FirstNet™

U.S. DEPARTMENT OF COMMERCE

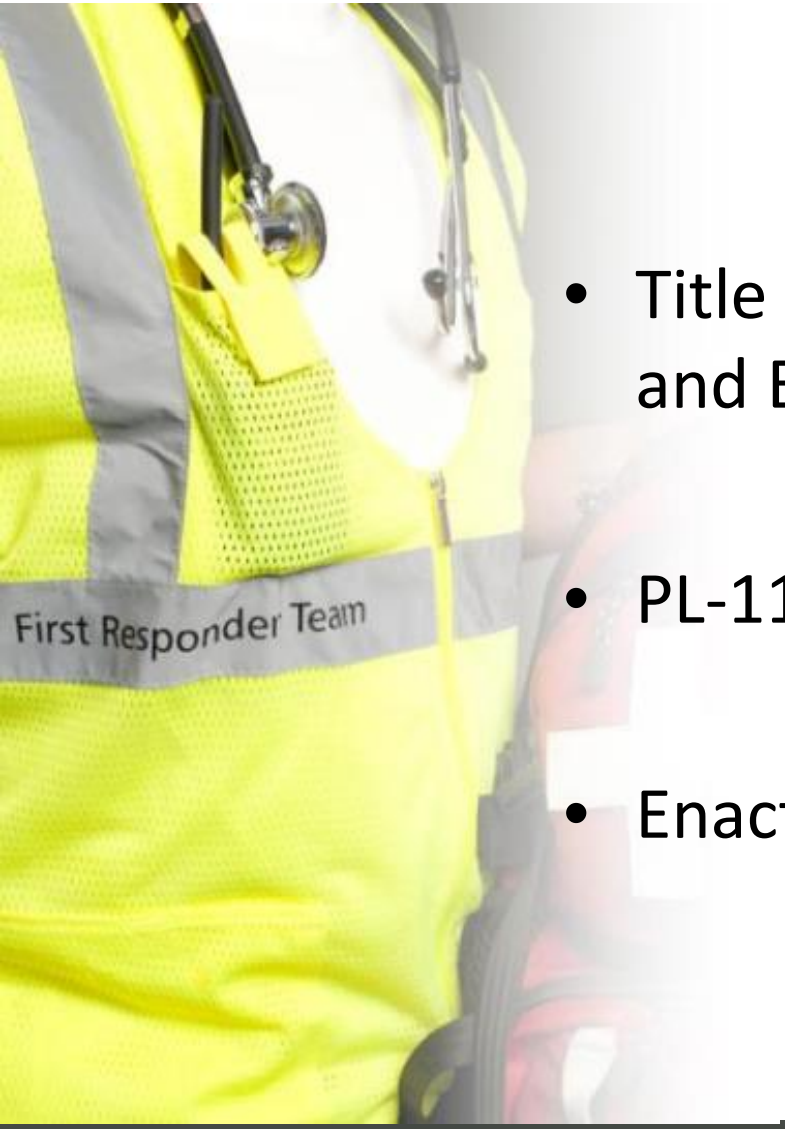
Ed Reynolds

FirstNet Board Member

ATIS Board Meeting

June 14, 2013

Middle Class Tax Relief and Job Creation Act of 2012



- Title VI – Public Safety Communications and Electromagnetic Spectrum Auctions
- PL-112-96
- Enacted February 22, 2012

FirstNet is established as an independent authority within NTIA.

FirstNet will take all actions necessary to ensure the design, construction, deployment, and operation of the nationwide broadband network dedicated to public safety

- Hold a single public safety 700 MHz wireless broadband license
- Act in consultation with federal, state, tribal, and local public safety entities, Director of NIST, the FCC, and FirstNet's public safety advisory committee
- Ensure deployment phases with substantial rural coverage milestones
- Leverage existing state, federal and commercial assets
- Reinvest fees from the use of FirstNet and its spectrum to build, operate, maintain, and improve the network

The law establishes many requirements for FirstNet.

