FirstNet® Authority

Rising to the Challenge

FEBRUARY 2021

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

Miami-Dade agencies, like Miami-Dade County Fire Rescue and the Miami-Dade County Emergency Operations Center, use FirstNet to support their everyday operations and to keep the community safe during hurricane season.

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 2020.[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 2020 is the period from October 1, 2019, through September 30, 2020.

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When the Kansas City Chiefs won the Super Bowl in 2020, over one million fans gathered for a championship parade and rally. Kansas City's public safety agencies spent weeks preparing, including working with an on-site FirstNet team that provided support and training for the uplift tool, local control portal, and the advanced network status tool.

LETTER *FROM* EXECUTIVE DIRECTOR EDWARD PARKINSON

When the First Responder Network Authority (FirstNet Authority) was established by Congress in February 2012, it was given a clear mission: ensure the successful deployment, operation, and maintenance of the nationwide public safety wireless broadband network. This responsibility to public safety is something that the FirstNet Authority takes very seriously and I am pleased to report that the FirstNet Authority made significant progress fulfilling this mission in fiscal year (FY) 2020. The organization remains dedicated to serving our nation's first responders today and in the years to come.

In the years following state and territory opt-in decisions, where every Governor chose to adopt the FirstNet state plan, the FirstNet system has made significant progress. Deployed by our contracted partner, AT&T, FirstNet service deployment and adoption growth has progressed steadily, and while significant work remains, the FirstNet Authority is pleased by the developments of the network in FY 2020. This year, public safety faced many concurrent and unprecedented challenges – hurricanes, wildfires, tornadoes, protests – while responding and adapting to the coronavirus. Through it all, the FirstNet system rose to the challenge.

Our success in serving public safety during this most demanding of years is demonstrated by the data. At the start of FY 2020, there were approximately 9,000 public safety agencies and 750,000 connections on the network. By the end of FY 2020, there were more than 13,000 public safety agencies and 1.5 million connections on the network. Time and time again, the FirstNet network proved itself and it earned the trust of thousands of new public safety agencies and personnel who saw the network perform for themselves and their peers.

Since the creation of the program, the FirstNet Authority has evolved through various stages: consulting with public safety stakeholders and governments, contracting with a private-sector partner to provide the solution, working with our nation's governors to provide individual state plans, and overseeing a successful deployment of the network. In June, the FirstNet Authority entered into our next statutorily mandated phase, with the FirstNet Board approving the first investments back into the network. Valued at over $200 million, these investments will expand the fleet of deployable network assets (such as cell on light trucks and other movable assets) available to users to boost coverage and capacity and fund the first phase of a multi-year project to enable 5G services for FirstNet subscribers.

In FY 2020, there was unprecedented demand for the FirstNet deployable assets. Public safety requested support for planned events such as marathons and parades, and unplanned event response to natural disasters like hurricanes and flooding, COVID-19 support and other emergencies. Expanding our fleet of these assets will help ensure the network promptly and effectively supports our first responders' broadband communications needs across the nation.

Our focus remains on meeting the demands of the public safety community. Building a network along globally accepted standards with enhanced capabilities designed specifically for first responders makes FirstNet unique. As such, public safety engagement continues to be the driving force behind the development and continued evolution of their network. Our strength comes from the many first responder use cases we can now showcase in this report from across the country.

Continued consultation through the FirstNet Authority's ever-evolving Roadmap is one tool the organization uses to survey our stakeholders to obtain feedback we can use for the network's continued improvement, and I encourage all who wish to provide feedback to go to our website at www.firstnet.gov and please take the short survey.

Shortly after the end of FY 2020, we issued an update to our Roadmap that will set the strategic direction for how the FirstNet Authority will evolve the network to satisfy first responders' communications needs today and in the future. Beyond providing a vision, it includes concrete priorities around six domains that lay out the blueprint for public safety communications. The Roadmap guides the FirstNet Authority's allocation of its resources, ensuring that investments in the network are fully aligned with the specific and evolving needs of the public safety community.

In closing, the FirstNet Authority is indebted to all the first responders who have helped shape their network and through their input continue to help us strive to meet their standards. Our organization pledges to continue our dialogue with our nation's public safety personnel as FirstNet continues to transform the future of public safety communications. I would also like to thank the team at the FirstNet Authority as they continue to serve our nation's first responders. I am fortunate to be part of an incredible group of people who work tirelessly for those who serve us all. Thank you to the FirstNet team, and thank you to all public safety.

Sincerely,
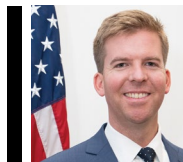
Edward Parkinson
Executive Director

The American Birkebeiner Ski Race, hosted in rural Wisconsin, is the largest cross country ski race in North America. Cell phone communication on the course is traditionally a challenge due to the many hills, valleys, and dense trees in the area. With a FirstNet SatCOLT providing a mobile cellular connection, coverage was not a concern at the 2020 Birkie.

EXECUTIVE SUMMARY

The First Responder Network Authority is an independent entity within the Department of Commerce's National Telecommunications and Information Administration (NTIA) tasked by Congress to ensure the establishment and continuing operation, maintenance, and improvement of a nationwide, interoperable public safety broadband network. In 2017, following an open, transparent, and competitive procurement process, the FirstNet Authority awarded a 25-year contract to AT&T to build, operate, and maintain the network. AT&T commenced a 5-year initial deployment of the radio access network (RAN) in March 2018. Under the Middle Class Tax Relief and Job Creation Act of 2012 (2012 Act), the FirstNet Authority is responsible for overseeing the network buildout and operations.

The 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 to meet the needs of our nation's first responders.

In FY 2020, first responders used FirstNet to respond to an unprecedented number of major events that tested the capabilities of the network. These included a historic wildfire season, a very active hurricane season, nationwide demonstrations, and a global pandemic. In a normal year, even one of these events would present an extraordinary challenge to first responder communications. The FirstNet Authority is proud to report to Congress that in FY 2020, the FirstNet network rose to the challenge.

FirstNet responded to these challenges successfully because the network was created to provide innovative solutions for public safety, incorporate the feedback and needs of the public safety community, and prepare for problems ahead of time. FirstNet's success is due in large part to Congress's vision and the FirstNet Authority's partnership with the public safety community. Several aspects of the FirstNet program differentiate the network from commercial carrier services, including:

- **Interoperability:** Following the events of 9/11, it became clear that first responders needed a network that would allow different agencies and jurisdictions to communicate. The FirstNet network is built to open, global standards for broadband communications and is fully interoperable across jurisdictional and organizational lines. It is also interoperable with other commercial service providers and is paving the way for broadband interworking with traditional land-mobile radio systems.

- **Priority and Preemption:** As our society becomes more digitally connected, events like New Year's Eve or a virtual concert can create moments when there is more demand for broadband access to a cellular network than there is capacity. Priority and preemption mean that public safety users' calls, messages, and other data get prioritized over commercial traffic on FirstNet.

- **Consultation and Planning with Public Safety Stakeholders:** FirstNet is designed to meet the needs of the communities we serve. To accomplish this, the network was developed based on extensive engagement with local, state, tribal, and federal public safety responders and in coordination with all of our nation's governors. No network can cover every inch of the country and, recognizing that limitation, FirstNet's coverage was planned in collaboration with users so that we are able to provide the best possible service to meet their needs. These individual state plans, in which all states chose to participate, guide the initial five-year network buildout.

- **Deployables:** The FirstNet Authority recognized that storms, fires, and other events can cause towers to go offline, and public safety incidents and emergencies can occur in remote areas without good cell coverage (e.g., missing or injured hikers). To solve this problem, the FirstNet Authority required our contractor, AT&T, to build a fleet of deployable assets. These vehicles function like mobile cell phone towers. They range from large satellite trucks to small drones that can raise a small cell booster on a tethered cord. This year, AT&T added an aerostat blimp, FirstNet One, that can provide service over a large area for weeks at a time. The FirstNet Authority is investing more funds to expand this fleet in response to user growth and widespread support for these resources.

- **Investments to Continuously Improve the Network:** The FirstNet Authority's contract with AT&T allows exclusive use of the 700 MHz Band 14 Public Safety Broadband Spectrum, which can be used for commercial use when not needed by FirstNet subscribers. In exchange for the use of this valuable spectrum, AT&T makes annual payments to the FirstNet Authority. As planned by Congress, the FirstNet Authority uses this income to be financially self-sustaining and make significant reinvestments to improve the network over time. Over the course of the 25-year contract, the FirstNet Authority is required to continue to reinvest funds back into the network.

- **The FirstNet Authority Board:** The FirstNet Authority is led by a Board made up of three permanent members who are Cabinet officials and 12 non-permanent appointed members who represent a broad range of first responder professionals and stakeholders as well those with telecommunications industry expertise. The Board helps to guide the work of the FirstNet Authority's federal civil servants.

