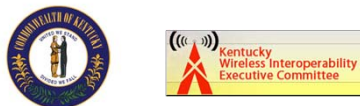




Users and Coverage

Initial Consultation Meeting with the State of Kentucky


Users and Coverage Goals



1. First Responder Users / Operations
 - Identify potential user base and their operational areas
 - Estimate current usage of mobile data today
2. Coverage
 - Review FirstNet Initial Coverage Objectives
 - Discuss State Inputs and Approach to Objectives
 - Discuss Coverage Modeling and Desired Outputs

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Key Inputs to FirstNet Design



Coverage

Where?

- Where Needed (Objectives)
- Different Device Types
- Throughput levels


Capacity

How Much?

- # of Users and Devices
- Application Usage
- Data Consumption

FirstNet Financial Team

- RFP Development/Evaluation
- Economic Modeling




Nationwide Design

FirstNet Engineering Team

- RFP Development/Evaluation
- Core, RAN and Devices

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Guiding Principles for Data Requests



- **Critical Data:** only gather critically essential data
- **When Needed:** collect data close to when it will be used to ensure accuracy
- **Pre-populate:** where possible, FirstNet will collect as much data as possible from available sources for editing and validation
- **Specify Deliverables:** identify required deliverable formats, not necessarily specific tools and processes
- **Be Flexible:** allow flexibility given different stakeholders' existing use of tools, processes and resource constraints
- **Get Feedback:** socialize the process before formalizing
- **Advance Notice:** identify schedule, process and tools as early as possible for stakeholders to plan accordingly
- **Local Knowledge:** rely on stakeholder knowledge to help prioritize data collection

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Users / Operations Overview



Estimated Total		From Samples	Estimated Total	From Samples
Disc.	# Agencies	# of Users	LE: 1.5	LE: 22,500
LE	250	15,000	Fire: 1.0	Fire: 20,000
Fire	300	20,000	EMS: 2.0	EMS: 10,000
EMS	125	5,000	Other: 1.5	Other: 75,000
Other	500	50,000		

of Agencies and Users (Just Example Totals) Device per User Factor* # of Potential Devices Usage Profile (where available) Location and Amount of Responses (where available)


=> Inputs to RAN Design representative of Public Safety Operations

Who does Kentucky consider to be eligible users?
 What kind of assessment has been done on the potential user base?
 Current provider? Device types and counts? Procurement options and vehicles? Typical costs?
 Current usage amounts? Growth projections? Operational areas? Potential adoption?

*Several inputs: current usage, adoption rate, growth projections, new devices, etc.

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Users / Operations Collection



CASM NextGen - Communications Assets Survey and Mapping Next Generation
MDST - Mobile Data Survey Tool

CASM NextGen

MDST

State Collection

OEC Coverage Workshop Data

Disc.		# Agencies	# of Users	LE: 1.5	LE: 22,500	Voice, Video, Data Usage Profile
LE	250	15,000	Fire: 1.0	Fire: 20,000	EMS: 10,000	Other: 1.5
Fire	300	20,000	Other: 1.5	Other: 75,000		
EMS	125	5,000				
Other	500	50,000				

of Agencies and Users (Just Example Totals) Device per User Factor # of Potential Devices Usage Profile Operational Area & Location/Amount of Responses

*In the absence of any of this data, FirstNet will use baseline assumptions and estimates

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FirstNet's Coverage Objective Goals

GOAL: Come up with a consistent, nationwide starting point to objectively identify Public Safety's coverage desires

1. Set a FirstNet Nationwide Coverage Objective Baseline
 - Identify initial coverage objectives relevant to Public Safety's desires
 - Develop a systematic, consistent and objective approach applied nationwide
 - Leverage feedback from OEC's Coverage Workshops
 - Generate maps to document the starting point
2. Facilitate coverage discussion for a phased build out
 - Include additional data to tailor needs for each state
 - Modify based on stakeholder input and feedback
3. Generate coverage maps based on culmination of acquisition process

