FirstNet Information Session

March/April 2014
Amherst
Worcester
Plymouth
Peabody
Waltham

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Agenda

• Introductions
• Overview of the Public Safety Broadband Office
• What is FirstNet and the National Public Safety Broadband Network (NPSBN)?
• Long Term Evolution (LTE) Technology
• Implementation Considerations and Challenges
• FirstNet Progress Update and State Consultation Approach
• What’s Next?
OVERVIEW OF THE PUBLIC SAFETY BROADBAND OFFICE (PSBO)
Governor Patrick named Curt Wood the Commonwealth’s mandated single point of contact with NTIA and FirstNet.

Curt Wood
Undersecretary, Forensic Science & Technology

Steve Staffier
Commonwealth Statewide Interoperability Coordinator

Sean Hughes
Assistant Secretariat Chief Information Officer

Michael Saltzman
Project Director
The Role of the PSBO

The PBSO will collaborate with first responders, public safety entities and other stakeholders in preparation for the deployment of the network in Massachusetts.

- Support the Commonwealth’s mandated single point of contact with NTIA and FirstNet
- Hold outreach and information sessions
- Solicit feedback concerning public safety broadband needs and expectations
- Answer questions
- Provide up-to-date information about FirstNet and public safety broadband activities via our website
SLIGP Phases I and II Activities

The NTIA has provided funding via the State and Local Implementation Grant Program (SLIGP) for the first two phases of the NPSBN implementation. The PSBO is working on these activities.

Phase I: Education and Outreach
- Phase I focuses on governance, consultation with FirstNet, engagement of all relevant stakeholders, education and outreach, and identification of potential users of the NPSBN.

Approval to Move to Phase II

Phase II: Data Collection
- Prior to moving to Phase II, FirstNet will advise NTIA it is ready for the commencement of data collection.
- Phase II focuses primarily on collecting requested data for FirstNet in preparation for the public safety broadband network, as well as continuing activities started in Phase I.
WHAT IS FIRSTNET AND THE NPSBN?
Origins of FirstNet and NPSBN

9/11 Commission recommends improved communications for public safety and first responders.

Middle Class Tax Relief and Job Creation Act of 2012
- Establishes Technical Advisory Board for First Responder Interoperability within the FCC
- Authorized the NTIA to establish FirstNet
- Directed FirstNet to establish the NPSBN based on a single, national network architecture
- Reallocated 700 MHz D Block spectrum to public safety (under license to FirstNet)
- Authorized funding through spectrum auctions
FirstNet and NPSBN Overview

The First Responder Network Authority is an independent authority within the National Telecommunications and Information Agency. FirstNet holds the single public safety wireless license granted to ensure the building, deployment, and operation of the nationwide public safety broadband network.

The National Public Safety Broadband Network is the data network established in the 2012 Middle Class Tax Relief and Job Creation Act.

- The network will be designed to Public Safety grade standards
- FirstNet will build and operate a core network and design State Radio Area Networks (RANs) in consultation with each State
- The network will provide coverage to public safety in every state and territory
Public Safety Advisory Committee (PSAC)

The FirstNet legislation set out a requirement that the FirstNet Board establish a **standing public safety advisory committee** to assist it in carrying out its duties and responsibilities.

- To ensure public safety and first responder input into the design of the broadband network
- 40 representatives of public safety organizations
- Partnering with DHS to leverage current breadth and depth of knowledge from the SAFECOM program
Other FirstNet Partners

- DHS Office of Emergency Communications (OEC)
- DHS Office of Interoperability and Compatibility (OIC)
- Department of Justice (DOJ)
- Federal Communications Commission (FCC)
- Federal Emergency Management Agency (FEMA)
- National Institute for Standards and Technology (NIST)
- National Public Safety Telecommunications Council (NPSTC)
- National Telecommunications and Information Administration (NTIA)
- Public Safety Communications Research (PSCR)
- Other Government and Industry Partners
What is the FirstNet 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
FirstNet has the potential to support a broadly defined set of public safety users.