At the start of FY 2020, there were approximately 9,000 public safety agencies and 750,000 device connections on the network.[1] By the end of FY 2020, there were more than 13,000 public safety agencies and 1.5 million device connections on the network. FirstNet public safety users are benefitting from the service throughout the country every day in their efforts to save lives and protect communities. Subscribing agencies have access to FirstNet-dedicated deployable network assets providing reliable 4G 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 and as of the end of FY 2020, Band 14 has launched in 700 markets[2] across the country with 80 percent of nationwide coverage met. The FirstNet Authority verifies and validates AT&T's progress on the network buildout, including the achievement of rural milestones.[3]

To best serve public safety, the FirstNet Authority places emphasis on outreach and engagement with first responders around the nation. In FY 2020, the FirstNet Authority conducted over 1,250 engagements across all public safety disciplines and in all 50 states, 5 territories, and the District of Columbia. Informed by these engagements, the FirstNet Authority continues to update its Roadmap, originally released in FY 2019, which guides the future evolution of the NPSBN.

The FirstNet Authority's outreach directly to first responders serves as an opportunity to understand their needs and priorities for the network, while also learning about their user experiences to supplement technical analysis of the network as part of contract oversight. These engagements also provide users the opportunity to work with federal civil servants at the FirstNet Authority to help resolve any issues with the network and to continue to improve the public safety user experience.

In FY 2020, the FirstNet network faced unprecedented challenges. Under pressure from multiple and often simultaneous response efforts across the nation, the network rose to the challenge. The network was not only successful in meeting the needs of existing users, but more than doubled the number of connected devices used by first responders. The FirstNet network is only three years into a five-year implementation phase, but the FirstNet Authority can report that progress is overall ahead of schedule and meeting the financial goals established by Congress. More importantly, FirstNet is meeting the real-world needs of first responders in all 50 states, five territories, and the District of Columbia. As a result, the FirstNet network is experiencing rapid user growth as first responders continue to view it as effective, reliable, affordable, and responsive to their needs. As our nation approaches the 20th Anniversary of 9/11, the FirstNet Authority is proud to report that Congress's vision for the NPSBN is being successfully implemented, widely used by first responders, and meeting buildout and financial goals.

Several notable successes were achieved by the end of FY 2020, such as:

- **Swift Deployment:** The build-out plan of contracted Band 14 coverage in non-rural and rural areas was achieved ahead of schedule in 2020, translating to more FirstNet coverage where public safety needs it.

- **Rural Buildout:** By the end of FY 2020, rural coverage had increased to cover over 54 percent, or approximately 27.9 million people in rural areas. This growth in coverage surpasses the network deployment targets for the year as FirstNet continues the initial five-year network deployment, scheduled for completion in 2023.[4]

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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 Nov. 3, 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. Estimates of the Emergency Medical Services (EMS) market conducted by the National Association of State EMS Officials through a U.S. Department of Transportation cooperative agreement cited over 23,000 EMS agencies in the U.S. in 2020. *See:* https://www.ems.gov/pdf/National_EMS_Assessment_2020.pdf (last visited Dec. 20, 2020).

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 Nov. 3, 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.

4 See U.S. Department of Commerce Annual Performance Goal: Rural Wireless Broadband for Public Safety, which is regularly updated at https://performance.

- **Connections:** There has been significant adoption of the FirstNet service by public safety. There were over 13,000 public safety agencies and organizations subscribed with over 1.5 million device connections.

- **Applications:** There are over 150 apps in the FirstNet App Catalog.

- **Public Safety Device Ecosystem:** The number of device manufacturers contributing to the FirstNet network device ecosystem grew from 27 in FY 2019 to a total of 41 offering over 200 devices for public safety. These 200 devices 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).[5]

- **Investments:** The FirstNet Authority made its first reinvestments into the network. Valued at $218 million, these investments will expand the fleet of deployables available to users and fund the first

phase of a multi-year project to enable 5G services utilized by FirstNet subscribers.

- **Deployables:** FirstNet offers users access to a fleet of Band 14 deployables that temporarily replace infrastructure damaged in an emergency, boost capacity during major events, or bring service to hard-to-reach areas to support public safety response. Access is available at no extra cost to FirstNet subscribers. In FY 2020, FirstNet subscribers continued to rely on these assets during emergencies such as hurricanes and wildfires, pandemic response, and various planned events.

- **Financial Sustainability:** The FirstNet Authority continues to effectively manage its finances to remain self-sustaining, as envisioned by Congress.

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commerce.gov/stories/s/APG-Commerce-4/w7uw-qfy3/.

5 See NIST List of Devices Certified for Use on the FirstNet Network, which is regularly updated at https://www.nist.gov/ctl/pscr/process-document-nist-list-certi-fied-devices.

FirstNet helps Hattiesburg, Mississippi's AAA Ambulance Service to seamlessly communicate as they serve the 1.2 million residents living across 16 counties in southern Mississippi.

FirstNet is the only nationwide public safety communications platform built with and for America's first responders. Through a public-private arrangement, the First Responder Network Authority (FirstNet Authority) and AT&T 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 – whether supporting their everyday operations or responding to an emergency. By the end of FY 2020, there were more than 13,000 public safety agencies and 1.5 million device connections on the network. This represents a major growth in use; in FY 2019, FirstNet had 750,000 connections across 9,000 agencies. During the unprecedented challenges of the past year, first responders and other public safety personnel turned to FirstNet, and we are proud to assist them.

Below are several success stories highlighting public safety's use of FirstNet around the country.

Supporting the Full Spectrum of Disaster Preparedness and Response

Primary FirstNet users – such as law enforcement, fire services, and emergency medical services (EMS) – often rely on a broad ecosystem of partners to help them coordinate response efforts that keep people safe. Public works, utilities, schools, and hospitals are critical in helping public safety officials better plan for, respond to, and recover from incidents that can overwhelm communities. FirstNet is designed for the public safety community, but it is also available to the extended community that is called on to help support first responders during emergency response and recovery. These extended primary users can include essential government services, education, healthcare, transportation, utilities, and other organizations.

Many municipalities are turning to FirstNet to provide emergency communication services to multiple agencies. The **City of San José, California**, became the first to deploy FirstNet to all public safety personnel and emergency response staff, including their local airport, public works, transportation, and environmental services agencies. The **City of Annapolis, Maryland**, took a similar approach – Annapolis Police Department, Public Works, the Office of Emergency Management, the Transportation Department, and Recreation and Parks all utilize FirstNet to support an interoperable approach to public safety communications.

For Philip Mann, Public Works Director for the **City of**

Gainesville, Florida, access to FirstNet helps them work more effectively when clearing the way for other responders. He said, "We used the FirstNet service for our response. If we've got trees blocking roads, police and fire can't get to citizens who need help. Our utility company can't get to downed power lines to restore power."

Recently, Travis Johnson with the **Louisiana Office of Homeland Security and Emergency Preparedness** used FirstNet to determine what communications assets to send with Search and Rescue Teams responding to Hurricane Laura. "It enabled us to make better decisions about where to send our limited resources," he said.

Disaster response, and daily operations, are also improved by a feature called the Advanced Network Status Tool that allows authorized personnel – such as Communications Unit Leaders, Communications Technicians, or Emergency Support Function #2 communications coordinators – the ability to view network details at the cell-site level. It even enables users to obtain more granular information on which specific sites within a network market area may be impacted by an outage. Knowing where that critical infrastructure is can be a key piece of data in real-time planning. This unprecedented visibility into the FirstNet network is just one of the many differentiators that come with being a FirstNet user and a key ask from public safety for the network.

Coronavirus: FirstNet Responds

As first responders across the nation rapidly adjusted to a changing world, FirstNet continued to assist in a challenging environment. At a time when cell and data networks may be strained by a shift to work and school from home, priority and preemption on a dedicated network has become even more important. As the nation continues to respond to this crisis, FirstNet continues to work with first responders, hospitals, and the full ecosystem that enables critical services to be delivered.

Alexandria 9-1-1 Goes Remote

Among the most difficult challenges public safety faced at the onset of the COVID-19 pandemic was what to do about emergency call centers. As the pandemic grew, it became clear that having many people in a room together was a major risk to their individual health, as well as the continuity of operations if there is a large-scale outbreak at an emergency call center.

The **City of Alexandria, Virginia**, had considered the potential of using their FirstNet devices to enable remote call-taking, but remained cautious due to the unknowns involved. After a successful month-long pilot and as the need to further distance their teams became clear, IT staff went to dispatchers' homes and set up their equipment. Under this innovative approach, Alexandria's remote dispatchers are using equipment that includes a laptop, headset and smartphone, FirstNet hotspot, mobile router with computer-aided dispatch, and other necessary hardware. The dispatchers remotely have the full functionality of the center at their fingertips. "It's the same as what they have in the center, just a shrunken down version," said Public Safety Systems Administrator Bob Bloom. "They have RapidSOS, Smart911 and all the buttons at their fingertips. We put a talk group for 311 and 9-1-1 on the phones so it's like being back in the center where you can share information."

Hotspots and smartphones powered by FirstNet enabled 9-1-1 dispatchers in the City of Alexandria, Virginia, to take calls and handle Computer Aided Dispatch operations from their homes.

FirstNet hotspots enabled the emergency call center to go remote without worrying about the availability or quality of commercial networks. The emergency dispatcher does not have to compete for service with their neighbors attending virtual classes, meetings, and social gatherings. As demonstrated during the pandemic, this capability provides redundancy for emergency call centers to ensure continuity of service during times when operations may be limited due to weather or building issues.

