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Stakeholder Quarterly Webinar

April 2, 2015

- Welcome & Introductions Kristi Wilde
- FirstNet Updates Amanda Hilliard
- Second Public Notice Eli Veenendaal
- CTO Office Updates Jeff Bratcher
- SPOC Meeting Agenda Review Amanda

Strategic Program Roadmap identifies tasks in the areas of:



FirstNet Organization

Network Requests for Proposals (“RFP”)



Financial Sustainability

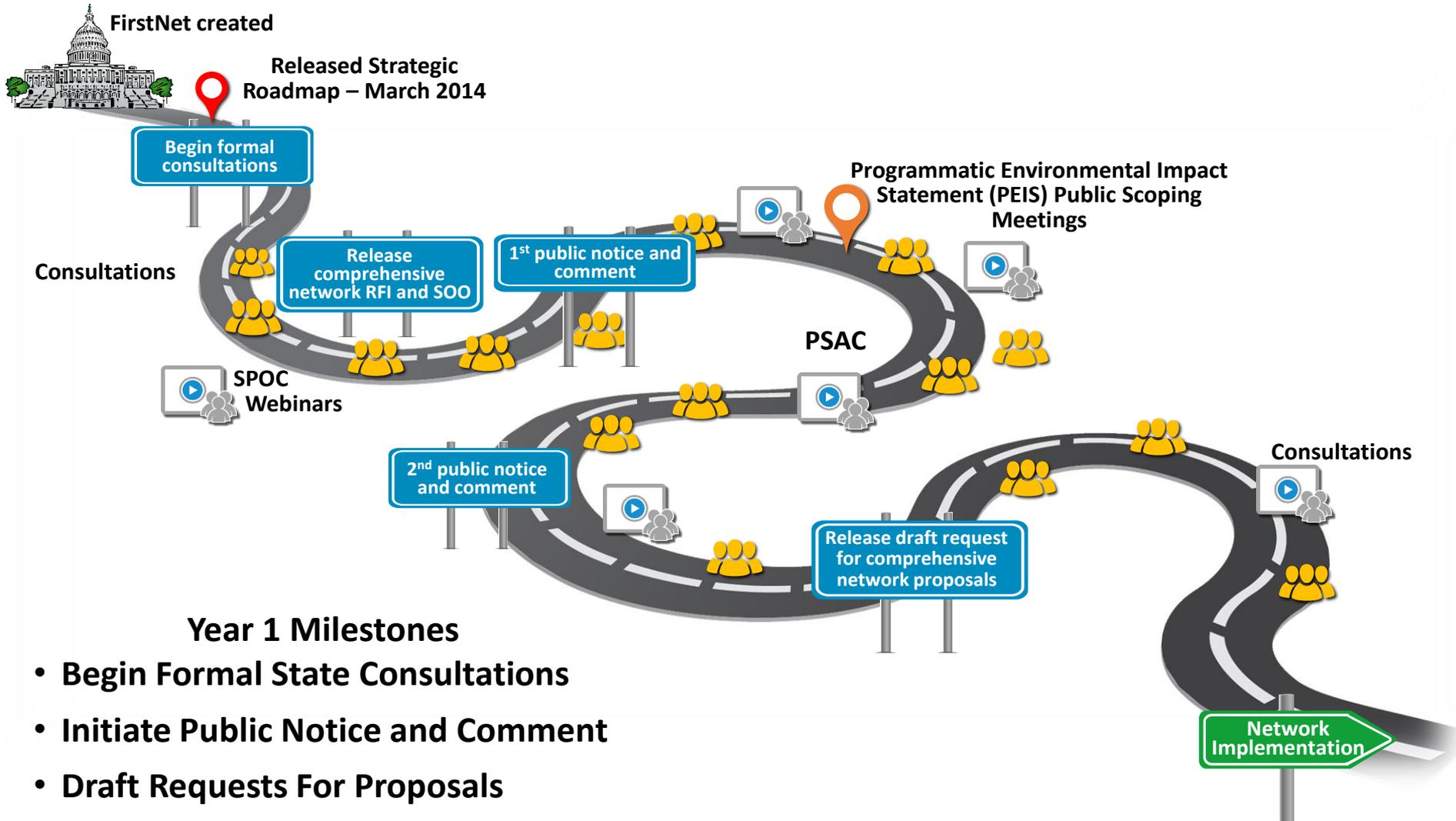
Testing

Outreach and Consultation

Pricing



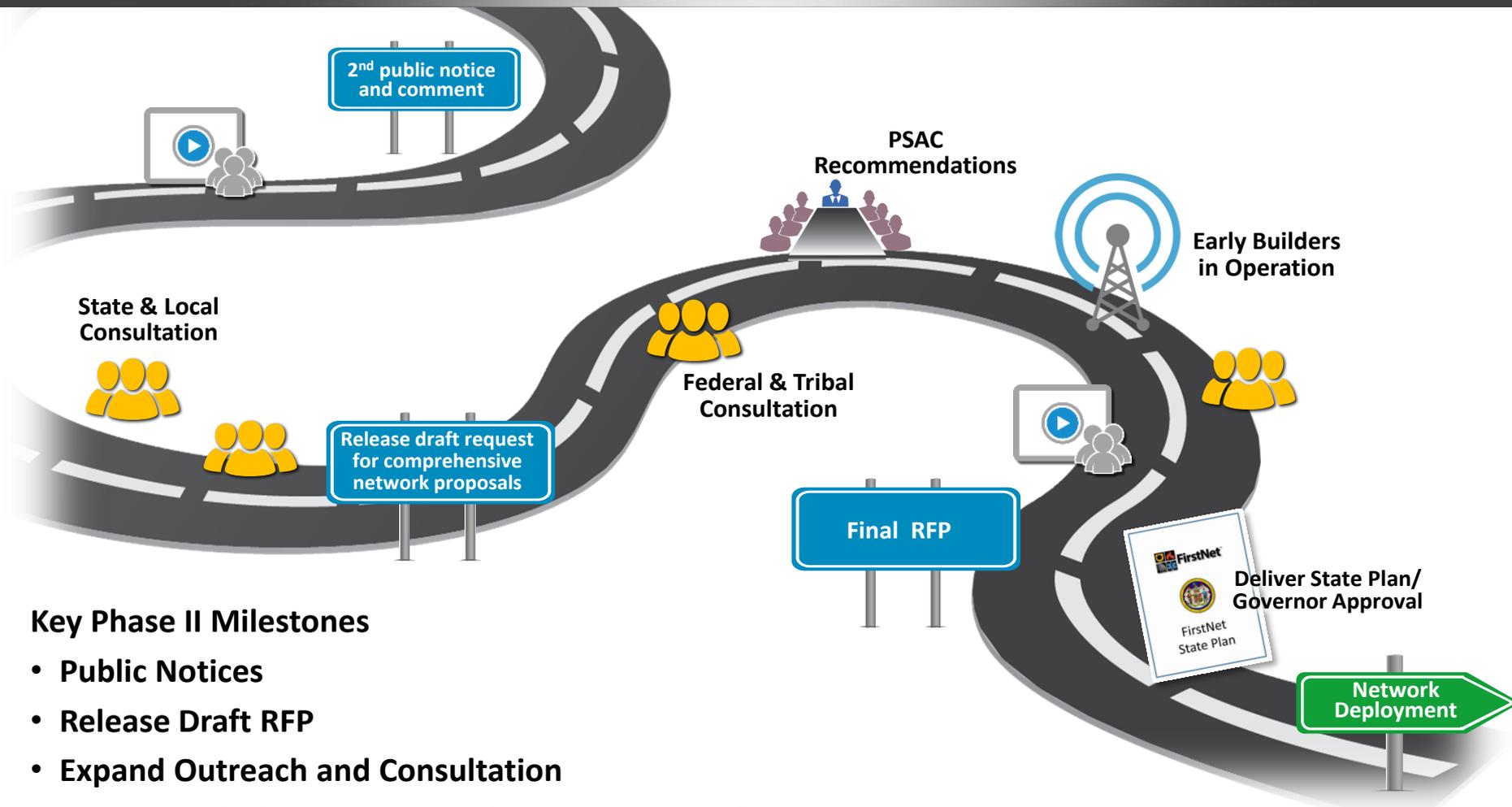
Progress Toward Roadmap Milestones



Year 1 Milestones

- **Begin Formal State Consultations**
- **Initiate Public Notice and Comment**
- **Draft Requests For Proposals**