Examples Uses

The NPSBN will provide **fast access to applications** which can be shared broadly or on a limited, credentialed basis. Examples include:

- Streaming video / surveillance
- Large file transfer / download
- Situational awareness
- Field fingerprinting
- Field reporting
- GIS / Mapping tools
- Locations of local resources / infrastructure
- Electronic access to building blueprints
- Medical histories
- Medical telemetry
- Material safety information
- Command post operations
- Database queries

Reference: FirstNet Presentation at MIT /BPD Symposium on HS, “Creating a Nationwide Network for Public Safety”, 11/7/2013, slide 8
Benefits of FirstNet

- Priority access and local control
- Enables more coordinated emergency response
- Improved situational awareness across the entire incident team
- Coverage based on geography, not just population
- Coverage solutions for rural and wilderness areas
- Capacity tailored to expected traffic loads and special event spikes

Reference: FirstNet Presentation at MIT/BPD Symposium on HS, “Creating a Nationwide Network for Public Safety”, 11/7/2013, slide 9
FirstNet Misperceptions

FirstNet has also addressed some **commonly held misperceptions** about the Authority and the NPSBN.

<table>
<thead>
<tr>
<th>PERCEPTION</th>
<th>REALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public safety may have to give up autonomy and control.</td>
<td>FirstNet will be a nationwide platform; Public safety sets rules locally.</td>
</tr>
<tr>
<td>Public safety will lose management of devices, users and talk groups.</td>
<td>Public safety will maintain local management.</td>
</tr>
<tr>
<td>FirstNet will cost too much to build and operate.</td>
<td>FirstNet has substantial opportunities to partner to lower construction and operating costs.</td>
</tr>
<tr>
<td>States can use FirstNet spectrum to generate revenue.</td>
<td>Fees from the use of FirstNet spectrum must, by law, be reinvested to build, operate, maintain, and improve the network.</td>
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<tr>
<td>FirstNet will replace LMR networks.</td>
<td>FirstNet will augment LMR for many years.</td>
</tr>
<tr>
<td>FirstNet has already begun designing the network.</td>
<td>FirstNet is in the research and analysis phase and must have input from states and territories to design the network.</td>
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LONG TERM EVOLUTION (LTE) TECHNOLOGY
Anatomy of the NPSBN

Four fundamental building blocks that make up a network

1. CORE NETWORK
   - Enhanced / Evolved Packet Core
   - Switching and Routing
   - Services, Provisioning, ID Management
   - Applications and Data Centers

2. TRANSPORT BACKHAUL
   - Carrying Voice, Data and Video
   - From Base Stations to the Core Network
   - (Fiber, Microwave, etc.)

3. RADIO ACCESS NETWORK (RAN)
   - Signalling
   - Towers and Base Stations
   - User Traffic

4. PUBLIC SAFETY DEVICES
   - Band Class 14
   - Smartphone
   - Dongle
   - Laptop
   - Air Card
   - Tablet
   - Specialty Device

Each State will have their own LTE RAN, working in concert with the nationwide system.

Reference: FirstNet Boston Regional Workshop, "Research and Analysis" Presentation, 6/19/2013, slide 6
FirstNet Technology Vision – 4G LTE

4G LTE: A Proven Next Generation Technology

• Global technology standard
  – Widely deployed
  – Economy of scale, time to market
  – Rapidly evolving for commercial and consumer use and now for public safety

• Dramatic improvements over previous technologies
  – Higher bandwidth
  – Lower latency
  – Greater capacity
  – Better efficiency
  – Lower deployment cost
Public Safety LTE

• Dedicated Public Safety Spectrum
  – Band Class 14
  – Dedicated capacity

• New Standards
  – Priority Access
  – Preemption
  – Quality of Service
  – Direct device-to-device communications
    • With and without network connection
  – Group communications (one-to-many)
  – Push to talk

• “Hardened Infrastructure”
FirstNet will work with the vendor community on portable devices and in-vehicle routers