Helping Navy Hospital Ships Help New York and Los Angeles

To aid in hospital response times early in the pandemic, the U.S. Navy sent hospital ships to **New York City** and **Los Angeles** to treat patients. The hospital ships needed not only connectivity, but also the ability to communicate with civilian first responders and hospitals.

FirstNet set up portable cell sites nearby to ensure a strong signal for the USNS Mercy and USNS Comfort during the pandemic.

In Los Angeles, the USNS Mercy arrived in the Port of Los Angeles to find FirstNet ready and waiting to get them connected to the FirstNet network. FirstNet set up portable cell sites nearby to ensure a strong signal for ambulances and medical staff on the ship who were operating in an area not accustomed to these connectivity needs. However, regular cell signals would not penetrate the steel hull of the ship. To solve this problem, FirstNet installed a dedicated 1 Gigabit per second (Gbps) land-to-ship circuit connection and had the ship connected within 24-hours.

In New York, FirstNet also provided critical land-based and on-ship solutions to enable the USNS Comfort's medical teams to be connected to their civilian counterparts. In New York and Los Angeles, FirstNet was faced with a new and urgent need from public safety and was able to meet those needs and ensure connectivity.

Supporting the Navajo Nation's COVID-19 Response

In June 2020, as the **Navajo Nation** expanded its COVID-19 response in collaboration with FEMA, FirstNet worked with the Navajo Nation to deploy two Satellite Cells on Light Trucks (SatCOLTs). With the Navajo Nation's assistance, FirstNet positioned a SatCOLT at the Navajo Nation Administration Building in Window Rock, Arizona, and another at the Navajo Nation Department of Transportation Tse Bonito Office in New Mexico.

"Navajo Nation has been working with FirstNet to make sure the needs of tribal first responders and health command workers serving Navajo Nation are met," said Chris Becenti, Executive Director, Navajo Nation Telecommunications Regulatory Commission Office. "We appreciate that FirstNet answered our call when we requested the deployable asset to provide critical connectivity for federal and tribal officials responding to the COVID-19 crisis."

Supporting Mutual Aid Efforts in New York City

The genesis of FirstNet goes back to the tragic events of September 11, 2001. In April 2020, New York City again found itself in need of significant assistance to handle the COVID-19 crisis. Similar to 9/11, first responders from around the nation would converge in New York to help. In 2020, this effort was greatly aided by the availability of FirstNet so that emergency dispatch, brick and mortar hospitals, field hospitals, New York City ambulances, hundreds of ambulances from around the country, and even a Navy hospital ship (as discussed earlier) could easily communicate.

Members of the New York Army National Guard conduct an exercise on Randall's Island.

To organize this massive effort, first responders were organized at Fort Totten and on Randall's Island. Fort Totten is a former military base in Queens, which now serves a variety of purposes including housing and training units for the U.S. Army Reserve, New York Police and Fire Departments, a historical society, and public park space. Randall's Island is home to parkland, athletic fields, a driving range, and a few public services such as a state police station, wastewater treatment plant, psychiatric hospitals, and homeless shelters. With the use of these sites to lead a massive mutual aid response with ambulances from around the nation, connectivity was necessary.

FirstNet deployed portable cell sites as well as in-building solutions to provide the network access that enabled these two locations to function effectively. To track and communicate with the ambulances across the city, smart phones enabled with Enhanced Push-to-Talk and capable of using the FirstNet network were distributed to the various public safety responders. This allowed dispatch to track ambulances, send messages and other data, and enabled ambulances to communicate through both cellular devices and traditional Land Mobile Radio (LMR).

Worlds End Ultra Marathon: When the Mission is Intentionally Difficult

The Worlds End Ultra Marathon is a 63.8-mile race held annually in **Sullivan County, Pennsylvania**. The location was chosen because it is an incredibly rugged, difficult, and hilly terrain – the race bills itself as one of the toughest ultra-marathons in the United States. The race covers net elevation changes of almost 25,000 feet, makes use of 12 aid stations to track progress and help injured participants, and takes place over 19 hours. While the steep hills and valleys provide an extra challenge for runners, they also create severe limitations on communications.

In September 2020, FirstNet deployable assets provided critical voice and data connections where they would otherwise not have been possible. The FirstNet network enabled the aid stations to speak with each other and the operations center in real time to track and report injuries and missing runners. First responders at the operations center could watch their peers' position on a GPS display and provide directions if they became lost en route to help injured runners. Previously, the race and its support staff would not have had a connection to the outside world, but, with deployables from FirstNet, first responders were able to remain in contact with County dispatch for routine business. In a location intentionally selected for its difficult terrain, first responders called on FirstNet and had a custom and dedicated communications network ready to support them.

James Mullen Jr.

FirstNet deployable assets provided critical voice and data connections where they would otherwise not have been possible at the Worlds End Ultra Marathon.

Staff from the FirstNet Authority worked closely with local and state first responders, event planners, and AT&T contractors. Federal staff worked to support event planning, deployment, and after-action reviews. FirstNet Authority staff regularly take an active role in helping to plan, manage, and conduct after-event reviews to ensure quality of service, share lessons learned from prior events, and to gain experience they can share with peers who support other communities to improve first responder communications.

Project Hoosier Safety: Apps Improve Communications and Reduce Costs

The **Indiana Integrated Public Safety Commission** has led the way in innovating and integrating land mobile radio (LMR) service with FirstNet's cell and data service. Utilizing the LMR to Long Term Evolution (LTE) application, they can make the two systems interwork. This solves many daily communications challenges such as a police officer stationed at a school or court, inside of a brick or stone building, where they would normally lose or have lower quality LMR connections. By routing their LMR voice through Wi-Fi and the network system, these officers can maintain high quality and reliable communications, whether they are inside or outside.

This innovative integration of traditional and modern communication tools benefits the approximately 90,000 users of the State's integrated system, and in doing so enables them to better serve and respond to the needs of their communities. Additionally, the use of LTE allows the creation of as many subgroups of users who need to communicate with each other as needed, without the historic limits of radio frequency congestion.

An officer with Tippecanoe County Sheriff's Office in Indiana uses FirstNet on his smart phone.

In addition to improving communications, this innovation has the potential to save millions of dollars across Indiana according to State projections. Historically, administrative, support, and other functions would require very expensive radios to listen, track, and support field operations. Utilizing a solution that provides interworking between LMR and LTE means that these staff can simply use a lower-cost FirstNet device.

Jonesboro Tornado

When a violent tornado hit **northeast Arkansas** in March 2020, local communities had little time to prepare. There were only 14 minutes from the time that the National Weather Service issued a tornado warning to when the storm touched down in Jonesboro. The EF-3 tornado intensified rapidly, growing to 140 miles per hour and 600 yards wide as it sped over a path of 12.5 miles in **Craighead County**. The tornado caused major destruction to homes, businesses, and a shopping mall. Vehicles were mangled, the local airport damaged, and a nearby train derailed. Despite the wreckage, FirstNet kept first responders connected and communicating throughout the storm and its aftermath.

First responders from across the region came together to respond after a violent tornado hit northeast Arkansas in March 2020.

First responders from across the region came together to respond after the storm. Many were already FirstNet users, including the **City of Bay** police and fire departments. Subscribers since 2018, they have long understood the benefits of FirstNet's capabilities and the importance of interoperable communications during incidents. Two years after joining, they were able to appreciate the network's reliability and performance even during a major natural disaster.

"After the tornado passed, [the area] was inundated with first responders from all over. My FirstNet service was never interrupted, no dropped calls or call failure, and the internet was spot on," said City of Bay Chief of Police Paul Keith.

Because of forethought and planning, first responders in Craighead County were prepared to respond and communicate during the storm. They were also prepared because of a prevailing commitment to collaboration among the community's public safety agencies, the FirstNet Authority, and AT&T.

"The fire and police department integrated together. We depend on each other, so we need that communication to be able to talk to one another," said Chief Paul. "FirstNet and AT&T from the get-go have been super. Anytime we had any kind of question or comment, they're always there to listen and always have an answer for us immediately."

For every state, AT&T assigns a liaison to coordinate with the state-level emergency operations center to prepare for any

events or disasters. Setting up these partnerships in advance allows for AT&T to understand the local needs and to provide technology that fits best. Establishing working relationships beforehand also helps things to run smoothly when disaster strikes, and responders on the ground know who to contact in an emergency. Similarly, the FirstNet Authority has a public safety advisor for each state and territory who works closely with public safety agencies to collect feedback and capture lessons learned about their experiences using the network. This information is used to help better understand how public safety is integrating broadband communications into disaster response.

"Coordination, staging resources, basically just figuring out what you need and where you need it is a huge part of the initial response," said Craighead County Deputy Sheriff Dustin Norwood. "FirstNet built by AT&T truly impressed me during the hours after the response."

Cameron Parish, Louisiana: Inaugural Deployment of FirstNet One

FirstNet has relied on a fleet of 72 deployable assets to provide service during expected and unexpected events. In August 2020, FirstNet prepared and staged deployables as Hurricane Laura, a Category 4 hurricane, moved towards the Gulf Coast. Among those assets was FirstNet One, FirstNet AT&T's 55-foot aerostat (blimp). As Hurricane Laura moved north, first responders moved quickly and FirstNet deployables were moved in to set up a temporary cell network to support first responders.

The FirstNet One 55-foot aerostat joined the nationwide FirstNet deployable fleet.