Phase II: Road To Implementation

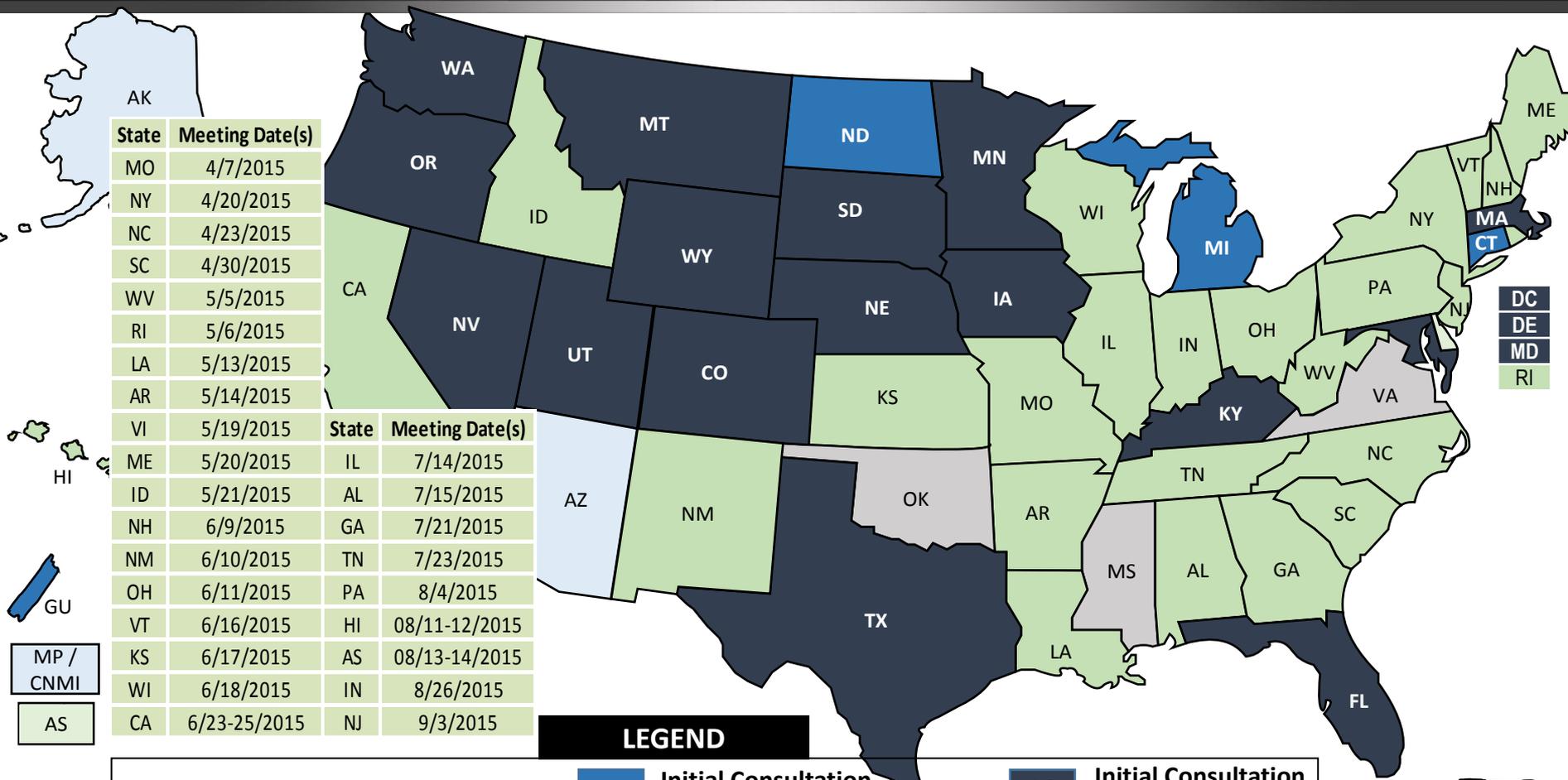


Key Phase II Milestones

- Public Notices
- Release Draft RFP
- Expand Outreach and Consultation
- Leverage PSAC Recommendations and Early Builder Results
- Release Final RFP

Tracker – State Consultation Activities

As of April 3, 2015



State	Meeting Date(s)
MO	4/7/2015
NY	4/20/2015
NC	4/23/2015
SC	4/30/2015
WV	5/5/2015
RI	5/6/2015
LA	5/13/2015
AR	5/14/2015
VI	5/19/2015
ME	5/20/2015
ID	5/21/2015
NH	6/9/2015
NM	6/10/2015
OH	6/11/2015
VT	6/16/2015
KS	6/17/2015
WI	6/18/2015
CA	6/23-25/2015
IL	7/14/2015
AL	7/15/2015
GA	7/21/2015
TN	7/23/2015
PA	8/4/2015
HI	08/11-12/2015
AS	08/13-14/2015
IN	8/26/2015
NJ	9/3/2015

State	Meeting Date(s)
IL	7/14/2015
AL	7/15/2015
GA	7/21/2015
TN	7/23/2015
PA	8/4/2015
HI	08/11-12/2015
AS	08/13-14/2015
IN	8/26/2015
NJ	9/3/2015

LEGEND

All Received Initial Consultation Package From FirstNet	49 Initial Consultation Checklist Returned To FirstNet	19 Initial Consultation Meeting Held
	53 Pre-Consultation Conference Call Closed	27 Initial Consultation Meeting Scheduled

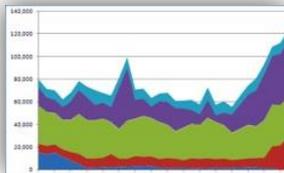
Data Collection Categories

Coverage Objectives



- Coverage
- Phased Deployment

- Applications
- Data Usage



Capacity



State / Territory

Users and Operations



- Public Safety Entity Info
- Devices
- Operational Areas

- Procurement Vehicles
- Service Plans / Costs
- Barriers



Current Service

The following Job Announcements have posted to USAJOBs

- **Region 1 Consultation & Outreach Lead**
 - Open through April 14, 2015
 - <https://firstnet.usajobs.gov/GetJob/ViewDetails/399415200>
- **Region 3 Consultation & Outreach Lead**
 - Open through April 15, 2015
 - <https://www.usajobs.gov/GetJob/ViewDetails/399462700>
- **Region 6 Consultation & Outreach Lead**
 - Open through April 15, 2015
 - <https://www.usajobs.gov/GetJob/ViewDetails/399475500>
- **Region 7 Consultation & Outreach Lead**
 - Open through April 15, 2015
 - <https://www.usajobs.gov/GetJob/ViewDetails/399478000>
- **Region 8 Consultation & Outreach Lead**
 - Open through April 15, 2015
 - <https://www.usajobs.gov/GetJob/ViewDetails/399488000>

- Early Builder Strategies and Lessons Learned
 - Working Group conference calls held in December 2014 and January 2015
 - Members developed recommendations that FirstNet will be able to incorporate into the network design and implementation
 - New tasking issued in February focuses on deliverables related to formal key learning conditions and informal key lessons
- Tribal Outreach, Education, and Consultation Strategies
 - Working Group conference call held in January 2015 and an in person meeting in February 2015
 - Members developed several recommendations that FirstNet will be able to incorporate into its tribal engagement efforts and requested continuation of the Working Group

PSAC Consultation – New Assignments



- Priority and Preemption Task Team Kicked Off 2/26
 - FirstNet is seeking advice from PSAC regarding an initial framework for implementing access prioritization, user preemption, and prioritized application use in the nationwide public safety broadband network (NPSBN)
- Public Safety Grade (PSG) Task Team Kicked Off 2/27
 - FirstNet is seeking advice from PSAC regarding an initial methodology and Framework for implementing PSG elements in the NPSBN with respect to priority needs, critical infrastructure protection, and geographic and human threats
- User Equipment Kicked Off 3/4
 - FirstNet is seeking advice from PSAC on functional objectives for and ergonomic considerations of Band 14 broadband user equipment that will meet the operational needs of first responders

FY14 Annual Report to Congress



- Submitted to Congress on March 3, 2015
- Provides comprehensive update on:
 - Progress toward strategic goals
 - Partnerships with local, state, tribal, and federal jurisdictions
 - Development of the organization and culture of excellence
 - FirstNet resources and operations