FirstNet Envisions Continued Discussion and Revisions on Coverage Beyond Delivery of a State Plan

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Starting Coverage Objectives Data

1. Public Safety User Population (Source: HSP, OEC provided)
 - Public Safety User Density based on jurisdiction (OEC data to start)
 - Common response areas (CAD data) – as it's made available with State collection
2. Public Safety High Risk / Areas of Interest (Source: HSP)
 - Key facilities – PS agencies, corrections, airports, EDCs, hospitals, PSAPs, schools, etc.
 - Critical infrastructure – manufacturing, energy, dams, etc.
 - Large Public Venues – stadiums, theme parks, malls
 - Other major event locations – if provided with initial consultation submission
 - *Area for feedback – tourist/recreational destinations (parks, hiking, waterways, etc.)
3. US Population (Source: 2012 US Census)
 - Population density
4. Developed Areas / Buildings (Source: 2006 National Land Cover Database)
 - Dense / Medium / Light / Open / None
5. Roadways (Source: Federal Highway Administration)
 - National Highway System
 - Average Daily Traffic Counts to identify significant secondary roadways
6. Tribal Land
7. Rural Metrics
8. Federal Land

These will be incorporated with additional considerations (i.e. FirstNet Rural milestones) or via separate consultation (i.e. Federal)

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Nationwide Approach

1. Employee count of L.E., Fire, EMS agencies
2. Public Safety High Risk / Areas of Interest
3. US Population
4. Developed Areas / Buildings
5. Roadways / Avg. Daily Traffic

Resulting Combined Map =>

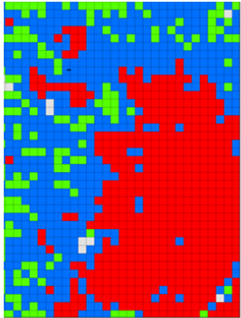
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Converting Data into Coverage Objectives

FirstNet

1. Employee count of L.E., Fire, EMS agencies
2. Public Safety High Risk / Areas of Interest
3. US Population
4. Developed Areas / Buildings
5. Roadways

- A lot of data in different formats
 - Points, lines, polygons, etc.
- To evaluate these broad datasets, applied a 1x1 mile grid for uniformity
- Evaluated all data by grid to:
 - 1) Identify areas that had data of interest to PS
 - 2) Show concentration areas



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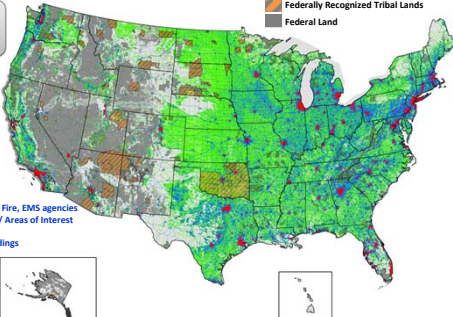
Nationwide Coverage Objective

FirstNet

Legend:
■ High Concentration
■ Moderate Concentration
■ Low Concentration

■ Federally Recognized Tribal Lands
■ Federal Land

1. Employee count of L.E., Fire, EMS agencies
2. Public Safety High Risk / Areas of Interest
3. US Population
4. Developed Areas / Buildings
5. Roadways



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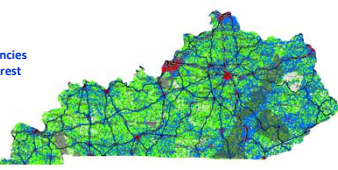
Results for Kentucky

FirstNet

1. Employee count of L.E., Fire, EMS agencies
2. Public Safety High Risk / Areas of Interest
3. US Population
4. Developed Areas / Buildings
5. Roadways


Legend:
■ High Concentration
■ Moderate Concentration
■ Low Concentration

■ Federally Recognized Tribal Lands
■ Federal Land



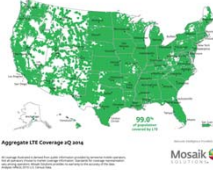
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How Should FirstNet Phase a Build Out?