For the first time, FirstNet One was used to support disaster recovery. Flying at up to 1,500 feet, FirstNet One can provide voice and data services over a large area, doing the job of multiple ground-based deployables. First responders noted that in the aftermath of Hurricane Laura, FirstNet One and other deployables provided them with the only available network. FirstNet One provides

a new way to support first responders and communities through a prolonged recovery operation. It also represents a force multiplier as it covers such a large area with service that multiple other resources can be redeployed to other communities. In a year when our nation has seen multiple simultaneous wildfires and hurricanes in addition to a pandemic and other routine needs, FirstNet One is an example of FirstNet's commitment to building a truly national service to support public safety.

Kansas City Hosts a Victory Parade and Tests FirstNet

When the Kansas City Chiefs won the Super Bowl in 2020, over one million fans gathered for a championship parade and rally. Kansas City's public safety agencies spent weeks preparing to ensure their teams were ready to communicate amidst large crowds and an influx in emergencies.

Kansas City's public safety agencies used FirstNet to keep more than one million football fans safe during a celebratory parade.

An important part of the city's preparation included FirstNet. Michael Binder, Senior IT Analyst for **Kansas City**, tested the FirstNet network before the event and during the parade while working in the Kansas City Emergency Operations Center (EOC). FirstNet support remained on site to assist staff with technology and training for their staff.

"We deployed 80 FirstNet devices to our public safety officials and tested voice calls, sent and received video, and verified push-to-talk functionality," Binder said about the city's preparation. "The FirstNet team was in the EOC giving us hands-on support. And what better time to put something like this to the test than a Super Bowl Champions parade." FirstNet's priority and preemption are critically important when crowds of one million, or even a few hundred, all try to use voice and data services simultaneously. During these moments of incredible stress on commercial networks, first responders can utilize priority and preemption on FirstNet, for example, to communicate about a missing child, share photos of a suspicious bag, or direct fire trucks to an emergency.

Supporting Public Safety on New Year's Eve

On New Year's Eve 2019, FirstNet deployed a SatCOLT to **Las Vegas, Nevada** to provide support to the City's command center. New Year's Eve can be a challenging time for public safety as they contend with crowds, increased injuries, and dangerous drivers. On top of those issues, the approach of midnight can cause a major strain on commercial communication networks. Calls to friends and family as well as pictures and videos posted to social media of fireworks or countdowns can overwhelm capacity.

With the FirstNet SatCOLT on-site to boost coverage, Las Vegas public safety could feel confident in the capacity of their network to support any necessary response despite the potential for increased calls and communications. With priority and preemption, they knew that even with the highest surge in usage, they would have a clear path and not need to compete for signals or access with the celebrating crowds.

Working with Rural First Responders

Reaching rural America has always been a top priority for the FirstNet Authority as we build a nationwide public safety broadband network. When life-threatening emergencies happen in remote or wilderness areas, public safety benefits from FirstNet's wireless broadband connection that allows interoperable communication with their fellow responders, dispatch, and the citizens they serve.

As mandated by Congress, the FirstNet Authority is committed to ensuring the network continues to serve rural public safety's broadband communications needs. For instance, in FY 2020, the FirstNet Authority visited **Yamhill County, Oregon** to celebrate the launch of a FirstNet cell site that will boost connectivity in the area. Staff spoke with members of the neighboring **Washington County Sheriff Office (WCSO)**, who are using FirstNet on their cell phones and their mobile data computers, to hear their feedback about the network buildout and learn more about their operational needs as they protect a community of 600,000 people spread out in mostly rural areas.

Patrol Lieutenant Jim Wheaton has been with the Washington County Sheriff Office for 16 years. As a deputy, he knows what it is like to face communications obstacles due to insufficient coverage or capacity in the region. He reflected, "One of those challenges is the terrain that our deputies are operating in. For example, in Washington County, we have a large portion of our county, which is mountain ranges and forestry and there can be some gaps in communication. What FirstNet does for us is gives us the ability to stay connected."

Washington County Sheriff Patrol Lieutenant Jim Wheaton uses FirstNet to stay connected.

Lieutenant Wheaton added that using FirstNet to support their smart phones not only allows deputies to communicate with each other, but also with the citizens themselves. He said, "What FirstNet does is it gives us the ability to put the end user, which is the people, first and so we're able to get out there and get the job done and get it done efficiently and effectively by good solid communication." Law enforcement officers with access to a FirstNet-enabled cell phone can easily reach people outside of the radio system and have an alternate way of reaching their fellow officers and leadership in an emergency. WCSO's 9-1-1 call screening and dispatch functions are handled by the Washington County Consolidated Communications Agency. Assistant Director Jennifer Reese stated that they appreciate the reliable connectivity of the mobile data computers inside WCSO vehicles. Having continual access to dispatchers, computer-aided dispatch, and other mission-critical data enhances operations in such a geographically- diverse county.

FirstNet Supports Wildfire Responses

In the final five months of FY 2020, wildfires grew in size and number across the western United States. As part of its disaster response, FirstNet positioned deployable assets and generators in affected areas. When called upon for assistance by local public safety agencies, FirstNet deployables were used at least 53 times. Firefighters and public safety used these mobile solutions to substitute for towers consumed or damaged by the fires and to provide service in remote areas where it would usually not be available.

Connectivity is important to firefighters as they battle a moving and changing threat. Network connectivity allows command centers to track the location of firefighters and assets against maps of the fire. Reliable connectivity can also provide real-time weather updates, communication with command centers and resources, and of course, enable communication among those in the fire's immediate path. FirstNet devices and apps provide firefighters and

A FirstNet SatCOLT provided coverage to support communications between first responders fighting the Bertschi Road Fire.

emergency managers with cutting edge tools to reduce risks and increase the safety of the community and firefighters.

FirstNet Devices and Apps Modernize Routines

FirstNet has created a marketplace for public safety applications (apps) and devices. While first responders can use any commercial app, the FirstNet App catalog offers apps that go through a rigorous vetting process for security and efficacy. Police departments are using these public safety devices, apps, and other technology solutions to improve policing in a wide variety of ways that improve efficiency and record keeping, allow officers access to data previously only accessible in their car, and to take photos and record audio to aide in investigations. The following are just a few examples.

The Portland Oregon Police Bureau issued smart phones to officers and installed apps with mobile capabilities for e-citations, community engagement, access to Criminal Justice Information System (CJIS) through multi-factor authentication, and Computer Aided Dispatch (CAD) integration.

The Hillsdale County Sheriff's Office in rural Michigan uses FirstNet smart devices to increase field connectivity.

The Green Bay Wisconsin Police Department serves a city of 105,000. During a typical football season, 81,000 football fans gather at Lambeau Field, home of the Green Bay Packers, causing cellular congestion and preventing officers from using their phones – until they switched to FirstNet in 2019. Now on game day, officers use FirstNet to access operational plans, threat assessments, online ejection forms, stadium dispatch, and a geolocation tracker for officer location. FirstNet helps integrate this technology to keep everyone in these multi-jurisdictional events informed. The Green Bay Police Department also uses FirstNet in everyday operations. For example, they use a mugshot app to check IDs, a mapping app to access school floor plans and live video, and an online form to notify city leaders and command staff of severe weather.

Riviera Beach Florida Police Department officers use their smartphones to access city camera footage, take and submit pictures of crime scenes, and record sworn statements. With FirstNet, these functionalities are always available to officers, during routine business, emergencies, or disaster response.

The Green Bay Police Department has integrated their FirstNet devices with mapping technologies and a mass communications incident command system.

Riviera Beach Police Chief Michael Madden has seen the benefit of mobile technologies. "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," he said. "It bridges many gaps on the technology forefront and drastically improves communications between first responders and with our community at large."

As these examples demonstrate, public safety continued to see significant benefits in FY 2020 from using FirstNet to serve the American people.

The FirstNet Authority Roadmap, launched at APCO 2019, uses feedback gathered from public safety to identify priorities for advancing the FirstNet network.

FIRSTNET AUTHORITY ROADMAP *AND* INVESTMENTS

The Roadmap

With its original publication in August 2019, the Roadmap reflects stakeholder input and expresses areas of focus for the FirstNet Authority in evolving and advancing the FirstNet network. In FY 2020, the FirstNet Authority embarked on an effort to update the Roadmap to reflect new research and current stakeholder input. Publicly released in October 2020, the updated version maintains the original six domains: Core, Coverage, Situational Awareness, Voice Communications, Secure Information Exchange, and User Experience. However, revisions to the primary underlying relevant technologies and the domain priorities reflect the on-going evolution of public safety needs. Figure 1 identifies the priorities within each Roadmap domain.

As with its creation, the FirstNet Authority based updates to the Roadmap deliberately on stakeholder input and recent research. Since the release of the original Roadmap, the FirstNet Authority has participated in nearly 1,300 engagements with first responders and hundreds of discussions with industry, as well as executed substantive engagement-driven polling and data collection.

While the pandemic impacted in-person discussions, virtual engagement continued unabated. In addition to typical public safety engagements, the FirstNet Authority conducted a series of more in-depth and targeted research efforts to further hone the Roadmap focus areas. These efforts included:

- A series of interviews with academic and industry-leading technologists focused on long-term technology trends,

- An analysis of applicable research publications and trade press transcending law enforcement, fire service, EMS, emergency communications, and emergency management, and

- A rigorous technology prioritization survey of first responders.