PURPOSE	To create a nationwide, wireless, interoperable public safety broadband network
Network	Single network architecture, LTE
Spectrum	700 MHz D Block
Funding	$7B through spectrum auctions proceeds
Sustainability	Self-funded through fees
Governance	Specifications for the FirstNet Board

Board composition was carefully designed to include public safety, government and industry representatives. Members shall include:

- Secretary of Homeland Security
- Attorney General of United States
- Director of Office of Management and Budget
- 12 appointments by Secretary of Commerce
  - At least 3 individuals to represent collective interests of states, localities, tribes, and territories
  - At least 3 public safety professionals
- Desired representation:
  - Geographical and regional
  - Rural and urban

THE FIRSTNET BOARD

Name	Experience
Chuck Dowd	Assistant Police Chief – NYC
Paul Fitzgerald	Sheriff, Story County, Iowa
Jeff Johnson	Fire Chief (ret.), CEO Western Chiefs Association
Kevin McGinnis	Chief/CEO NE Mobile Health Services
Sam Ginn	Telecom Exec, FirstNet Chairman
Craig Farrill	Telecom Exec
William Keever	Telecom Exec
Ed Reynolds	Telecom Exec
Susan Swenson	Telecom Exec
Tim Bryan	Telecom Exec – Rural
Teri Takai	Former CIO for CA and MI
Wellington Webb	Former Mayor, Denver
Sylvia Mathews Burwell	Director of OMB
Eric Holder	U.S. Attorney General
Janet Napolitano	Secretary of Homeland Security

Ensuring Nationwide Interoperability

The FCC's Interoperability Board

An interoperability board within the FCC was established to lead the development of minimum technical requirements.

By May 22, 2012, the Interoperability Board, in consultation with NTIA, NIST, and OEC, was required to:

- Develop minimum technical requirements to ensure a nationwide level of network interoperability
- Submit them to the FCC for review

Minimum technical requirements are to be used:

- By FirstNet to develop RFIs and RFPs for building, operating, and maintaining the network
- By the FCC to evaluate the RAN deployment plans of states that wish to build their own RAN instead of accepting the FirstNet deployment plan

STATE AND LOCAL CONSULTATION

The First Phase of our Work

FirstNet must consult with regional, state, tribal, and local jurisdictions.

- Consultation must cover the distribution and expenditures of any amounts required to carry out FirstNet responsibilities, including:
  - Construction of a core network and any radio access network build out;
  - Placement of towers;
  - Coverage areas of the network, whether at the regional, state, tribal, or local level;
  - Adequacy of hardening, security, reliability, and resiliency requirements;
  - Assignment of priority to local users;
  - Assignment of priority and selection of entities seeking access to or use of the nationwide interoperable PSBN; and
  - Training needs of local users
- FirstNet consultation must occur through the single officer or governmental body designated by each state

FirstNet plans to keep thousands of stakeholders informed and involved.

- States and Territories
- Public safety users
- Public Safety Advisory Committee (PSAC)
- Tribes
- Federal users and agencies
- Congress
- Media
- Public safety BTOP recipients
- Applications developers
- Vendors
- Technical community

FirstNet will consult with the states, tribes, territories and localities and work collaboratively to develop state network build-out plans.

Work Stream	When
Nationwide, Regional Workshops	May – June 2013
Individual State Meetings	Beginning June 2013
Data Gathering	Commencing with Phase 2 SLIGP Funds Release

© First Responder Network Authority

STATE DECISIONS

FirstNet must complete the RFP process for the construction, operation, maintenance, and improvements of the nationwide network.

- Upon completion of the RFP process, FirstNet will notify the Governor or designee for each state of:
  - Completion of the RFP process;
  - Details of the proposed plan for buildout of the nationwide, interoperable broadband network in the state; and
  - Funding levels for the state as determined by NTIA
- No later than 90 days after notification, each Governor must choose whether his/her state will:
  - Accept the FirstNet proposal to build the radio access network in the state; or
  - Conduct its own deployment of the radio access network in the state

If a state wants to build its own radio access network, there are many steps that need to be followed to win approval.