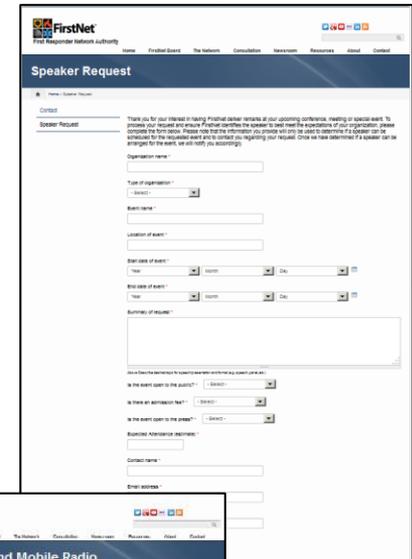


Communications Update

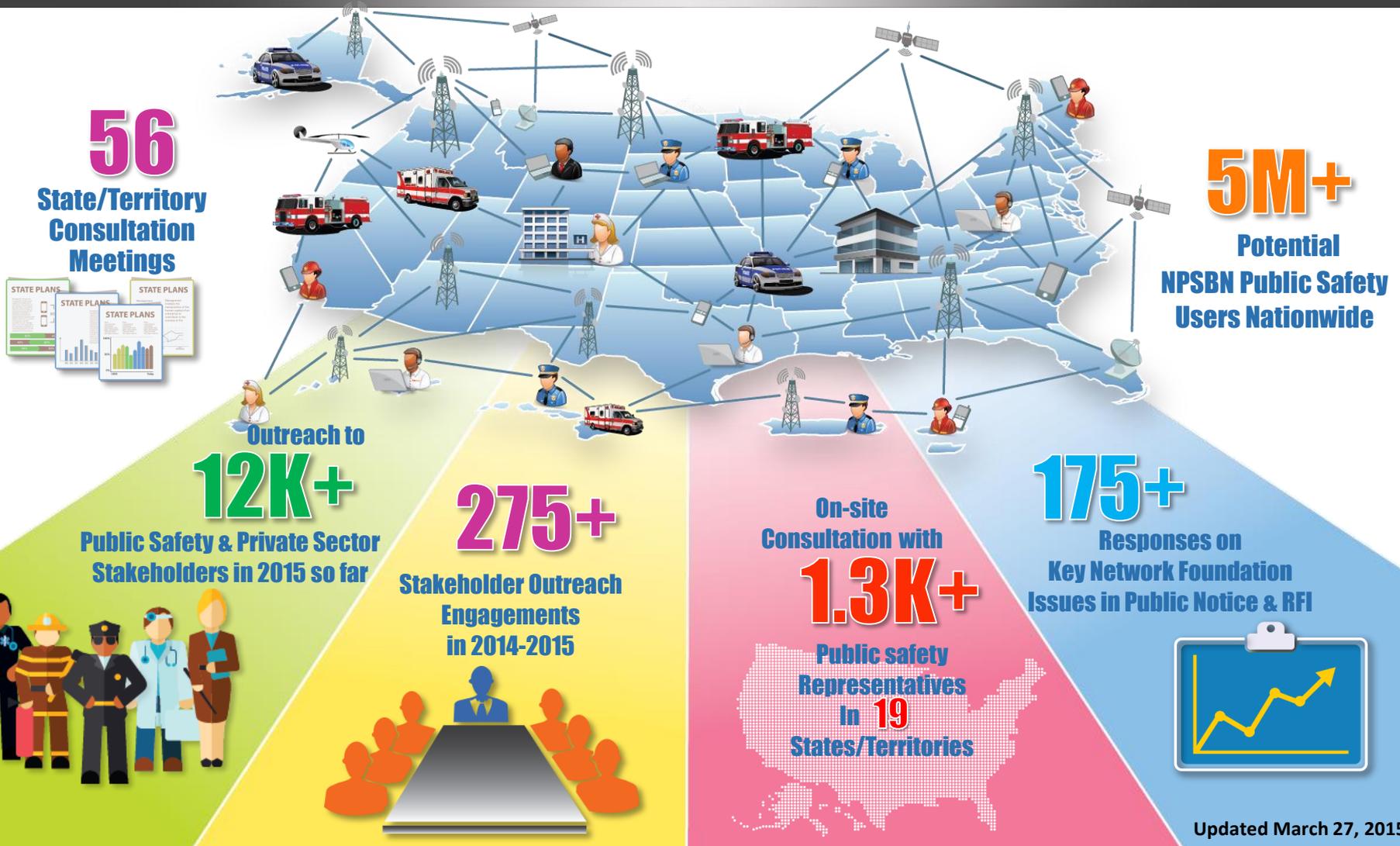


Three new web pages have been added to the site to provide stakeholders with more information and updates in key areas:

- **Speakers Request:** Aims to help FirstNet manage the large quantity of speaker requests coming via an online form <http://firstnet.gov/contact/speaker-request>
- **Environmental:** Provides updates and resources related to FirstNet's FirstNet Programmatic Environmental Impact Statement (PEIS) <http://firstnet.gov/about/peis>
- **Land Mobile Radio:** Discusses the expected continued use of LMR technology upon launch of the NPSNB



Outreach and Consultation By the Numbers





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FirstNet *Second Public Notice*

Eli Veenendaal
Attorney-Advisor



Second Public Notice



- The FirstNet Board voted to release a second public notice seeking comments on certain legislative interpretations under the Act relating to key topics including:
 - Technical Requirements for Equipment Use on the Network
 - Network Policies
 - State Plan Implementation and Decision Process
 - Customer, Operational, and Funding Considerations Regarding State Assumption of Responsibility to Build and Operate a RAN
- The public, including any individual or organization, is invited to submit written comments to the notice either electronically through www.regulations.gov or by mail to the address listed in the notice
- The comment period for this notice closes April 28, 2015



Technical Requirements for Equipment Use on the Network



The Act

- FirstNet must “promote competition in the equipment market place by requiring for devices used on the network to be built to open, non-proprietary, commercially available standards...”

Notice Interpretations

- Applies to any equipment, including end user devices, used “on” (*i.e.*, to use or access) the network
- Applies whether or not the equipment is to access the network via a FirstNet or state deployed radio access network
- Applies only to parameters necessary to ensure “interoperability”

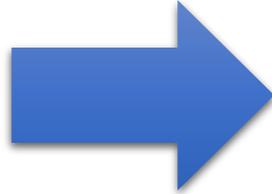
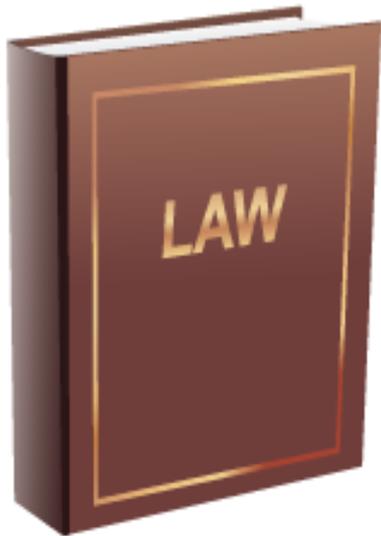
The Act

- FirstNet must establish network policies in carrying out its duties and responsibilities to deploy the network

Notice Interpretations

- Policies developed apply either directly or indirectly to States that seek to conduct their own RAN deployment
- A State's demonstrations of interoperability is a commitment to adhere to FirstNet's interoperability policies
- Compliance with network policies is essential to the deployment and interoperable operation of the network and will be a condition of entering into a spectrum capacity lease
- States, during consultation, will have substantial opportunities to influence the network policies

Middle Class Tax Relief and Job Creation Act of 2012



“Upon the completion of the request for proposal process...the First Responder Network Authority shall provide to the Governor of each State, or his designee—

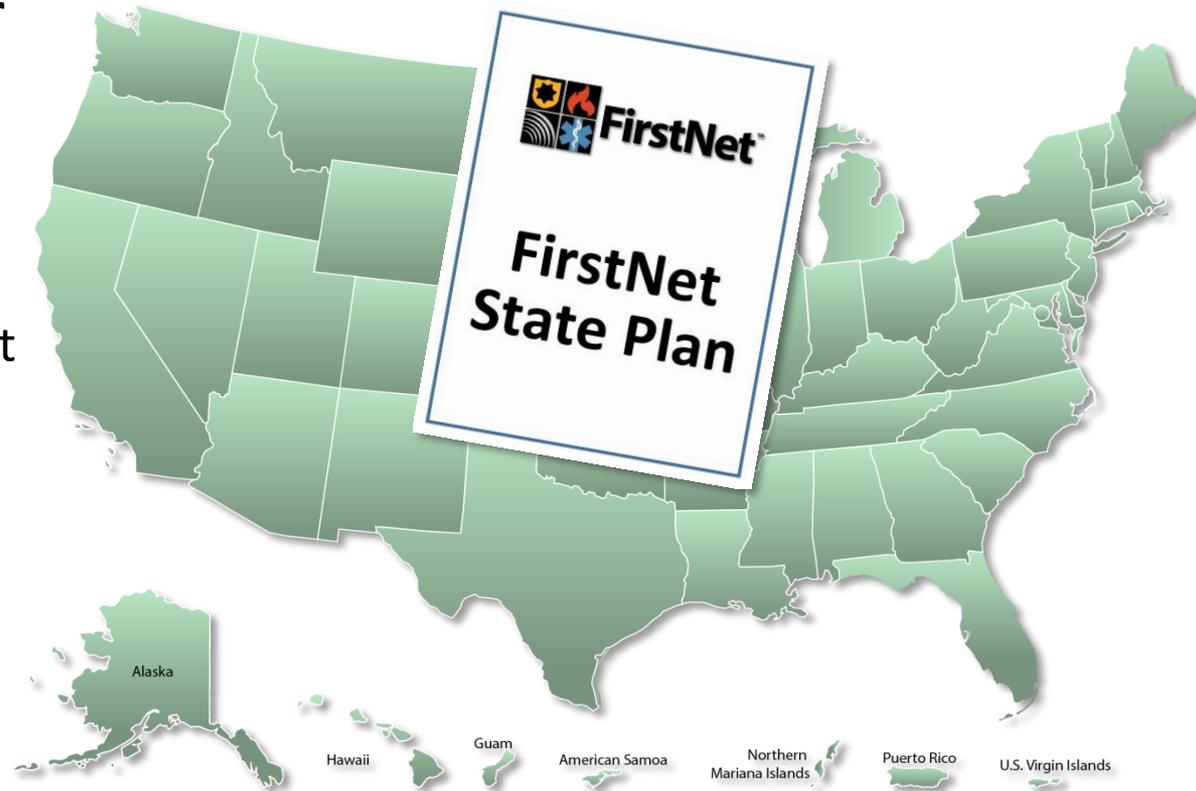
- (A) notice of the completion of the request for proposal process;
- (B) details of the proposed plan for buildout of the nationwide, interoperable broadband network in such State (“State Plan”); and
- (C) the funding level for the State as determined by the NTIA.”