These efforts focused on the current and future impact of communications technology on first responder effectiveness as well as emerging technology trends. Near-term, first responder priorities include coverage improvement, mission-critical services, and LMR-to-LTE interconnectivity. First

Figure 1: Roadmap Domains and Updated Priorities

CORE

- Generational Updates (e.g., 4G to 5G)
- Priority and Preemption, including Uplift on 5G
- Mission Critical Services Platforms and Enablers on 5G
- Network Security on 5G

COVERAGE

- Outdoor Coverage Expansion
- Indoor Coverage Expansion
- Unique Coverage Solutions Advancement

SITUATIONAL AWARENESS

- Locate and Present Personnel Location
- Location Services Integration

VOICE COMMUNICATIONS

- Operationalize FirstNet Push-to-Talk
- Active Role in Standards
- Critical Features

SECURE INFORMATION EXCHANGE

- Database Integration
- Application Integration

USER EXPERIENCE

- Mission-Enabling Applications
- Mission-Capable Devices

Miami-Dade County Fire Rescue used FirstNet to support operations during Super Bowl LIV.

responders prioritize the concrete items they see and use on a daily basis that impact today's operations. Technologists, who naturally have a different focus and were specifically asked about future trends, suggest real-time data analytics and non-intrusive user communications, among others, as the most promising technologies long-term.

As a result of these efforts, the 2020 Roadmap includes updates to priorities and focused technology areas, refinement in "public safety's take" on each domain, and updates to the FirstNet Authority's "key takeaways." All updates are centered on those items with the most potential to improve first responder effectiveness.

The Roadmap will continue to be the FirstNet Authority's guide in application of its resources to the most promising and most impactful priorities, both short- and long-term.

Initial Investments

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 (2012 Act) requires the FirstNet Authority to reinvest funds back into the FirstNet network to improve the NPSBN for public safety.

In FY 2019, the FirstNet Authority developed 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 investments, 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 FirstNet Roadmap.

In June 2020, the FirstNet Authority Board approved the first set of investments: (1) to upgrade the NPSBN network core to be 5G-ready and (2) to further expand the dedicated fleet of deployable assets. Specifically, the Board approved $218 million for the FirstNet Authority to invest in:

1. **Initial upgrades to enable 5G network capabilities.** Evolving the network to 5G is expected to be a multi-phase effort, beginning with upgrades to the dedicated FirstNet network core. The physically separate, redundant and highly secure network core is foundational to FirstNet. It acts as the nervous system of the network, separates all public safety traffic from non-public safety user traffic, and enables differentiated services for network users. In the future, 5G is expected to drive major increases in the quantity and types of connected devices for FirstNet users.

2. **Expanding the fleet of FirstNet deployables to enhance network coverage and capacity for public safety during emergencies and events.** In 2020, public safety turned to the FirstNet deployables for additional support in hundreds of operations around the nation. These assets supported public safety communications, such as during the COVID-19 response, at large events, emergencies, and responses to disasters, including wildfires, tornadoes, and hurricanes. The FirstNet fleet currently includes 72 land-based deployables such as SatCOLTs, plus three airborne Flying COWs™ (Cell on Wings), and the FirstNet One aerostat. The Board's actions will grow the fleet to help meet the increasing demand for these assets from public safety.

These investments are a direct result of Roadmap priorities in the Core and Coverage domains and represent the first strategic investments toward advancing the network beyond its contractual baseline and responding to first responders' evolving operational needs.

STAKEHOLDER OUTREACH

Since its inception, the FirstNet Authority has prioritized stakeholder engagement to ensure the NPSBN reflects the operational needs and objectives of the public safety community – for which the network was created. The FirstNet Authority's Public Safety Engagement (PSE) team regularly engages with public safety across disciplines and levels of government: state, local, federal, and tribal. With staff drawn from the public safety community (including law enforcement, EMS, emergency communications/9-1-1, emergency management, and fire service), as well as dedicated and specialized staff to engage with tribal governments and federal government agencies, the PSE team engages with public safety in the field to receive feedback and to share information with public safety professionals.

In FY 2020, the FirstNet Authority conducted 1,250 engagements with public safety stakeholders in all 56 states, territories, and the District of Columbia. As discussed above, many of these engagements informed the update to the FirstNet Authority Roadmap, paving the way for future investments in the network.

The FirstNet Authority and our NPSBN contractor, AT&T, also regularly provided briefings and updates to state

government leaders on deployment of the FirstNet network in their state during FY 2020. The FirstNet Authority has taken steps to improve transparency with state leaders, and all our stakeholders, including expanding the detail of information that we can share with key stakeholders. Additionally, the FirstNet Authority has been working with AT&T to improve the consistency of briefings on progress made towards achieving the goals of the individual state plans and will continue this work in the future.

In FY 2020, the FirstNet Authority updated its website with a new form where public safety users can submit feedback on their experience using the network. The FirstNet Authority's website also lists the name and contact information for each state, territory, and tribal nation's point of contact to ensure local users have access to the staff that serve them.

Public Safety Advisory Committee (PSAC)

As required by the 2012 Act, the FirstNet Authority established a Public Safety Advisory Committee (PSAC) to assist the FirstNet Authority in carrying out its mission. The

PSAC consists of 44 members representing all disciplines of public safety as well as state, territorial, tribal, and local governments. The PSAC also has at-large members and federal members. In FY 2020, the PSAC updated its charter to add two spots to its Executive Committee (EC) and invited the National Association of EMS Physicians (NAEMSP) to its membership. These updates enabled a more holistic PSAC leadership team from a wide variety of public safety disciplines and brought a new network user perspective to the PSAC.

During FY 2020, the PSAC conducted 35 engagements, including: an all-day in-person meeting with staff, leadership, Board members, and AT&T; bi-monthly webinars addressing product and network developments with staff experts; and monthly leadership and Tribal Working Group teleconferences. These regular meetings enabled strong working relationships among PSAC members and the FirstNet Authority to discuss and address topics such as: disaster response and deployable assets; the FirstNet Core; FirstNet Push-to-Talk (PTT); and Identity, Credential, and Access Management (ICAM) capabilities. Throughout the year, the FirstNet Authority Roadmap guided PSAC activities, as topics and technologies were specifically and strategically selected from those called out in the Roadmap's priorities.

Tribal Government Engagement

Recognizing the unique needs and requirements of tribal governments and public safety agencies, the FirstNet Authority has a Tribal Working Group (TWG) within the PSAC that is led by dedicated staff. The TWG is made up of delegates appointed by national and regional tribal associations and tribal governments. The Chair of the TWG is a PSAC EC member appointed by the National Congress of American Indians. The TWG also has a liaison from the FirstNet Authority Board. The TWG, which represents diverse geographic and disciplinary interests in tribal public safety, was established to provide advice on formal tribal consultation, outreach, education, and inclusive engagement strategies in Indian Country. The intent is to inform and involve federally recognized tribes as it relates to their use of the FirstNet network.

The FirstNet Authority has continued to emphasize engagement with tribal stakeholders to address their public safety communications challenges and needs. During FY 2020, the TWG met monthly via teleconference, and focused these meetings on Roadmap domain topics and associated data collection in an effort to help guide the advancement of the FirstNet network in tribal communities.

Rhode Island emergency management agencies tested FirstNet's capabilities during an exercise at TF Green International Airport.

CONTRACT *AND* DEPLOYMENT OVERSIGHT

Contract Overview

One of the FirstNet Authority's primary responsibilities is to manage and ensure the successful execution of the contract with AT&T to build, deploy, and operate the FirstNet network. Signed in March 2017, this 25-year indefinite-delivery indefinite-quantity (IDIQ) services 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 requirements over time.

Under the contract, AT&T must build, operate, maintain, and enhance the network for 25 years while achieving public safety user adoption targets and maintaining a minimum number of 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, fulfilling Congress's vision that the Authority be self-sustaining.

The FirstNet Authority has issued seven task orders under the IDIQ contract:

- **Task Order 1 (TO1)** required the development of a secure platform (the state plan portal) that delivered individual state plans to the states, territories, and District of Columbia (referred herein as "states").

- **Task Order 2 (TO2)** required development of the individual state plans. These plans detail the Radio Access Network (RAN) deployment and operations for each of the 56 states, territories, and District of Columbia. While the state plans were delivered by AT&T and TO2 closed out (March 2018), the state plan portal (TO1) is still available (through the initial five-year buildout to March 2023) to allow governors and designated state stakeholders to access their respective plans. The state plans were developed in consultation with state officials and approved by the state's governor, a key aspect of the FirstNet Authority's focus on fostering a partnership with public safety and local authorities.

- **Task Order 3 (TO3)** 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 ecosystems for the network. The FirstNet network has its own core, which processes and secures FirstNet users' traffic separate from the AT&T commercial network. The core is a critical piece of physical infrastructure that serves a telecommunications network in a way similar to a server or router for an office or home, respectively. AT&T deployed the FirstNet core in March 2018 and continues to operate and maintain it under the terms and conditions of the IDIQ contract and TO3.