- If a state decides to opt-out, its Governor must notify FirstNet, NTIA, and the FCC
- The state then has 180 days to develop and complete RFPs for the construction, maintenance, and operation of the radio access network (RAN) within the state
- The state shall submit an alternate plan for the construction, maintenance, and operation of the RAN within the state to the FCC and the plan must demonstrate:
  - Compliance with the minimum technical interoperability requirements
  - Interoperability with the nationwide PSBN
- FCC shall review and either approve or disapprove the plan

If the FCC approves the state plan, the state must meet certain requirements to win approval from NTIA to lease spectrum from FirstNet.

- If the FCC approves the plan, the state:
  - may apply to NTIA for a grant to construct the RAN within the state
  - shall apply to NTIA to lease spectrum capacity from FirstNet
- In order to obtain a grant and lease, the state must demonstrate it has:
  - Technical capability to operate, and the funding to support, the state's RAN;
  - Ability to maintain ongoing interoperability with the nationwide PSBN;
  - Ability to complete the project within the specified comparable timelines specific to the state;
  - Cost-effectiveness; and
  - Comparable security, coverage, and quality of service to that of the nationwide PSBN
- If the FCC disapproves the plan:
  - The construction, maintenance, operation, and improvement of the network within the state shall proceed in accordance with the plan proposed by FirstNet

There are additional funding implications if a state wins approval to build its own RAN.

- The state shall pay any user fees associated with the state use of core elements of FirstNet.
- Grants for construction of an opt-out state's RAN might not equal the state's funding levels under the FirstNet plan
  - Construction grant program specifics will depend on a number of factors, including nationwide progress in network deployment and available funding

    Such grants might cover only RAN construction costs, not operational, maintenance, and improvement costs
    - (Network construction, operational, maintenance and improvement costs are covered for states that participate in the FirstNet plan)
  - Match requirements might be imposed on state RAN construction grants