State Plan Process



Under the Act, the Governor has 90 days to choose whether to

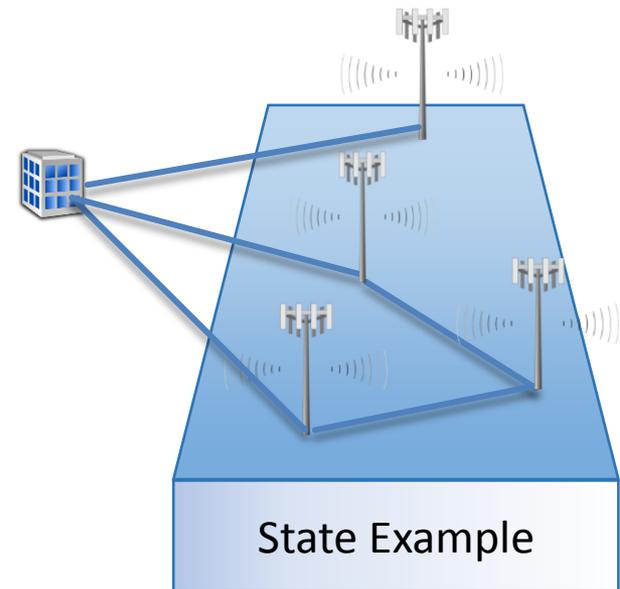
1. Participate in the FirstNet proposed radio access network (RAN) deployment or
2. Assume responsibility to conduct its own state RAN deployment



State Participation in FirstNet Proposed RAN



- Governor chooses to accept the deployment of the RAN as proposed by FirstNet
- FirstNet is responsible for RAN deployment, including the building, operation, and maintenance of the State RAN
- The State's public safety entities will be responsible for paying user fees for the FirstNet service, if they adopt the service



State Conducted RAN Deployment



The state must notify FirstNet, National Telecommunications and Information Administration (NTIA), and the Federal Communications Commission (FCC) of its decision to deploy a RAN and then:

Complete RFPs within 180 days

- For statewide RAN construction, maintenance, and operation

Develop alternative State plan for RAN deployment

- Must meet minimal interoperability requirements

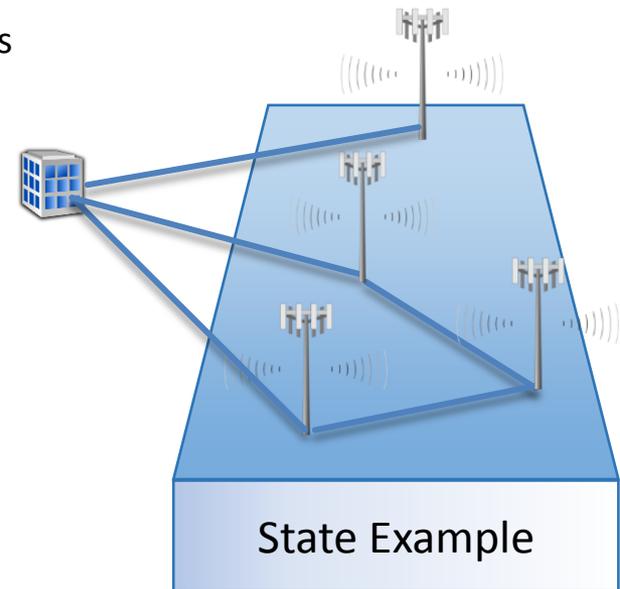
FCC reviews alternative State plan

- Disapproved – Network deployment follows FirstNet proposed plan
- Approved– State *may* apply to NTIA for a grant for RAN construction, but *must* apply to lease spectrum capacity

If approved, apply to NTIA to lease FirstNet spectrum capacity

- Must demonstrate “cost-effectiveness” of state plan
- Must show comparable completion timelines, security, coverage, and quality of service to that of the nationwide public safety broadband network (NPSBN)

Pay fees to use FirstNet core



Key Network Considerations

- FirstNet must consider the potential effects in and outside of a State on public safety customers.
- FirstNet's costs and available funding nationally, including its ability to meet substantial rural milestones, and the purchasing power of FirstNet on behalf of public safety.
- FirstNet and States must in all cases define and implement a potentially complex operational relationship to serve public safety.

The Act

- Does not expressly define which customer-facing roles are assumed by a State or FirstNet with respect to public safety entities in States that have assumed responsibility for RAN construction and operation

Notice Interpretations

- FirstNet preliminarily concludes that the Act provides sufficient flexibility to accommodate a variety of different arrangements so long as the interoperability and self-sustainment goals of the Act are met
- FirstNet's preliminary interpretations leave to discussions on a state-by-state basis the specific implementation of service provision in such States

- **FirstNet is a Zero-Sum Game**

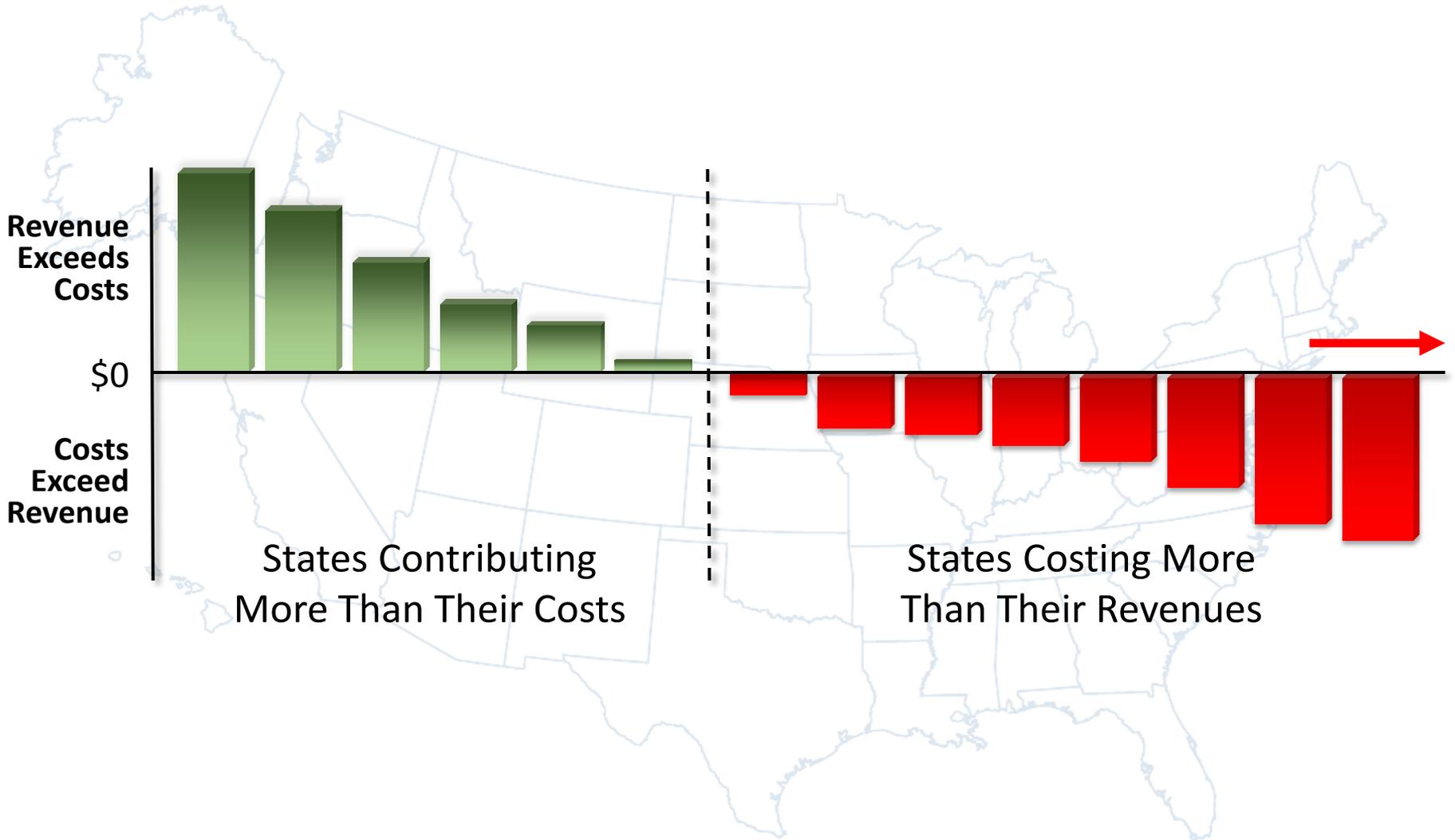
- Fees = Costs
- All FirstNet fees are reinvested to construct, maintain, operate, or improve the nationwide network