- **Task Order 4 (TO4)** requires AT&T to deploy the network's Band 14 coverage nationwide (including the territories), while fulfilling the specific commitments made in the individual state plans. TO4 contains the requirements associated with constructing the RAN, which consists of cell towers, sites with RAN infrastructure, 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 deployables), in addition to access to at least 300 other transportable cellular assets in AT&T's commercial fleet that can provide supplementary network coverage when needed.

- **Task Order 5 (TO5)** requires equipment and connectivity for the FirstNet Innovation and Test Lab, located in the FirstNet Authority's Boulder, Colorado office.

- **Task Order 6 (TO6)** requires AT&T to expand the FirstNet deployable solution acquired through TO4. TO6 includes adding more SatCOLTs to the FirstNet dedicated deployable fleet, as well as adding new deployable form factors to provide additional flexibility and variety to the services offered. TO6 further requires AT&T to examine their deployable storage and response plans to ensure the deployable fleet is optimized to meet the response requirements per the terms and conditions of the IDIQ contract and TO4. TO6 also created a new quality assurance performance metric to ensure that deployables are meeting the contractually defined response times. TO6 is one of two reinvestment

task orders awarded in June 2020.

- **Task Order 7 (TO7)** requires AT&T to upgrade the FirstNet network so public safety begins to experience the throughput benefits of 5G while maintaining the overall FirstNet user experience. TO7 enables a smooth transition from 4G to 5G by leveraging some of the existing 4G network systems. Future task orders are required to complete a full migration from 4G to 5G. TO7 is the second of two reinvestment task orders awarded in June 2020.

Task Orders 1, 3, 4, 5, 6 and 7 are ongoing. TO2 was completed in March 2018 after all 56 governors (or appropriate territorial counterparts) opted into their respective customized state plans.

Network Deployment, Operation, and Maintenance

Under the IDIQ 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 states opting into the FirstNet deployment, the FirstNet Authority has established a single, interoperable nationwide network as required by Congress.

At the end of FY 2020, the initial network build was approximately 80 percent complete. AT&T has met all

contractual milestones – including rural and non-rural coverage requirements and adoption targets – and continues to deliver key services to the public safety community. Additionally, as discussed above, the FirstNet Authority has a process through which potential investment opportunities to further improve the FirstNet network are identified and evaluated – the first such investments were approved in FY 2020.

Measures for Success

In addition to key contractual deliverables, the FirstNet Authority uses standardized program management tools and contractual processes to track and evaluate all activities associated with the FirstNet network contract and program. The FirstNet Authority has developed rigorous contract management and administrative processes and tools used since the execution of the IDIQ contract to track network-related contractual activities. As a result, the FirstNet Authority can minimize and mitigate risk while continuing to improve the network. The FirstNet Authority continued to utilize these measures in FY 2020 to ensure the progress of the NPSBN.

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:

Figure 2: Task Order Timeline
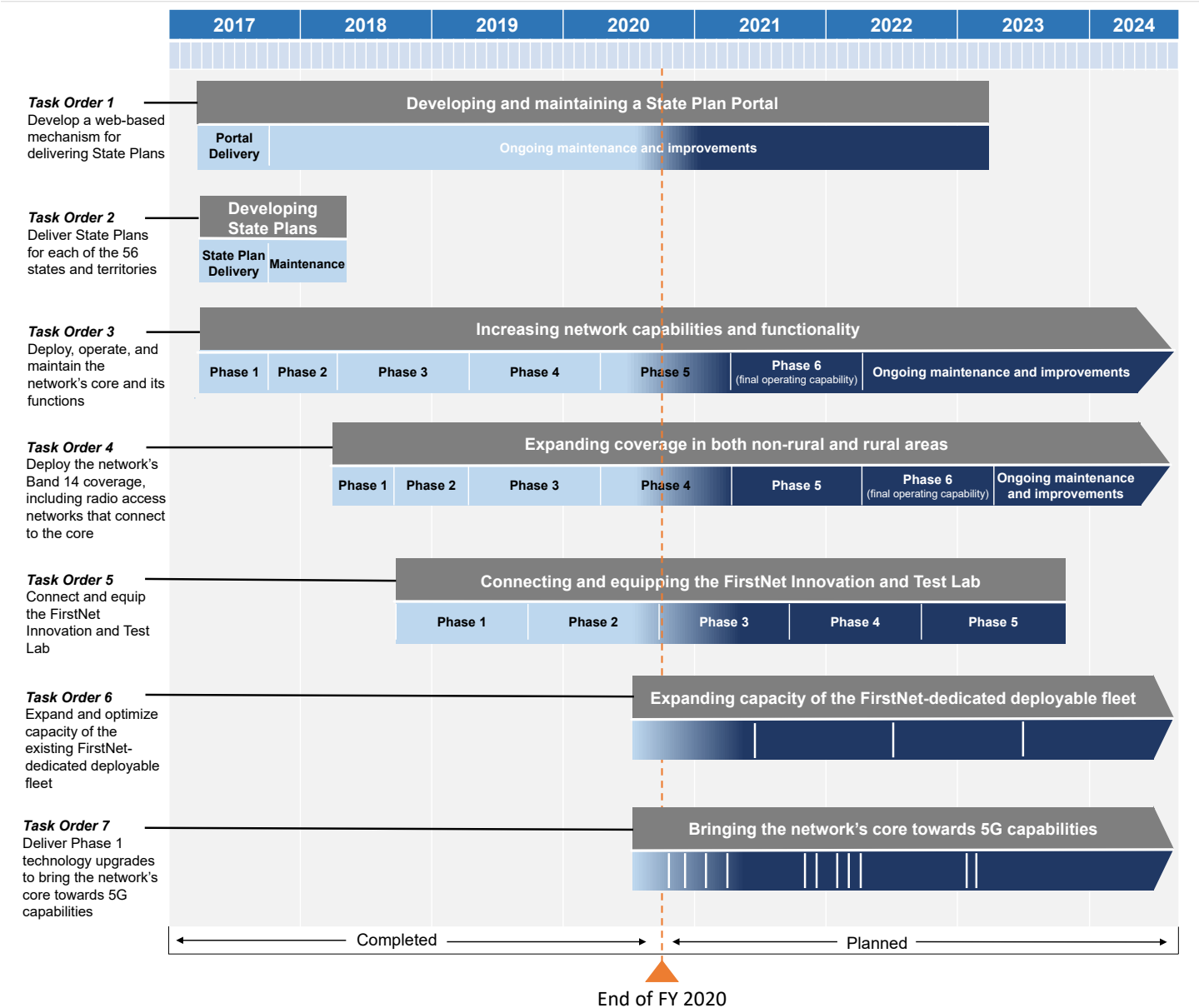
- Direct telecommunications **standards development** organization engagement to move industry and interoperability for public safety forward (examples include 3rd Generation Partnership Project (3GPP) and Telecommunications Industry Association (TIA) standards contributions);
- **Devices** and **applications** 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
- **Innovative partnerships across government** to stimulate the public safety ecosystem.

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 available commercial standards makes it easier for device manufacturers to participate in the public safety device market, thereby increasing competition and lowering device costs for public safety users.

The FirstNet Authority continues to prioritize the inclusion of public safety requirements in standards development. Our efforts are particularly focused on 3GPP, a partnership 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, the FirstNet Authority has been successful at ensuring that 3GPP specifications address the needs of first responders.

The FirstNet Authority has employed a two-pronged focus in this work: 1) developing and evolving global specifications for mission-critical services (MCS) such as mission-critical push-to-talk (MCPTT), video, and data (MCData); and 2) developing specifications for interworking broadband MCS with legacy public safety technologies, such as LMR. The current specifications for MCS were originally targeted for LTE technologies. The FirstNet Authority is engaging in efforts to evolve these standards to support 5G technologies as well.

During FY 2020, the FirstNet Authority worked together with suppliers and global public safety partners to finalize updated 3GPP standards. Of particular interest to public safety were features to support MCPTT enhancements, such as new features for group and private calls, as well as improvements to prioritize emergency or imminent peril priorities. MCData enhancements included the addition of the MCData Message Store capabilities in the network and new features for group messaging. 5G radio enhancements included foundational support for Direct Mode capabilities based on Vehicle-to-Everything (V2X) off-network

capabilities as well as 5G support for the Internet of Things (IoT), while 5G core network enhancements included support for Quality of Service, Priority, and Preemption (QPP) in the 5G core network and support for location services over 5G.

The FirstNet Authority participated in standards development for other features essential to public safety, including new 5G Direct Mode capabilities to support public safety needs, enhanced Multicast Broadcast Services for 5G (5MBS), and 5G running over satellite systems. As a result of our efforts, these critical public safety features are now formally reflected in 3GPP standards. The 5G Direct Mode feature will provide first responders with the capability to communicate when they are beyond network wireless coverage. 5MBS 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 LTE Multimedia Broadcast Multicast Service (MBMS) or the 5MBS capability, each communication group will utilize the radio resources of about two people communicating with one another, regardless of the number of users in the group. As we move to video group communications (which consumes significantly more radio bandwidth than voice), this feature will be even more important for conserving radio resources. Additionally, running 5G over satellite systems could offer coverage extension for first responders in areas that do not have terrestrial wireless coverage.

