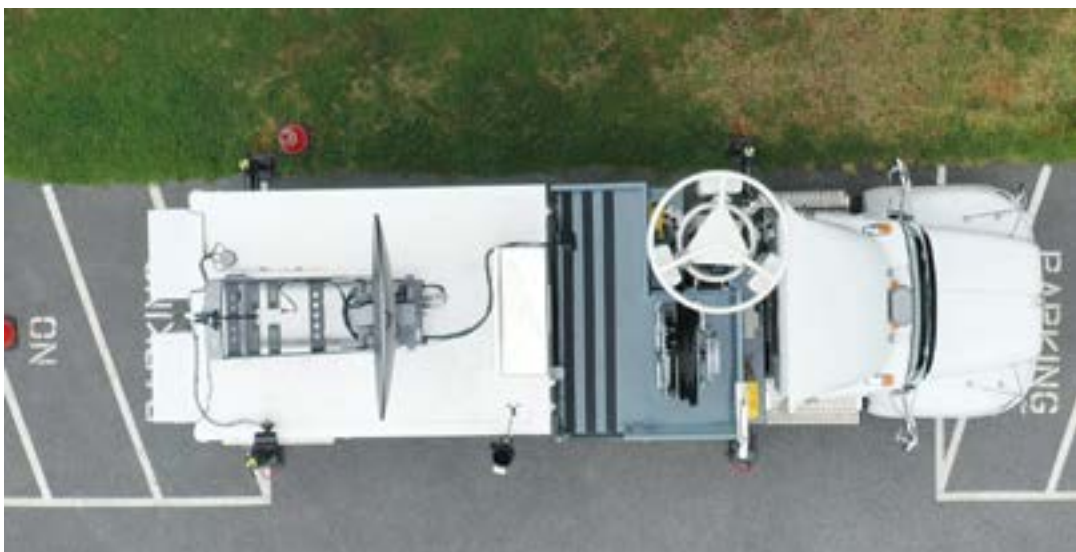
Changes in Assets, Liabilities, and Net Position

The FirstNet Authority had $8.0 billion in total assets as of September 30, 2019, compared to $8.1 billion for FY 2018 – a decrease of $100 million, or 1.2 percent, offset by a $95 million, or 6.5 percent, decrease in total liabilities. As a result, our net position increased $625,000.

Limitation on Administrative Expenses

47 U.S.C. § 1427(b) limits the FirstNet Authority's administrative expenses to $100.0 million in the 10-year period beginning February 22, 2012. Since its inception through September 30, 2019, the FirstNet Authority has expended $47.25 million of the originally authorized $100.0 million for administrative expenses. The agency spent $9.0 million on administrative expenses in FY 2019, which reflects a $2.7 million increase compared to FY 2018. The increase in FY 2019 administrative expenses is due primarily to a $2.5 million decrease in administrative expenses recorded during FY 2018 that was a result of a one-time cost allocation adjustment to recorded accrued leave liabilities.

FirstNet

CONCLUSION

Robust communications capabilities for public safety are critical to the resiliency of our nation's communities. As directed by Congress, the FirstNet Authority is delivering the first and only dedicated public safety broadband communications network in the United States. The network is making measurable differences for America's public safety agencies and the communities they serve. It is modernizing and transforming the communications that first responders use for their jobs every day and in every emergency.

Our continued coverage, device, capability, technology, and device connection growth in FY 2019 is benefitting all communities — rural, suburban, and urban. Public safety's growing use and reliance on wireless broadband communications makes the FirstNet network invaluable for planned and unplanned events as well as routine everyday use. Emergencies can happen anywhere, at any time, and no community is immune to disasters. FirstNet's fleet of deployables allows the delivery of additional coverage and capacity across the country, including remote and otherwise uninhabited areas, when and where needed. We are working with AT&T to ensure first responders have the best tools and capabilities to prepare and respond anywhere in the country.

Due in part to the existence of the FirstNet network, today's public safety communications marketplace is highly competitive. Direct consultation, feedback, criticism, encouragement, and honesty from stakeholders across the country built the FirstNet network into what it is today. In FY 2019, the FirstNet Authority worked with public safety, industry, academia, and governments across states, territories, tribal nations and Washington, D.C., to improve public safety communications. In FY 2020, we will continue to consult with stakeholders; oversee network deployment, operation, and maintenance by AT&T; invest in improvements to the network; and represent the interests of public safety in the advancement of technology and innovation improvements. These actions will ensure that the only broadband communications network built specifically for, and in consultation with, public safety continues to meet their needs as they work to save lives and keep us safe.
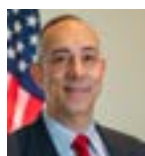
APPENDIX A: FIRSTNET AUTHORITY FY 2019 BOARD[1]

Edward Horowitz (Chair)
Venture Capital/Technology Executive

Richard Stanek (Vice Chair)
Former Sheriff, Hennepin County, MN

Chief Richard Carrizzo
Chief of the Southern Platte
Fire Protection District, Kansas City, MO

Welton Chase Jr.
Brig. Gen. (ret.), U.S. Army,
Army Information Technology (Signal)

Neil E. Cox
Telecommunications/Technology Executive

Brian Crawford
Senior Vice President, Chief Administrative
Officer of Willis-Knighton Health System

Billy Hewes
Mayor, Gulfport, MS

Robert T. "Tip" Osterthaler
Business/Technology Executive

Paul Patrick
Division Director, Family Health and Pre-
paredness, Utah Department of Health

Teri Takai
Government Information Technology Expert;
Former CIO, States of Michigan and California

David Zolet
President and Chief Executive Officer, LMI

Mick Mulvaney
Director of the Office of Management
and Budget

Dana Wade
Office of Management and Budget
Designee

Kevin McAleenan
Secretary of the Department of
Homeland Security (Acting)

Ron Hewitt
Department of Homeland Security
Designee

William P. Barr
U.S. Attorney General,
Department of Justice

Christopher M. Piehota
Department of Justice Designee

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[1] FirstNet Board Members as of September 30, 2019 — A current list of FirstNet Authority Board members is located at www.firstnet.gov/about/board/members

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