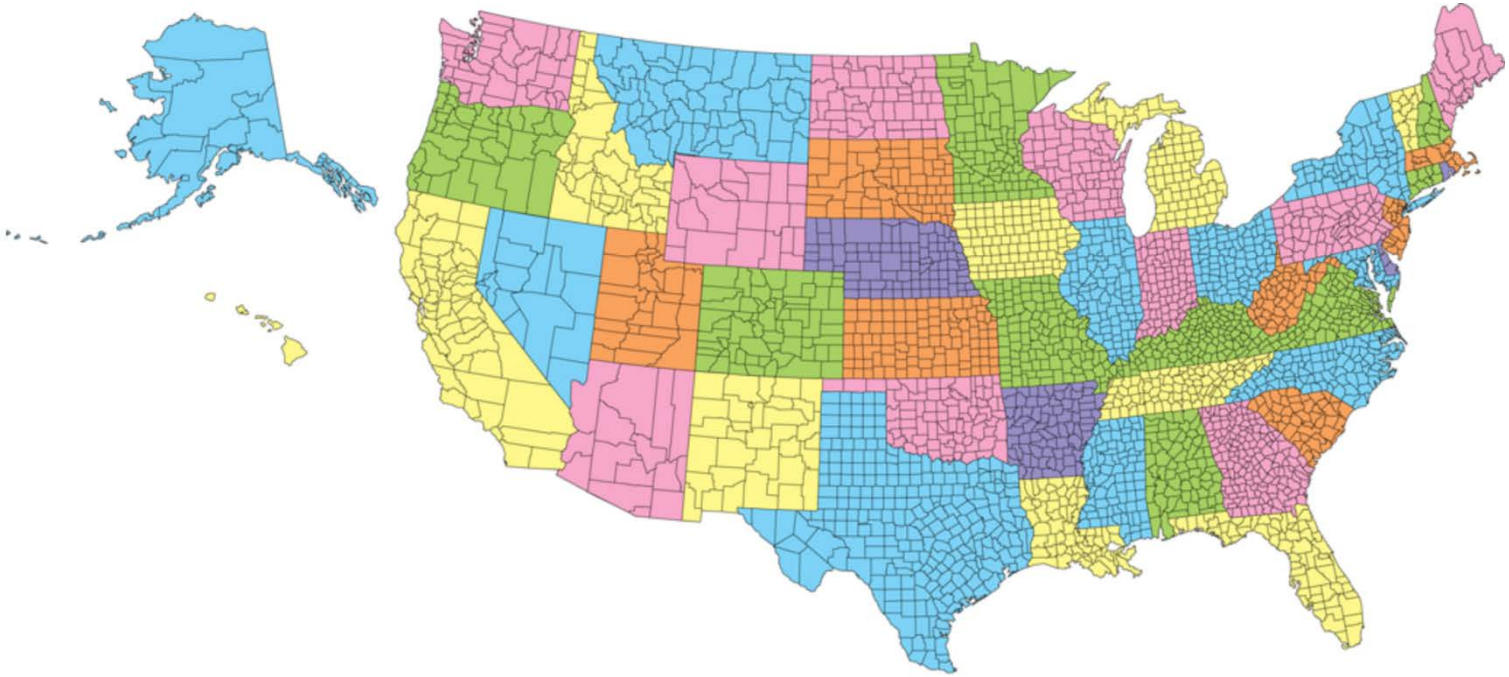
VISION

To provide emergency responders with the first nationwide, high-speed, wireless broadband network dedicated to public safety

> "FirstNet will be a force multiplier, enabling collaboration to help save more lives, solve more crimes and keep communities safer."

Jeffrey D. Johnson, Chief (Ret.)
Chief Executive Officer — Western Fire Chiefs Association
FirstNet Board Member

FirstNet will work toward supporting first responders wherever their need is.

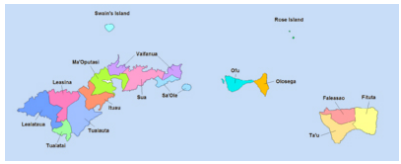


That includes 3,252 counties across 50 states and 6 commonwealths/ territories.