In FY 2020, the FirstNet Authority also continued working with 3GPP, the Alliance for Telecommunications Industry Solutions (ATIS), and TIA to support standards work involving the interworking between LTE-based MCPTT systems and legacy LMR-based systems, such as Project 25 (P25) trunking and conventional systems. 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. As of June 2020, 3GPP now contains the standards for the LTE interface to support MCPTT/LMR interworking. In addition, the ATIS and TIA standards to support the LMR side of interworking have been completed.
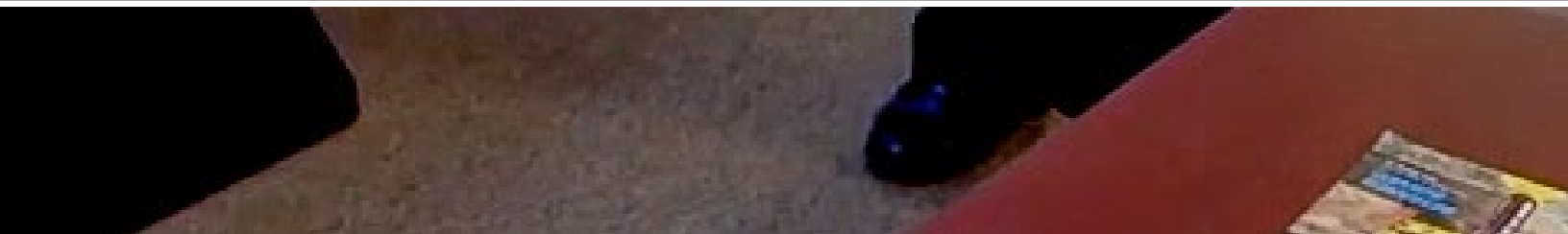
Devices

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. The National Institute of Standards and Technology (NIST) is required by law to ensure the development of a list of certified devices for use on the FirstNet network.

In FY 2020, the FirstNet Authority continued working closely with NIST to build upon the established device review process. Throughout the year, the collaboration with NIST resulted in

For Philip Mann, Public Works Director for the City of Gainesville in Florida, access to FirstNet helps them work more effectively when clearing the way for other responders.

11 updates to this list. As a result, by the end of FY 2020, the number of device manufacturers contributing to the FirstNet network device ecosystem grew from 27 in FY 2019 to a total of 41 offering over 200 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 "FirstNet Ready" (Band 14-enabled) devices from a wide range of leading manufacturers represents a significant accomplishment that benefits network users.

Public safety requires specialized devices because equipment designed for emergency response has different functional requirements than commercial devices. Besides technical details, such as the ability for responders to communicate between LTE and LMR, public safety entities have other daily needs that must be considered. For example, when an ambulance or medical service considers what devices to use, they must consider that the device will be sanitized with harsh chemicals many times a day. Among the inventory of FirstNet-approved devices are options that have been designed to withstand the level of sanitization required in a medical environment.

In addition, the FirstNet Authority has continued to collaborate with AT&T on evolving the device, accessory, and IoT ecosystems. The collaboration resulted in several unique devices being added to the approved FirstNet device portfolio. Notable additions in FY 2020 include:

- A ruggedized handheld device that natively supports MCPTT;
- Vehicle mounted devices that support transmissions at high power to effectively expand FirstNet's network coverage;
- Multiple foldable smartphones;
- Several smartphones that are capable of supporting 5G; and
- Several smartwatches.

Applications

FY 2020 was a year of growth for the application (app) ecosystem, with the number of FirstNet certified apps growing to over 150. Collectively, the catalog now includes solutions supporting seven branches/disciplines and eleven categories. The branches/disciplines include: law enforcement, fire and rescue, wellness and safety, hazmat, dispatch, emergency management, and critical

infrastructure. The eleven categories include: device security, secure connections, cloud solutions, CAD solutions, video surveillance, forensic intelligence, public safety community, cyber security and fraud detection, in-building coverage and mapping, public safety (communication) tools, and situational awareness and detection.

FirstNet Push-to-Talk

The FirstNet Authority shares what we learn from public safety engagements with our NPSBN contractor, AT&T, as a collaborative effort to improve the network and its services for public safety. For instance, the FirstNet Authority actively engages with the public safety community in early beta trials of new FirstNet products to collect feedback and lessons learned to help hone those products more specifically toward first responder needs.

In FY 2020, the FirstNet Authority followed this process to support AT&T as they developed FirstNet Push-to-Talk (FNPTT), the first nationwide, mission-critical standards-based service of its kind ever released in the United States. This product focuses on augmenting Land Mobile Radio (LMR), rather than replacing it, giving responders additional ways to expand their communications capabilities.

The FNPTT Release 1.0, released in March 2020, delivered initial foundational capabilities for public safety including: one-to-one calling; group calling; ability to declare an emergency and preempt other PTT calls; text messaging to groups or individuals; and mutual aid capabilities. Release 1.0 was followed in May by Release 1.5 that introduced a downloadable application that could be installed on Android devices such as the Samsung S9 and S10. We continue to support the development of future upgrades that will expand offerings and boost the ecosystem of devices able to support these applications.

Interworking with existing LMR systems is key to making FNPTT complement an agency's existing communications plans. LMR to FNPTT via Radio over Internet Protocol (ROIP) interfaces is expected to be available for talk-group interconnectivity between FNPTT users and LMR users in FY 2021. The more sophisticated interfaces that deal with demands of larger systems and larger numbers of talk-groups are scheduled for a future release.

During FY 2020, the FirstNet Authority successfully tested the FNPTT solution with public safety agencies across the country. For example, Captain Guy Patterson of the Cranford Police Department in New Jersey told us "Testing FirstNet PTT was an intensely promising experience, showing us the future capability, quality and performance, we can infuse into our response to enhance effectiveness and collaboration."

Baltimore City firefighters rely on FirstNet devices to stay connected in times of emergencies.

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 2020, FirstNet continued to expand this list of vendors with apps in the App Catalog to 58 and increase the number of available APIs to 26, attracting more brainpower from the software and app developer community to focus on creating new solutions for the public safety market.

Spectrum Management

The FirstNet Authority continued to actively manage and maximize the utilization of the 700 MHz Band 14 Public Safety Broadband Spectrum in support of the NPSBN deployment and operations. During FY 2020, the FirstNet Authority and AT&T conducted the technical assessment of 22 commercial experimental license applications and 19 federal entity spectrum use requests. These applications and requests sought access to FirstNet Authority-licensed Band 14 spectrum on a secondary, not-to-interfere basis in support of public safety wireless technology research, experimentation, and national defense training and readiness programs.

The FirstNet Authority's spectrum stewardship was also evident in the international arena. The FirstNet Authority continued to work closely with the Federal Communications Commission (FCC) and U.S. Department of State in their efforts to develop mutually beneficial long-term solutions for 700 MHz broadband spectrum sharing and utilization along the borders with Canada and Mexico. Under the leadership of the U.S. Department of State, these engagements have continued to move forward in a positive direction.

During FY 2021, the FirstNet Authority will also begin working with the FCC related to the renewal of its Band-14 spectrum license, which must be renewed in 2022. Renewal of this license is fundamental and essential to the continued operation of the NPSBN. The FirstNet Authority's enabling legislation does not provide for an automatic renewal; as a result, the FirstNet Authority must re-apply for the license to the Band 14 spectrum through the FCC in order to continue providing this dedicated spectrum to public safety.

Innovation: Accelerate R2 Network Challenge

In early FY 2020, the FirstNet Authority announced a collaboration with NIST and the Economic Development Administration (EDA) on the Accelerate R2 Network Challenge. This U.S. Department of Commerce-funded Challenge is designed to connect stakeholders in the disaster response and resiliency industries from across the country to accelerate the pace of technological innovation in the markets for:

- **Response innovation:** innovation in the communications, technology, and equipment first responders use when responding to disasters and events; and
- **Resiliency innovation:** finding new ways to build, protect, and connect networks and infrastructure to help communities recover and build readiness and resilience in the face of future disasters.

On July 1, 2020, EDA announced the selection of a public-private partnership to establish and operate the R2 Network, consisting of the following entrepreneurs, early stage investors, local government, and public safety stakeholders:

- RapidSOS,
- ResponderCorp,
- Orleans Parish Communication District, and
- the Western Fire Chiefs Association.

Together, along with the State of New Hampshire serving as a key strategic partner and collaborator, these partners will form a national, free-to-use, and self-sustaining platform that brings stakeholders together for a common goal: to support innovators and agencies in empowering first responders with the tools and technologies they need to stay safe and protect our communities.