<table>
<thead>
<tr>
<th>Device Types</th>
<th>Portables</th>
<th>In-Vehicle Routers</th>
<th>Specialized</th>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category Driver</td>
<td>Build out to gain economies of scale</td>
<td>Special operational needs</td>
<td>Unique uses</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>• Smartphone • Tablets • Modems</td>
<td>• Routers • Hotspots • Consoles</td>
<td>• Drones • Portable repeaters • Rovers</td>
<td>• Ruggedized cases • Battery packs • Chargers, mics.</td>
</tr>
<tr>
<td>Connectivity</td>
<td>• LTE, CDMA, HSPA • LMR/ P25 • Wi-Fi, Bluetooth • Direct mode</td>
<td>• LTE, CDMA, HSPA • Wi-Fi • Ethernet • USB</td>
<td>• LTE, CDMA, HSPA • LMR/ P25 • Satellite repeaters • Location services</td>
<td>• Bluetooth • USB • WiFi</td>
</tr>
<tr>
<td>Location Enabled</td>
<td>Yes</td>
<td>Yes</td>
<td>Some</td>
<td>n/a</td>
</tr>
<tr>
<td>Band 14 Support</td>
<td>2014</td>
<td>2013/2014</td>
<td>2015+</td>
<td>n/a</td>
</tr>
</tbody>
</table>
LTE and LMR

FirstNet will Augment LMR

- Public safety will rely on LMR for mission critical voice for many years
- LMR systems generally provide deeper coverage with fewer towers
- LTE needs to provide similar wide area and in-building coverage for data
- Ultimately voice may pass between the LTE and LMR networks
IMPLEMENTATION CONSIDERATIONS AND CHALLENGES
Coverage Challenges

- 50 States
- 6 Territories
- 3250 Counties
- 3.8 Million Square Miles
Coverage Challenges

The nature of the terrain, the density of populations, and the preexistence of other infrastructure are factors when determining coverage approaches.

- Rugged terrain
- Land use
- Population density
- Critical infrastructure
- Transportation and utility infrastructure
- Rural coverage
- Parks and open areas
- Tribal lands

Reference: FirstNet Boston Regional Workshop, "Research and Analysis" Presentation, 6/19/2013, slides 15-20
Public Safety Grade Considerations

- **Physical Resiliency**
  - Diverse routing of cell site links
  - Redundant core
  - Site hardening (security, shelters, etc.)
  - Backup power (UPS and Generator)

- **Operational Reliability**
  - Security
  - Capacity and availability
  - Spares, support, time to repair

- **Coverage**
  - Where and when its needed
  - Deployable systems
  - Satellite
  - New technologies

- **Ongoing Testing** at NIST’s PSCR lab in Boulder, CO

- **Possible partnering with commercial carriers**

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**Public Safety Features**

- Priority Access
- Preemption
- Quality of Service
- Direct device-to-device
- Group communications
- Push to talk
Reuse of Existing Assets

- Reuse of existing assets
- Principally Towers and Backhaul
- Many local, legal, and regulatory issues
- The PSBO will be staffed to address these matters

The next phase of the SLIGP grant will focus on data collection, in part to inform investment decisions for the State Plan.

Reference: FirstNet Webinar, “SPOC Quarterly Briefing”, 1/15/2014, slide 11
FirstNet Progress Update and State Consultation Approach

William M. Casey
Region 1 Liaison
Progress Update

Key 2013 / 2014 Milestones

- Jul: 10 Technical RFIs released
  - Deputy GM and Government Affairs Director hired
- Aug: New Mexico Spectrum Lease Agreement
- Sep: FirstNet Board approves FY 2014 Budget and Operating Plan; Established committee structure
- Oct: PSAC Meeting
- Nov: Established Northern VA as Corporate HQ & the Boulder, CO area as FirstNet’s Technical, Engineering and Network Design HQ
- Dec: Director of State Consultation hired
- Jan: Adams County and NJ Spectrum Lease Agreements; Harris County negotiations extended; PSAC Meeting
- Director of Outreach and Director of State Plans hired
Defining the Consultation Process