Coverage Objective	Phased Build Out
• Public Safety High Response (CAD) or Interest Areas	Build out
• Remaining Urban / Dev. Areas	Build out
• Remaining Rural Areas	Build out
• Remaining Major Highways	Build out
• Remaining Critical Infrastructure	Build out
• Remaining Secondary Roadways	Build out
• Remaining Potential Users	Build out
• Additional Land Area	Build out


Commercial LTE Build Out 2010-2014



What would a phased FirstNet build out look like in Kentucky?
What decision factors would you consider?

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Adjusting to Other Deployment Considerations




Coverage Objective	Build Out	**EXAMPLE ONLY**
• Co-location / Common Areas of Need (Population, Developed Areas, Highways, etc.)	Partner(s) Co-Location / Common Need	
• Rural Areas (FirstNet Rural milestones)	Site Acquisition	Public Safety Gaps (State/Local/Other Asset Considerations)
• Remaining PS Areas of Risk/Interest		
• Remaining Areas of Need	Site Acquisition	Tribal, Federal Needs (Tribal/Federal/Other Asset Considerations)
• Tribal Lands		
• Federal Land	Site Acquisition	FirstNet User Needs (All Asset Considerations)
• User Feedback		
• Capacity Growth		
Funding Source	<ul style="list-style-type: none"> Partner(s) Co-location (Excess Capacity Exchange) Initial Capital (\$7 Billion), where required 	Network Revenue

Proposed build out will be refined after RFP Award, ongoing discussion and additional build out considerations and tradeoffs


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Coverage Modeling





Coverage Modeling Overview 

- Coverage Objectives will be an input to modeling tools
- FirstNet has selected a coverage modeling tool
 - Used worldwide for LTE modeling
 - Granular dataset (terrain and land use)
 - o 30 meter in rural
 - o 10 meter in metro areas
 - o 5 meter in dense urban (3D buildings)
 - Multiple propagation models
 - o Tailored for land area type (urban, dense urban, rural, etc.)
 - o Tuned with drive test data for different regions of country
- FirstNet intends to discuss coverage parameters and assumptions for our predictions



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Coverage Modeling Viewing 

- By Device Type (for example)
 - Handheld
 - Vehicular (low power)
 - Vehicular (high power)
- By Data Rate (for example)
 - >1 Mbps (Video, web, email, etc.)
 - >512 kbps (Low-res video, web, email, etc.)
 - >256 kbps (web, email, SMS, etc.)
- Provide results by layers in an interactive map to:
 - Zoom to areas of interest
 - View by device(s)
 - View by data rate(s)
- From Draft RFI/SOO: "...throughput >256kbps > 95% of time..."


How would you like to see proposed coverage?
By device type and/or data rate?

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Users and Coverage Wrap-up




FirstNet logo



Summary 

- Identifying the potential user base and their current use of mobile data is important
 - Both Engineering and Financial needs
- Identifying coverage needs and a potential phased build out is also important
 - RFP Evaluation and Eventual Build Out
- Coverage will be an ongoing discussion throughout consultation and into network deployment


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Call to Action... Next Steps 

- Continued Outreach and Education
- Potential Users and Operations
 - Estimate current potential user base
 - Identify Operational Areas
 - Estimate current usage of mobile data
- Coverage Objectives
 - Identify coverage objectives
 - Provide a phased build out approach

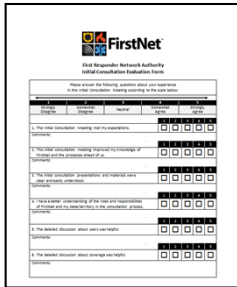
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Meeting Evaluation 

We want to hear from you!

- How was the meeting?
- What did you like?
- What can we improve?

Please provide us with your valuable feedback by completing your evaluation.



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