- **Three Funding Sources**

- \$7 billion
- Excess spectrum capacity fees
- Subscriber fees



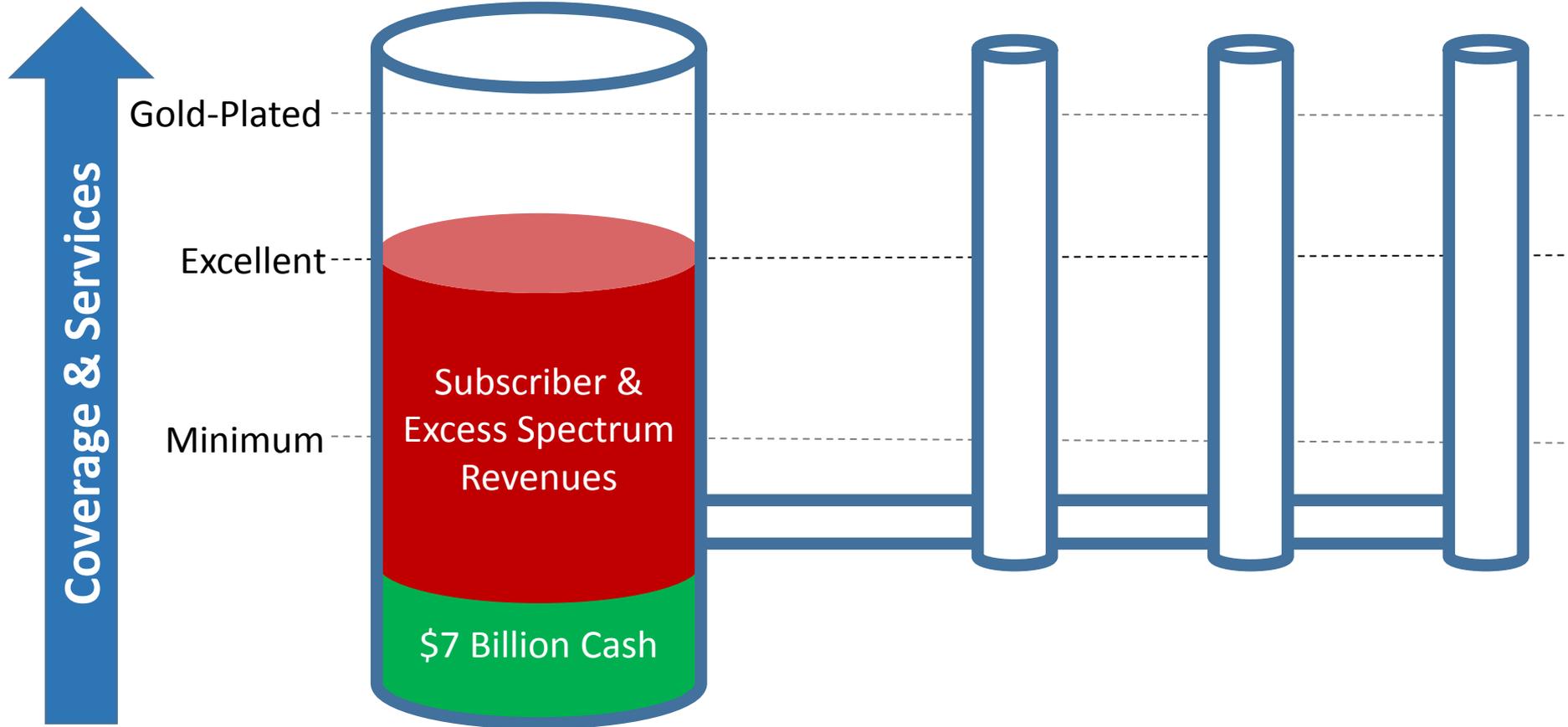
The State Equation: Cost to Serve \cong Density of Population