The R2 Network Challenge is a $2 million total effort, with funding contributions of $750,000 from EDA, $250,000 from the NIST Public Safety Communications Research division, programmatic support from the FirstNet Authority, and a $1 million match commitment from the public-private partnership. This Challenge brings together expertise from across the Department of Commerce and stakeholders from outside the federal government. The R2 Network will be nationwide in scope, with regional innovation clusters supported by government partners and local agencies to test and pilot resources needed to adopt new technology.
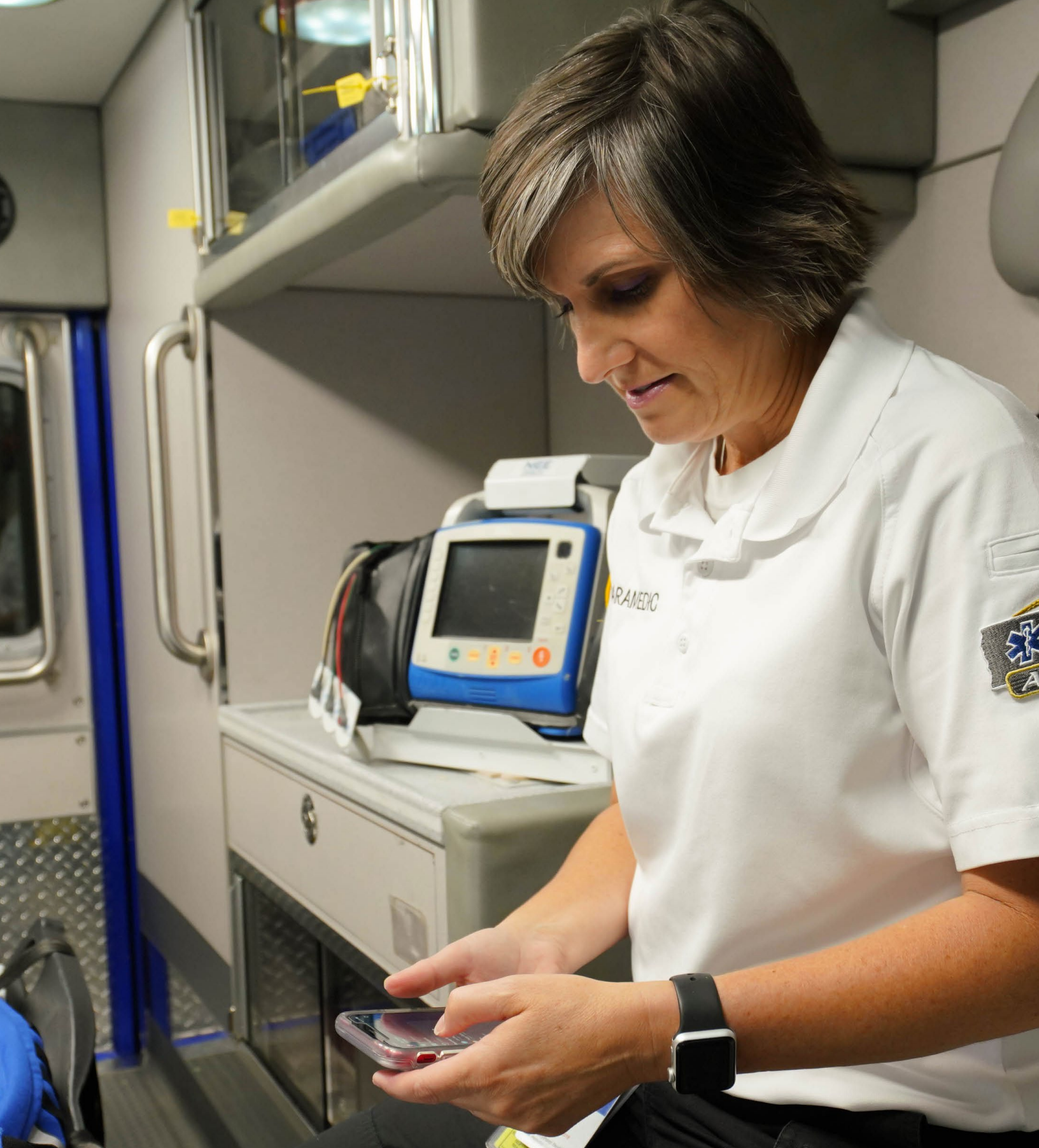
First responders from West Des Moines EMS in Iowa use FirstNet enabled apps and devices to improve patient care and response times.

FINANCIAL CONDITION

In Fiscal Year (FY) 2020, the FirstNet Authority continued its strong financial stewardship by achieving a clean financial statement audit opinion for the eighth consecutive year. Throughout FY 2020, funds were used to support our ongoing operations and execution of our strategic vision, which yielded network expansion and enhancements of the NPSBN. We incurred operating expenses during FY 2020 related to personnel compensation, contractual services for strategic and operational support, extensive stakeholder engagement, and update of the FirstNet Authority Roadmap. As of September 30, 2020, we had a cash balance of $3.4 billion.

The FirstNet Authority's audited FY 2020 Financial Report, including Independent Auditors' Report, is posted on the FirstNet Authority website at 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 15, 2020, the FirstNet Authority received $120 million from AT&T as the FY 2020 payment due under the contract, to fund FY 2021 operations.

Changes in Assets, Liabilities, and Net Position

The FirstNet Authority had $8.1 billion in total assets as of September 30, 2020, compared to $8.1 billion for FY 2019 offset by a $45 million, or 2.9 percent, increase in total liabilities. As a result, our net position decreased $53 million.

($ in Thousands)

As of September 30:	FY 2020 (Audited)	(FY 2019 Audited)
Changes in Net Position		
Total Assets	$8,080,424	$8,088,480
Total Liabilities	$1,537,378	$1,492,712
Net Position	$6,543,046	$6,595,768

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, 2020, the FirstNet Authority has expended $56.6 million of the originally authorized $100.0 million for administrative expenses. The agency spent $9.3 million on administrative expenses in FY 2020, which reflects a $300 thousand increase compared to FY 2019. As of September 30, 2020, we have available $43.4 million of the originally allocated $100.0 million for administrative expenses.

Representatives from Rhode Island public safety agencies used FirstNet-enabled devices to help manage communications between care teams and the emergency communications center during an airport emergency excercise.

CONCLUSION

The FirstNet Authority is proud of our work in FY 2020. In collaboration with our contractor, AT&T, and our federal, tribal, state, territorial, and local partners, FirstNet has made a serious contribution to supporting first responders across our nation. Congress created the FirstNet Authority to serve public safety's communications needs day-in and day-out – from routine daily operations to the most demanding emergency responses. During FY 2020, our nation's first responders worked tirelessly to help their communities in the face of enormous challenges.

The FirstNet Authority not only helped maintain and expand this critical resource during a historic year, but also creatively solved new problems, supported more agencies, made our first investments into the network, and held more than 1,250 engagements with first responders to ensure we continue meeting their needs. As we look to FY 2021 and beyond, we are prepared to support whatever challenges may come to public safety and continue to grow to serve more of the front-line responders who serve our communities.

We are grateful for the opportunity to submit this report of our FY 2020 work and accomplishments. The FirstNet Authority looks forward to continuing to work closely with Congress to extend and enhance public safety's network in the years to come.

Cell tower climbers ascend over a hundred feet to conduct tower inspections and maintenance service on a daily basis.

APPENDIX A: FIRSTNET FY 2020 BOARD
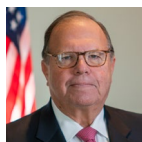
Edward Horowitz (Chair)
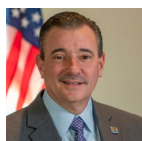Venture Capital/Technology Executive

David Zolet
CEO of CentralSquare

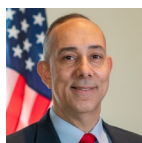**Richard Stanek (Vice Chair)**
Former Sheriff, Hennepin County, Minnesota

Russel Vought
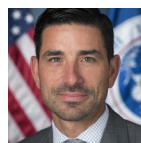Director of the Office of Management and Budget

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

Jessica Renier
Office of Management and Budget Designee

Welton Chase Jr.
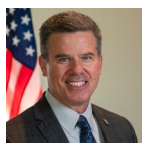Business/Technology Executive
Brigadier General (Ret.)

Chad Wolf
Secretary of the Department of Homeland Security (Acting)

Neil E. Cox
Telecommunications/Technology Executive

Vince DeLaurentis
Department of Homeland Security Designee

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

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

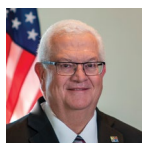**Billy Hewes**
Mayor, Gulfport, Mississippi

Darrin Jones
Department of Justice Designee

Robert T. "Tip" Osterthaler
Business/Technology Executive
Brigadier General (Ret.)

Karima Holmes
Director, Office of Unified Communications District of Columbia

Paul Patrick
Division Director, Family Health and Preparedness, Utah Department of Health

Matthew Slinkard
Executive Assistant Chief, City of Houston Police Department

Notes: FirstNet Board Members as of September 30, 2020 – A current list of FirstNet Board members is located at www.firstnet.gov/about/board/members.
Robert T. "Tip" Osterthaler started as Board Chair on August 20, 2020; Edward Horowitz served until August 19, 2020; Richard Stanek resigned on August 19, 2020; Richard Carrizzo named the Vice-Chair in September 2020.

A ribbon cutting event for a new Tilghman Island Maryland cell tower was just one of many across the country.

The FirstNet Authority was established in light of 9/11 to lead the creation of a dedicated nationwide broadband network using spectrum set aside for the public safety community (Band 14). Through a combination of government, commercial, and public safety partnerships, we are committed to delivering a network and supporting ecosystem of apps, devices, and capabilities that are innovative, reliable, accessible and secure. By modernizing public safety communications with our partners, we can help responders keep America safe – every day and in every emergency.

To learn more, visit **FirstNet.gov**.

FirstNet® Authority

First Responder Network Authority

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