DC

Puerto Rico

Virgin Islands

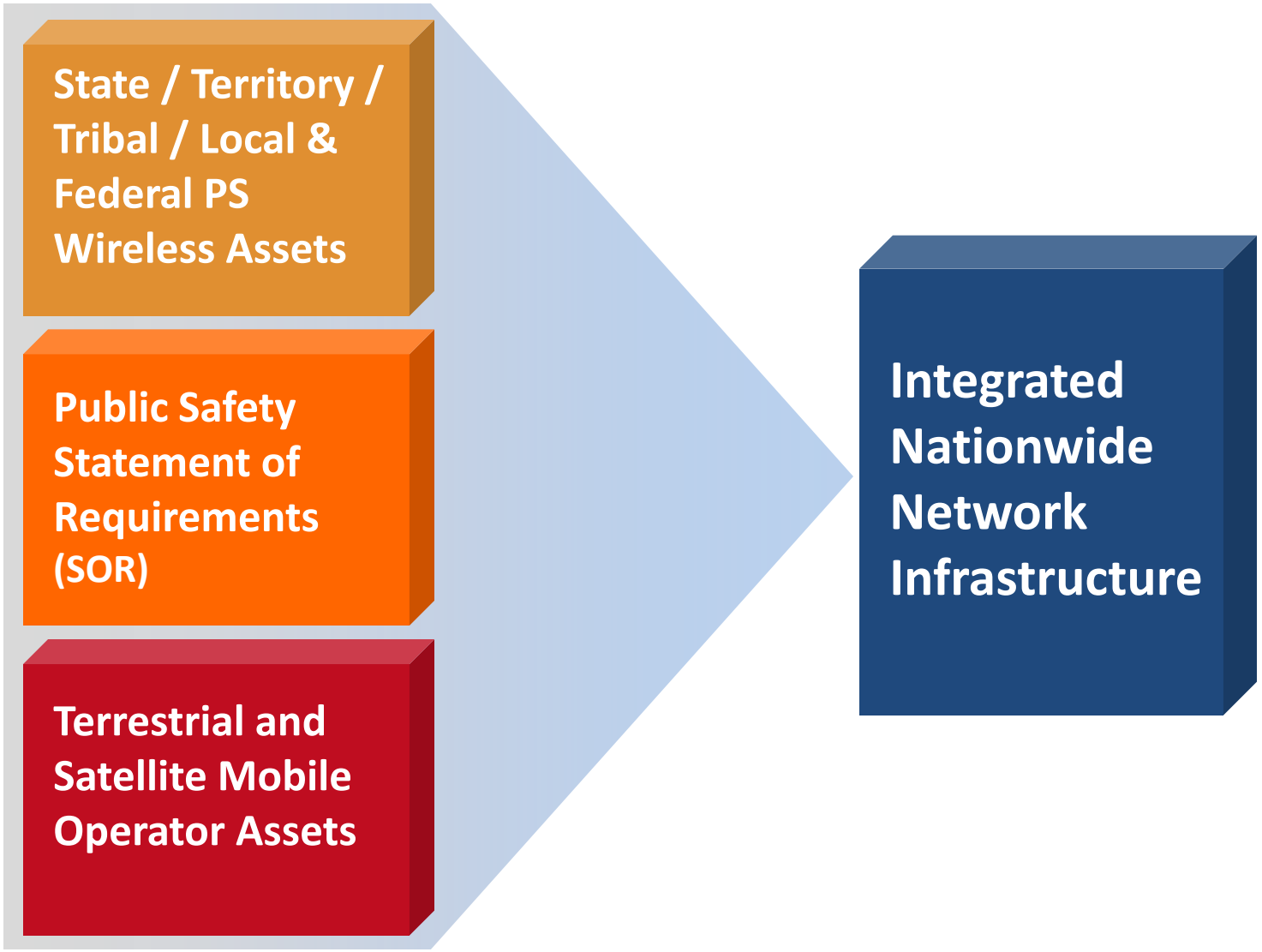


American Samoa

Guam

Northern Mariana Islands

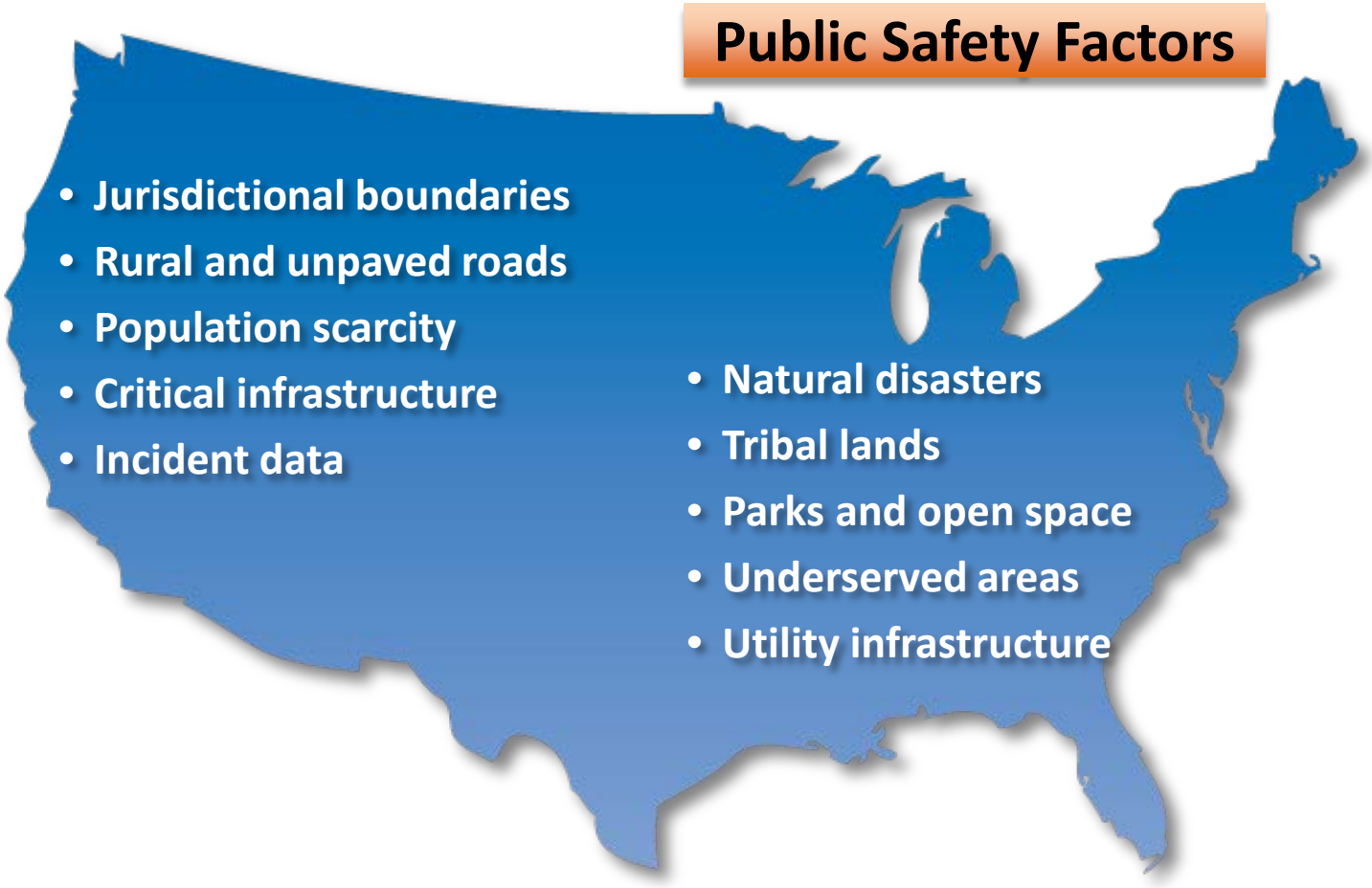
FirstNet will integrate public safety requirements and assets.