Potential Interpretations of the Act



FirstNet Opt-In States

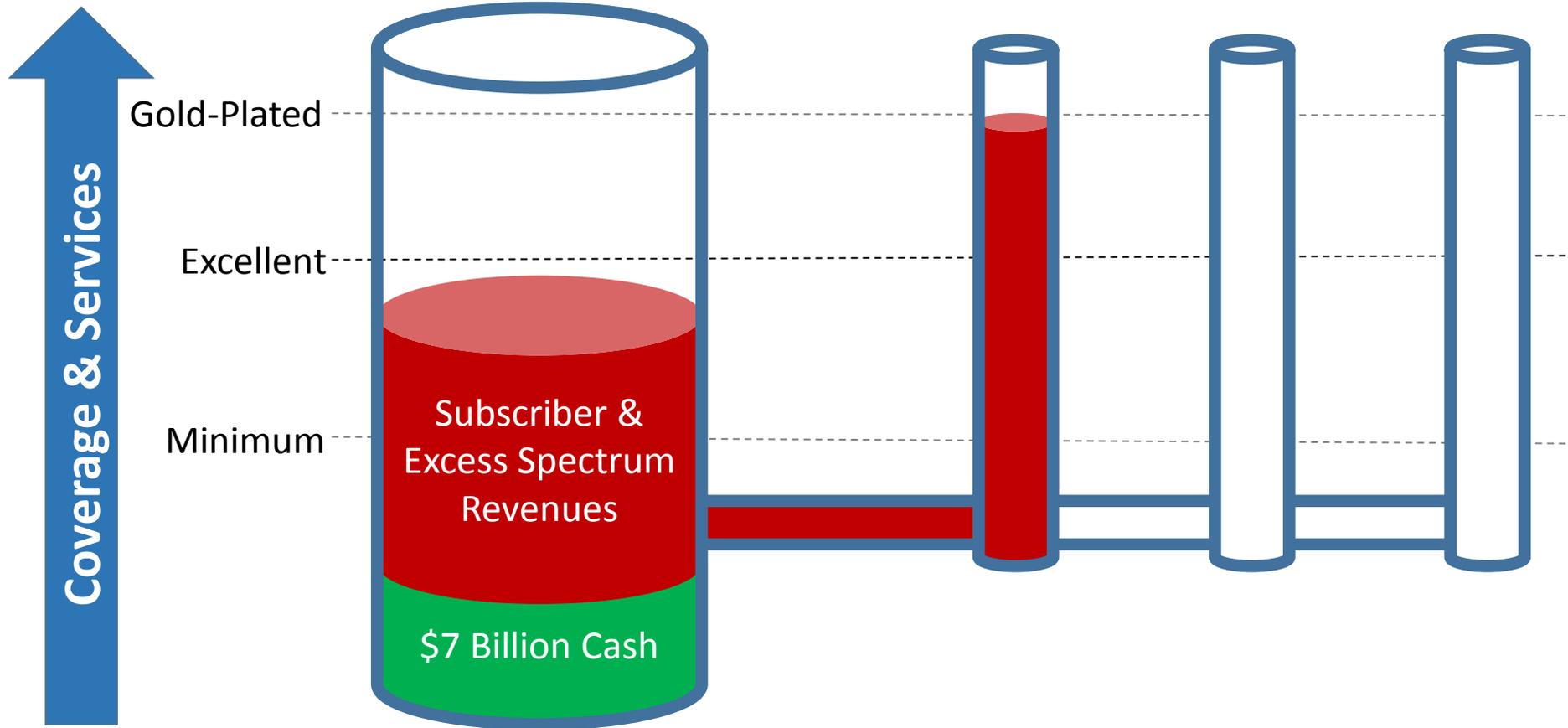


Potential Interpretations of the Act



FirstNet Opt-In States

High Density Opt-Out States

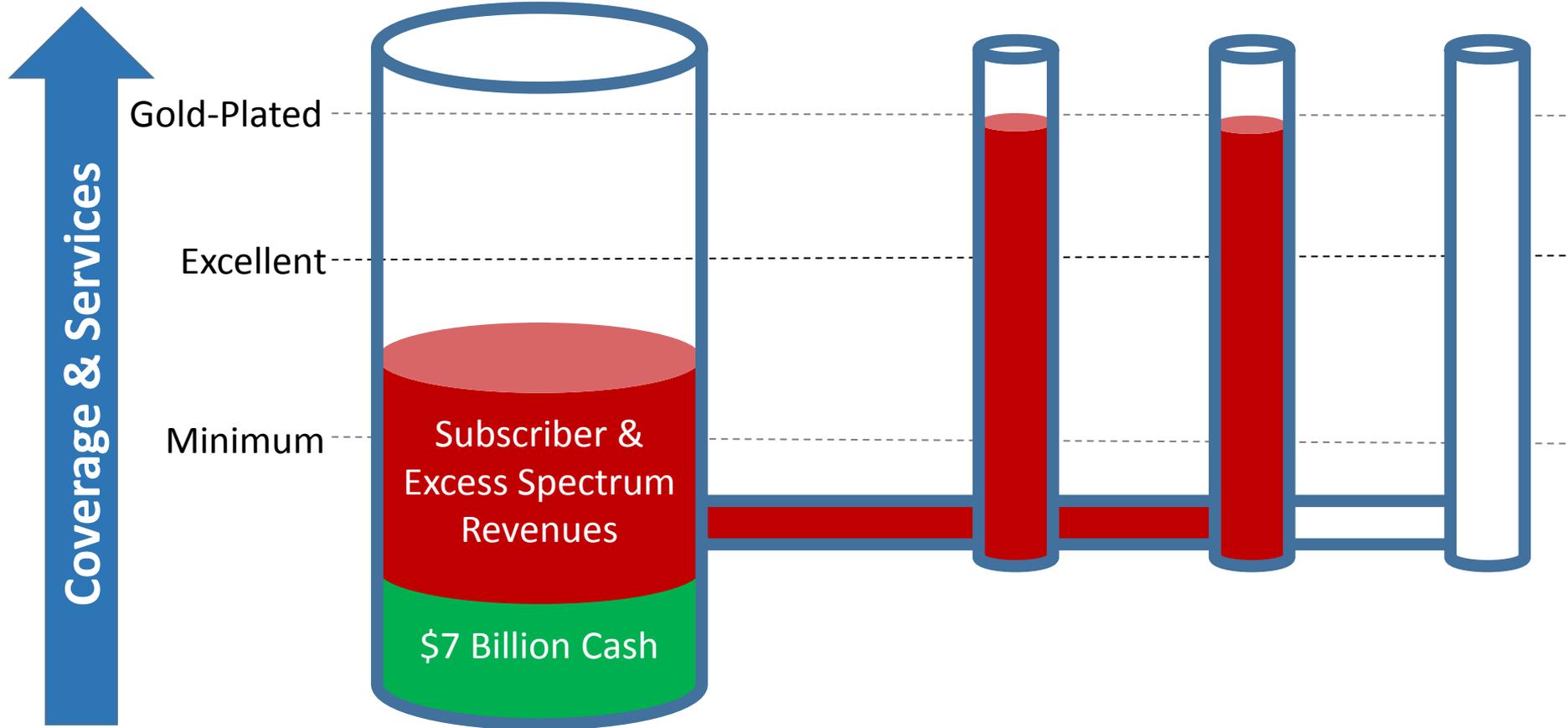


Potential Interpretations of the Act



FirstNet Opt-In States

High Density Opt-Out States

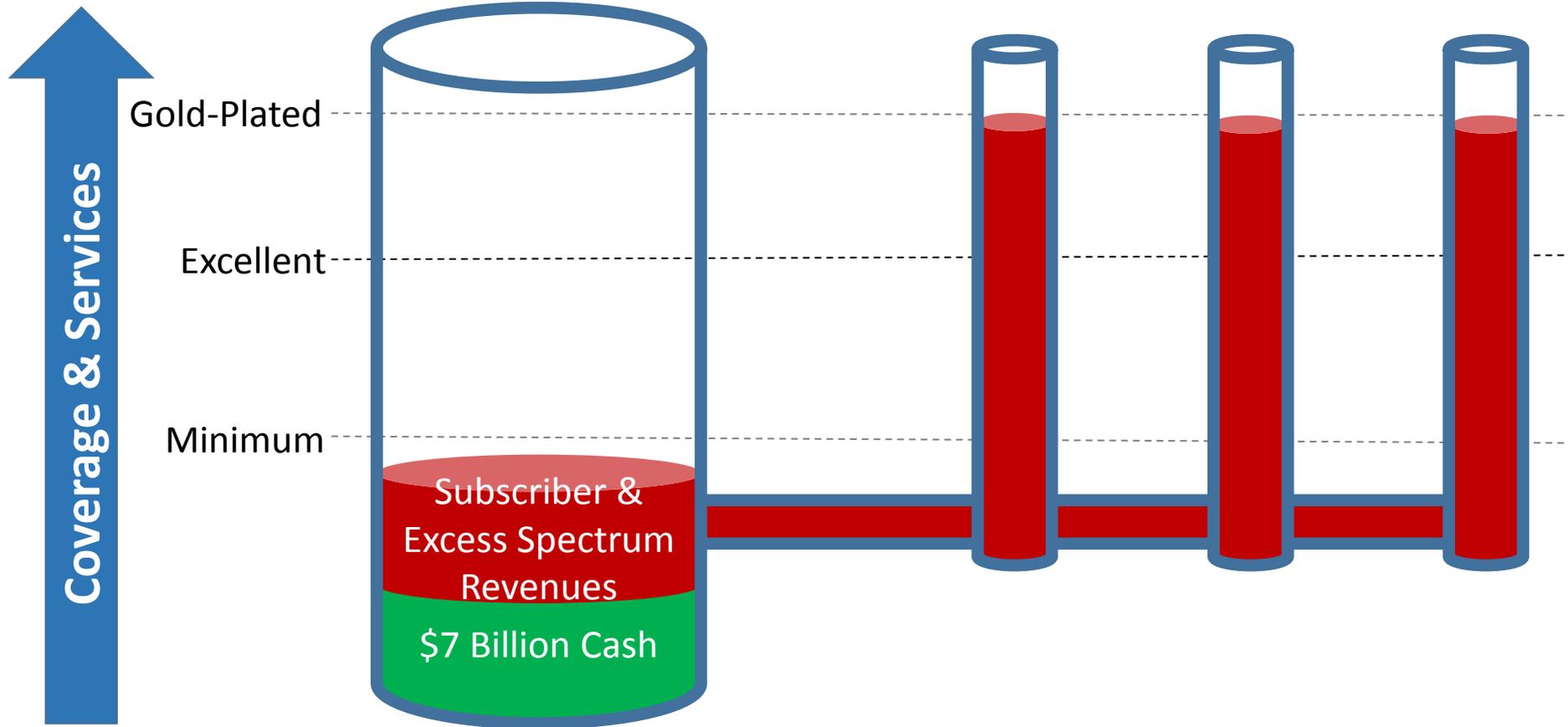


Potential Interpretations of the Act



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High Density Opt-Out States

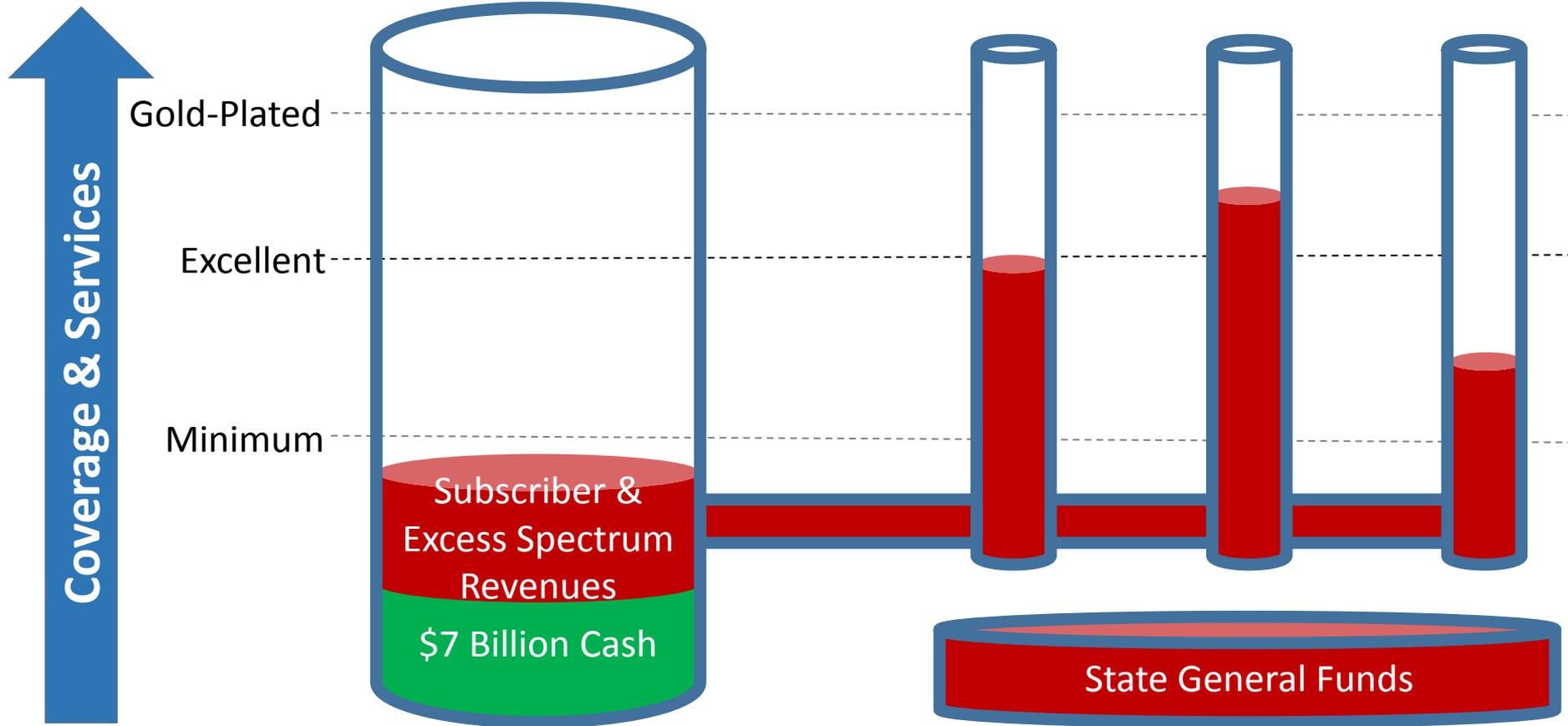


Potential Interpretations of the Act



FirstNet Opt-In States

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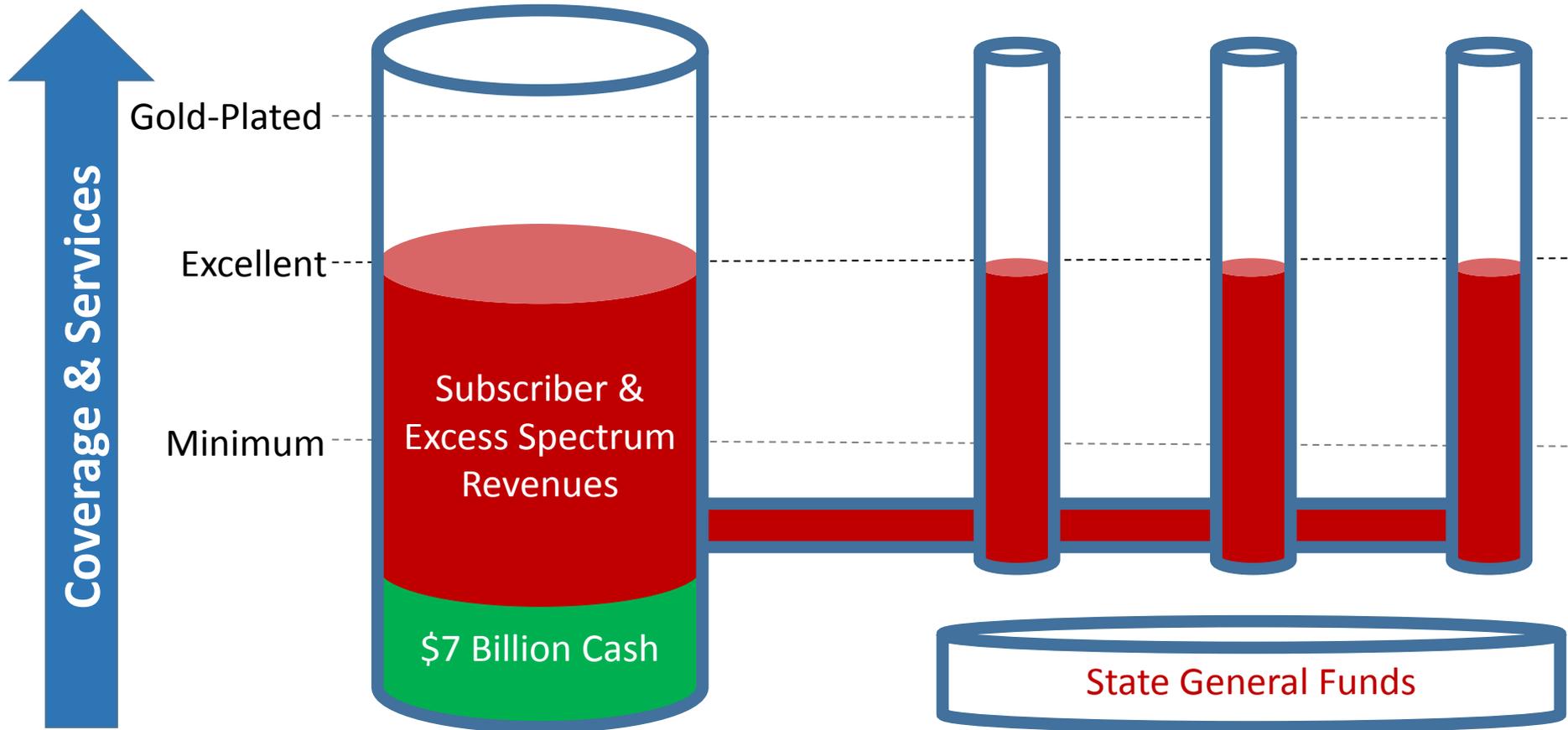


FirstNet's Preliminary Legislative Interpretations



FirstNet Opt-In States

High Density Opt-Out States





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Office of the CTO (OCTO) Update

Jeff Bratcher

Acting Chief Technical Officer

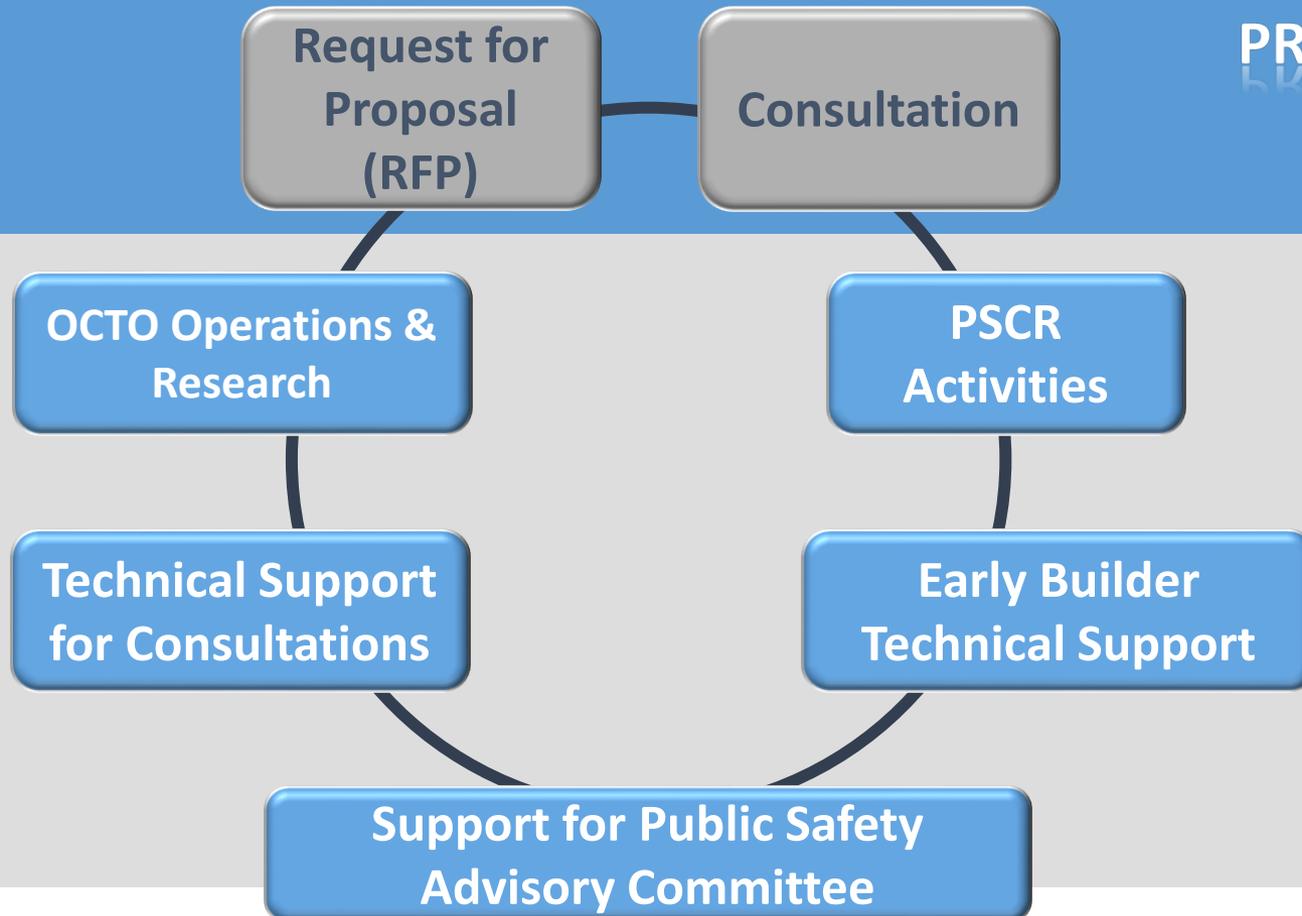


- Technical Activities
- OCTO Staffing
- Public Safety Communications Research Program (PSCR) Update
- Early Builders Update

OCTO Focus Areas



TOP
PRIORITIES



OCTO Organization Evolution



TODAY

Planning & Design

- Market Research
- Industry Standards
- RFP and associated deliverables
- Skills aligned network elements (RAN, Core, Device, Apps)
- **Federal Leadership Hiring**

Source Selection, Development, & Deployment

- Technical evaluation of offered solutions
- Increased team size to acquisition activities
- **Additional technical engineering staff**

Post-RFP Award

- Ongoing Operations
- Life Cycle Management
- Quality Assurance Surveillance
- Service Level Agreements (SLAs) / Key Performance Indicators (KPIs)
- Network Evolution & Planning
- Standards advocacy
- **Permanent employees focused on network operations and life cycle maintenance**

Since the last Technical Committee briefing:

- Director of Network Operations: Lynn Bashaw Dec. 29
- Director of Labs: Mike Van Zuiden Jan. 12
- Director of Applications: Mark Golaszewski Jan. 12
- Director of Devices: Joe Martinet Feb. 23

- Additional 11 technical contractors - RFP focus

Selections to be announced soon:

- Sr. Security Architect

FY15 Federal positions in development for posting:

- 17 engineering staff + 1 Admin Assistant

PSCR Supports FirstNet in 3 Key Technical Areas



Band 14 Long Term
Evolution (LTE) Testing and
Evaluation

Modeling and Simulation

Standards Development

PSCR Testing and Evaluation

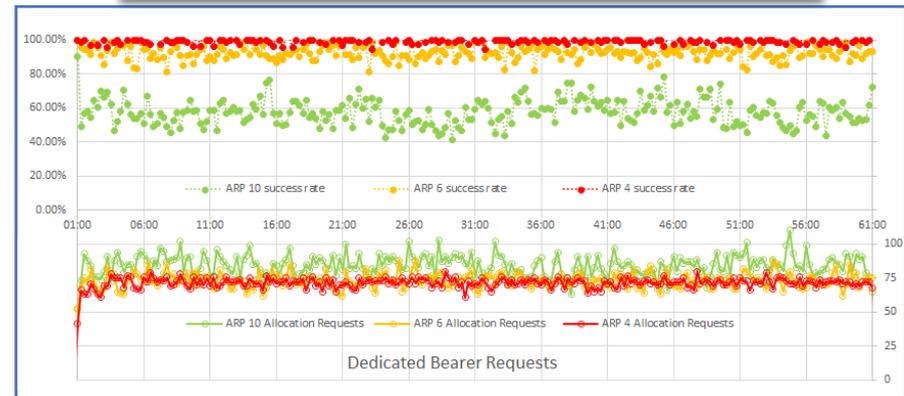


Radio Resource Allocation Priority



Expected to see High Priority Establishments take precedence over Normal Priority during congestion. Preliminary results have not shown expected outcome.

Data Bearer Allocation Priority

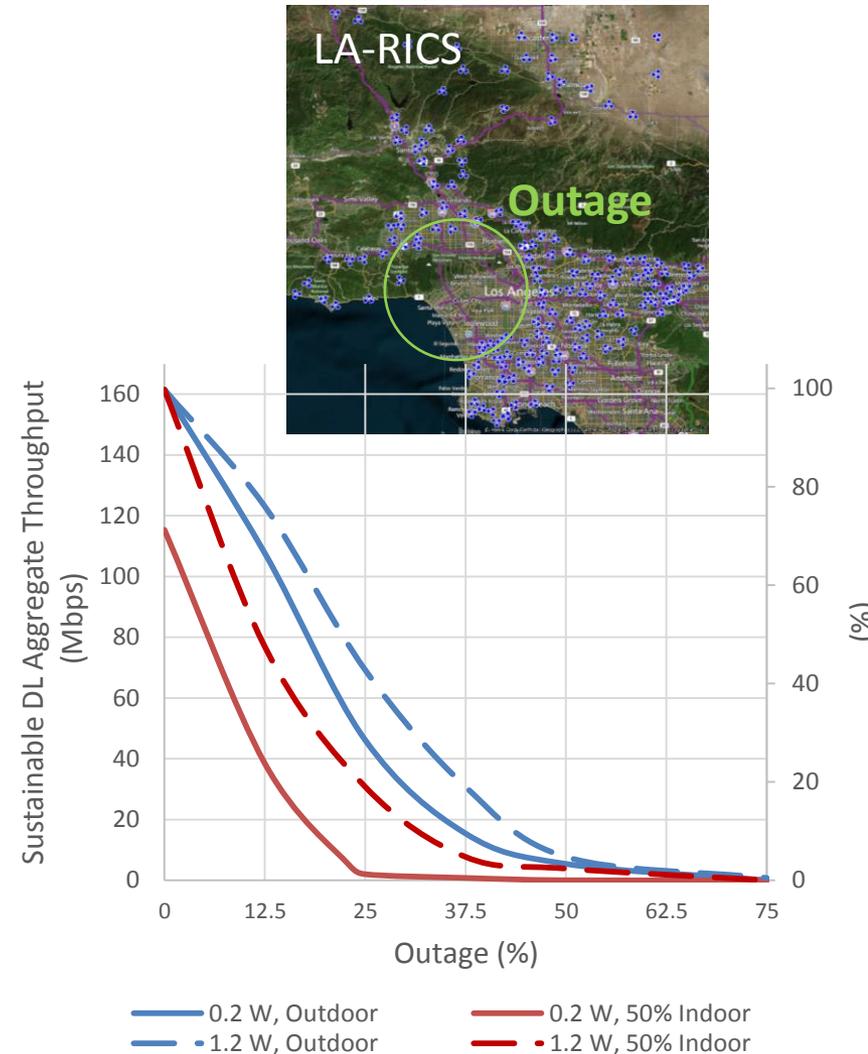


Expected to see High Priority Data Bearers take precedence over Normal Priority during congestion. Preliminary results confirm expected outcome.

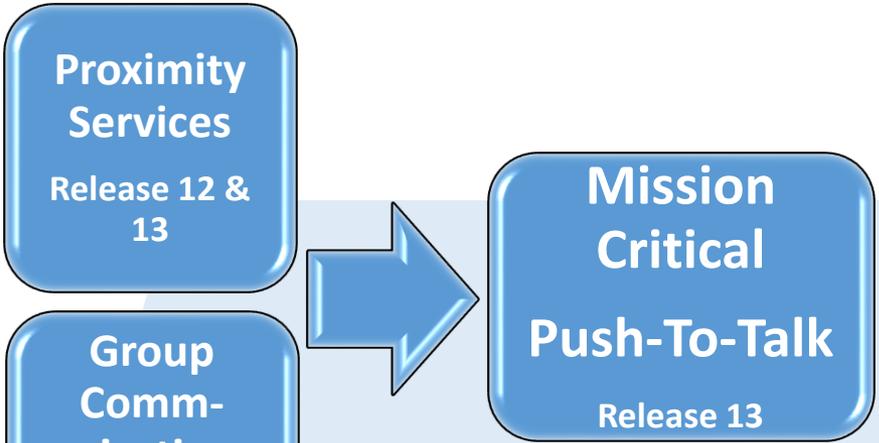
**Testing and Evaluation Continues to Provide
FirstNet with Valuable Data**

PSCR Modeling and Simulation

- Use LA-RICS site plan to evaluate high power resiliency strategy:
 - Set E-UTRAN Node B (eNodeB) to high power (FCC limit)
 - Compare with different user equipment (UE) powers 0.2W and 1.2W
 - Vary network outage from 0 to 75%
 - Compare indoor versus outdoor environments
- During a network outage, in order to maintain 95% coverage, the overall network throughput is reduced.
- Using high power-UEs can significantly improve the sustainable throughput
- Certain outage scenarios - up to twice as much sustainable throughput can be achieved.



PSCR Standards Development



FirstNet features are also supported by the UK, South Korea, Australia, Canada, France, Germany, and the Netherlands



Early Builder Band 14 LTE Projects



FirstNet Guiding Principal

“FirstNet will provide technical support to these projects and will share any lessons learned with the broader public safety community to enable the successful implementation of FirstNet’s nationwide network deployment. Designing and deploying a network that lives up to these principles will require an extraordinary level of coordination and collaboration among all stakeholders.”

Project	SMLA	KLCP	Sites	Primary Focus Areas / Key Learning Conditions	On-Air
1. LA-RICS	Yes	Yes	182	Secondary responders partnerships, Quality of Service (QoS), priority/pre-emption	3Q15
2. NM	Yes	Yes	7	Hosted core, int’l border spectrum management, Federal partnerships	2Q15
3. NJ	Yes	Yes	30	Deployables, disaster recovery, training, Network Ops Center notification	2Q15
4. ADCOM	Yes	Yes	16	PSCR/FirstNet test support, Band 14 device testing, demonstration access	NOW
5. TX	Yes	Yes	14	Core migration, data analytics, rural coverage, special events, LTE training	NOW

SMLA: Spectrum Manager Lease Agreement

KLCP: Key Learning Conditions Plan

What Have We Learned?

- Public Safety managed mobile virtual private network (MVPN) might prevent QoS, Priority, Pre-emption from operating at the application level



What Have We Learned?



- Most States and Public Safety Entities are not familiar with the relationship between “per-Gigabyte” pricing for Public Safety Users and the need for pre-pay/ Intelligent Network/Online Charging-based billing systems to support the pricing



What Have We Learned?

- FirstNet will not be immune to risk associated with delays due to public outcry over network build/new towers



What Have We Learned?

- In general, initial early builder networks do not have robust network performance, device, service reporting, or Operations, Administration, and Management (OA&M) platforms included



What Have We Learned?

- Relatively short life cycle of LTE equipment makes upgrades and technology replacement costly
 - Important to understand in the context of a multi-year network deployment schedule for the NPSBN





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SPOC Meeting Draft Agenda



- 2015 SPOC Meeting
 - April 14-15, Reston
- Regional Calls
 - May 25 – 29
 - June 22 – 26
 - July 20 – 24
- PSAC Meeting
 - June 1, San Diego (late afternoon public session)
- FirstNet Board Meetings
 - June 2, San Diego – Committee meetings
 - June 3 – Board meeting
- Public Safety Communications Research (PSCR) Public Safety Broadband Stakeholder Meeting
 - June 3 – 5, San Diego
- Quarterly SPOC Webinar
 - July 9, 2 pm eastern



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Thank You