- **Initiation**
  - Initial Consultation *(Aligned with SLIGP Phase 1)*

- **Design**
  - State RAN Design *(Iterative Design Reviews)*
  - Asset Identification & Selection *(Aligned with SLIGP Phase 2)*
  - State Operations *(National Template Customized by State)*

- **Approval**
  - Final State Plan *(Presented to Governor)*

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- PSAC
- Tribal Working Group
- NTIA SLIGP Monitoring/Support
- ECPC Federal Agency Inputs
Initial state consultation will cover a number of items to help FirstNet and the states begin the exchange of information, which will ultimately lead to the development of a state plan.
State RAN Design Process

Preliminary Design Review
- Based on coverage and users from coverage baseline
- Preliminary infrastructure estimates

Intermediate Design Review
- Incorporates revisions from Preliminary Design Review
- Targets best value sites from asset data collection
- Incorporates RFP/partnering information

Draft State Plan Review
- Incorporates revisions from Intermediate Design Review
- Includes tradeoffs/prioritization based on state plan
Asset Identification & Selection (Aligned with SLIGP Phase 2)

All Assets in

Location (within coverage objective)

Technical capacity/minimum hardening met

Access/operations

Legal/regulatory

Cost

Ideal Assets out

© First Responder Network Authority
State Operations

- Key Steps
  - Ensure state RAN design is supported by business planning and cost considerations
  - Leverage PSAC and other key groups to discuss the overall approach to:
    - Local control
    - Prioritization
    - Training
    - Security
  - Develop operations template with areas for input/customization
  - Develop system cost structure / business plan for state based on preliminary RAN design and potential user base
Final State Plan

- **Key Steps**
  - Document proposed coverage and associated cost
  - Supply projected funding level
  - Provide final review with state’s SPOC / governing body
  - Submit to the Governor

- **Guiding Principles**
  - Address areas of consultation required by law
  - Ensure public safety stakeholders have robust involvement before state plan is presented to the Governor

**State Plan Requirements**

- Completion of the RFP process
- Details of proposed build-out in the state
- Funding level for the state
WHAT'S NEXT?
What Comes Next?

- Prepare for the **data gathering and State consultation phase** of the implementation

- Conduct **more targeted meetings** with Massachusetts stakeholders for user and coverage requirements

- Establish a **working group** to support the consultation and implementation process
Information on the Web

Follow updates at:
mass.gov/psbo

Public Safety Broadband Office (PSBO)

Welcome to the PSBO
The Executive Office of Public Safety and Security has established the Public Safety Broadband Office to oversee and direct all Commonwealth planning and implementation activities associated with FirstNet.

This office will coordinate and collaborate with public safety entities, local and state officials, and other stakeholders in preparing the Commonwealth for participation with FirstNet in the building and deployment of the National Public Safety Broadband Network (NPSBN).

PSBO's Role with FirstNet and the NPSBN
Initially envisioned by the 911 Commission and enabled by the Middle Class Tax Relief and Job Creation Act of 2012, the First Responder Network Authority (FirstNet) is an independent Federal authority within the National Telecommunications and Information Administration (NTIA) that was established to provide emergency responders with a nationwide, high-speed, wireless network dedicated to public safety. The envisioned National Public Safety Broadband Network (NPSBN) will facilitate communications amongst first responders during emergencies and provide reliable, secure access for public safety users everyday.

To begin the process of implementing the network nationally, the NTIA has issued initial grants through the State and Local Implementation Grant Program (SLIGP). Phase One of this grant program started in the fall of 2013 and focuses on education and outreach. Phase Two will focus on data collection and FirstNet requirements. Including consideration specific to implementing the NPSBN in the Commonwealth. The PSBO will coordinate activities with the FirstNet regarding the creation of the NPSBN and its implementation in the Commonwealth.
Contact the PSBO

You can email the PSBO at:
PublicSafetyBroadband@state.ma.us

Request to be on the PSBO Contact List from mass.gov/psbo