Working with the public safety community, we will define what "public safety grade" means.

FirstNet Attribute	Defining Public Safety Grade
Coverage Area	"Where Public Safety needs it" (Geographic)
Reliability	"You can bet your life on it"
Levels of Backup	"Multiple fallback options"
Emergency Communications	"Your trusted resource"
Group Communications	"Essential to teamwork"

FirstNet coverage considerations go far beyond those of commercial networks.



FirstNet is mandated to use 4G LTE, a proven next generation technology.

- Fastest data speeds
- A bigger pipe
- Field-tested across the country
- Global technology standard
- Being adopted as a standard for public safety
- Non-mission critical voice

> "First responders need a network they can rely on and trust to get the job done, even in the worst of circumstances. That's what FirstNet will build."

Chuck Dowd
Assistant Chief of Police, New York City
FirstNet Board Member

FirstNet will augment LMR until mission-critical voice is available.

- Public safety will rely on LMR for mission-critical voice for many years
- FirstNet can be co-located on existing LMR infrastructure
- Sharing infrastructure will keep costs down and enhance coverage
- Our goal is to allow voice to pass between the two networks

FirstNet is just beginning to develop its business model.

Break even and build a self-sustaining network

- Fee for service
- Leverage value of the spectrum
- Reflect value of contributed assets and partnerships

> **"FirstNet intends to offer public safety grade services at a cost that's compelling to users."**
>
> — FirstNet Tenet

Video, image and access to databases and tools will enhance public safety's ability to meet their mission.

- Streaming video / surveillance
- Large file transfer / download
- License plate reader
- Facial recognition
- Field fingerprinting
- Field reporting
- GIS/Mapping tools
- Database queries

Public safety has provided more than 1,300 baseline requirements as the foundation for creating FirstNet.

NPSTC NIST NTIA FCC SAFECOM

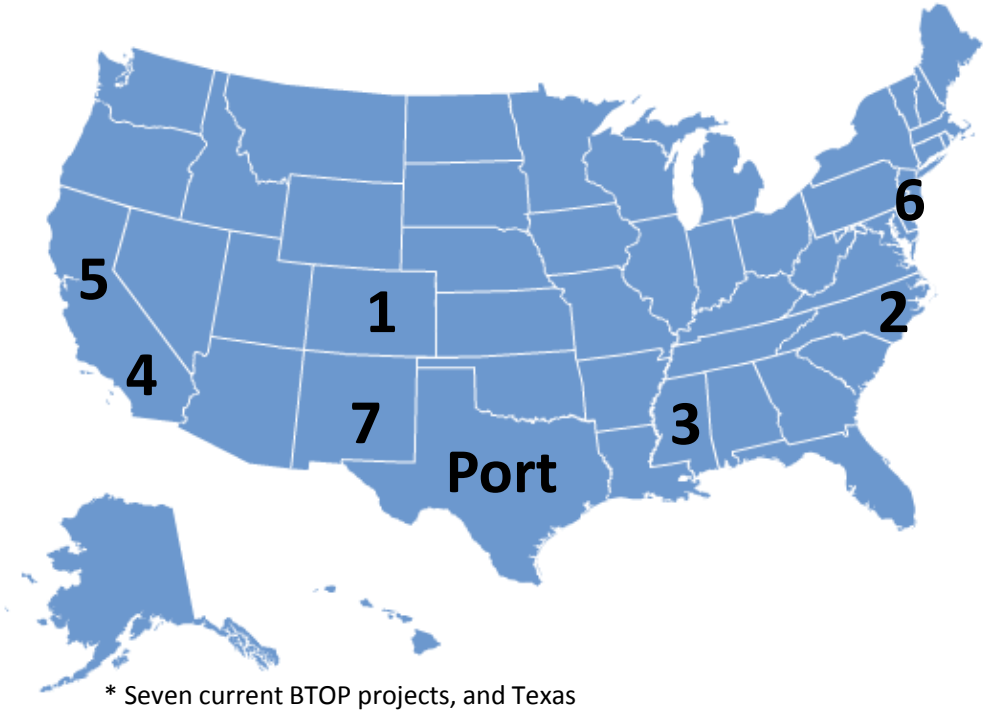
NPSTC Requirements	# of Req's
User Services	312
Network Services	209
Transport Requirements	154
System Design	66
User Equipment	60
Local Operations Support	157
Migration and Evolution	60
Governance	10
Policies and Procedures	94

FCC Minimum Interopability Specifications	# of Req's
Requirements (Must)	46
Considerations (Should)	55
Interfaces (Architectural)	11
Recommended Interfaces Requirements	9

FirstNet will:

- Build on the foundation of early work done by public safety groups
- Seek vendors who will meet or exceed these requirements
- Broaden the requirements to increase flexibility and decrease costs

FirstNet pilot projects* will provide broad learning opportunities.



* Seven current BTOP projects, and Texas

BTOP Grantees
1. Adams County, CO
2. Charlotte, NC
3. Mississippi
4. LA-RICS (Los Angeles)
5. Bay-RICS (San Francisco)
6. New Jersey
7. New Mexico
Ports
Harris County, TX

- International interference
  - Operational issues
    - Applications

FirstNet issued the first of 17 planned RFIs for devices on April 15, 2013, with core systems to follow.

CORE SYSTEMS

1. Evolved Packet Core (EPC) RFI
2. Network Service Platform (NSP) RFI
3. Transport RFI
4. Data Center RFI
5. Network Management Center and Operation and Maintenance Centers (NMC/OMC) RFI

FirstNet RFIs will cover every aspect of the network infrastructure.

RADIO ACCESS NETWORK (RAN) SYSTEMS

6. LTE Network Partners and Radio Access Equipment Providers RFI
7. Deployable RAN Infrastructure RFI

SATELLITE COVERAGE SYSTEMS

8. Satellite System Infrastructure RFI

OPERATIONAL SUPPORT SYSTEMS (OSS)

9. Network Planning Tools RFI

FirstNet RFIs will address network operations and support resources.

OPERATIONAL SUPPORT SYSTEMS (OSS)

10. User and Network Data Analytics RFI
11. Workflow and Asset Management Tool RF
12. Billing RFI
13. Provisioning RFI

USER OPERATIONS SYSTEMS

14. User Technical Support Services RFI

GENERAL SERVICES

15. System Integration RFI
16. Program Management RFI

Core Network

- **Architecture** – which network configuration will best serve public safety users now and into the future?
- **Coverage and Capacity** – how will the network perform during major events, large-scale disasters, extended periods without power?
- **Dynamic Priority and Control** –how will FirstNet support this requirement at the nationwide and local level when established hierarchies need to take the lead?
- **Security** – how will the network deliver and store data securely and keep confidential and sensitive information safe from cyber or physical attack?
- **Resiliency** – how will FirstNet ensure the network will perform when the network itself may be damaged during a disaster? How can multiple networks be employed to achieve high reliability?

Radio Access Network

- **RAN Planning:** Analysis consists of radio planning assumptions and engineering rules to optimize coverage, capacity and performance for a nationwide deployment.

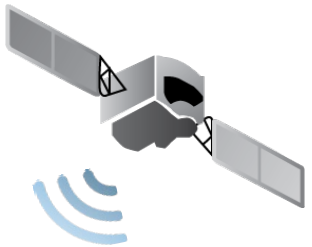
- **Cell Count Reference Point:** Initial modeling has shown that approximately 35,000 sites could cover 99.6% of the population and the nation's highway system.
  - **This is an initial model and estimate and subject to change.**
  - **Requirements and data from stakeholders will adjust the model and improve it.**

- **Cell Range:** Evaluating techniques for extending rural coverage.

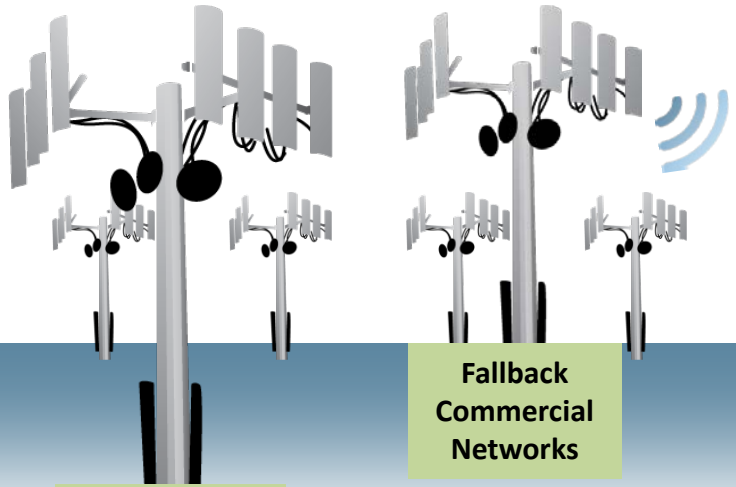
- **Radio Planning Tools:** Planning tools will be used to provide a consistent prediction of radio coverage and for comparison of RAN alternatives.

Diverse Coverage Architecture: considering a "3-in-1" Approach: Terrestrial + Satellite + Deployable

#2:
Mobile Satellite Systems



#1:
Multiple Terrestrial Mobile Systems



Fallback Commercial Networks

FirstNet Band 14 Network

#3:
Deployable Systems

Public Safety User

FirstNet U.S. DEPARTMENT OF COMMERCE

KEY STANDARDS NEEDED

FirstNet will work to accelerate standardization in several areas.

- Mission-Critical Voice
- Push-to-Talk (PTT)
- Direct Mode
- Higher Power Mobiles
- Dynamic Priority
- Cyber Security Aspects

First Responders are requesting these capabilities of FirstNet in our regional meetings

Balance the need for input with the desire to make progress.

- We will invest time listening to all of our stakeholders up front.
- We will understand state and local requirements, supplier capabilities and potential operating partner arrangements.

Follow the requirements mandated by law that govern how we operate.

- We will leverage existing public safety, wireless operator and utility infrastructure.
- We will reinvest fees from the use of FirstNet spectrum to build, operate, maintain and improve the network.
- We will operate with transparency but will not make public information that could jeopardize our ability to negotiate the best arrangements for network equipment, devices and services.

Offer public safety-grade services at a compelling and attractive cost.

- We will build a network that will be tailored to meet the needs of public safety.
- We will seek out scale economy advantages.
- We will work to save states millions of dollars by building, managing and maintaining FirstNet on their behalf.

FirstNet™

U.S. DEPARTMENT OF COMMERCE

FirstNet will build a network for millions of public safety users who need to be able to send data and talk to one another to meet their mission.

Creating FirstNet will require an unprecedented level of public-private partnership, collaboration and shared commitment to the well-being of all Americans.