

# 21<sup>st</sup> Century EMS Communications Systems: “Brick” to the Tricorder & FirstNet!



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*Communications Technology Advisor*  
**National Association of State EMS Officials**  
**National Association of EMS Physicians**  
**National Association of EMTs**  
**National Association of EMS Educators**  
**National EMS Management Association**





# Creating a Nationwide Network for Public Safety



Kevin McGinnis, MPS, Paramedic  
FirstNet Board Member

APCO Emerging  
Technologies Forum  
December 4, 2013



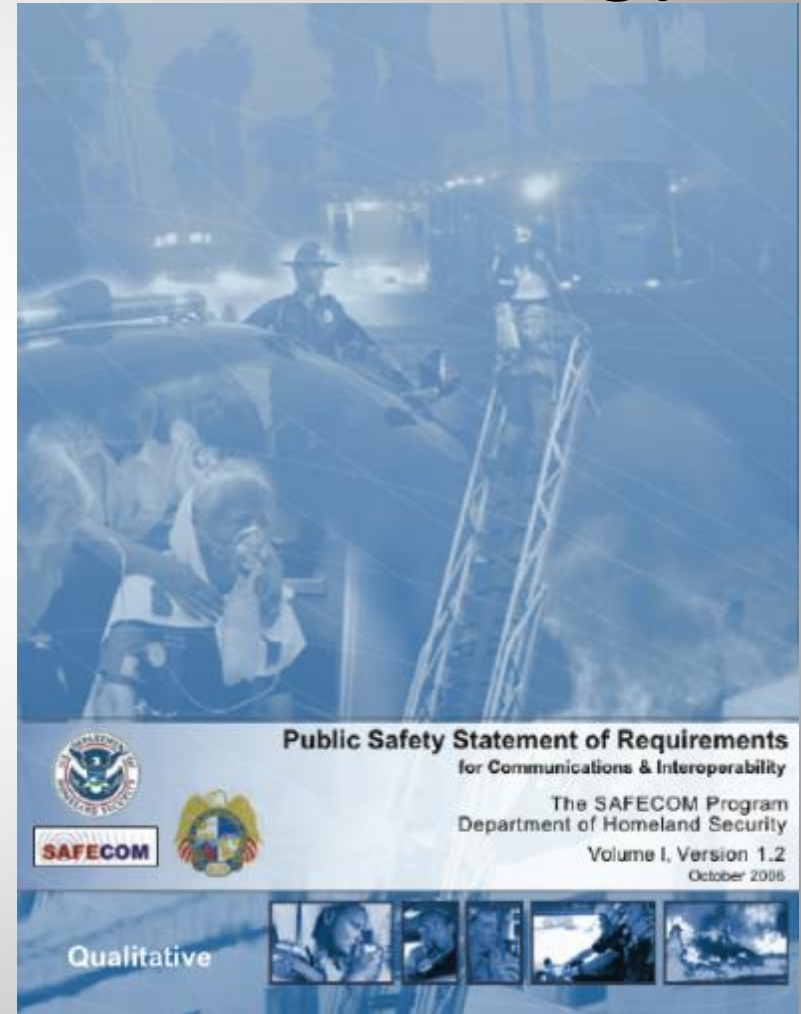


# EMS Needs Improved Communications Technology

Joint Advisory Committee on  
Communications Capabilities of  
Emergency Medical and Public  
Health Care Facilities



Report to Congress  
February 4, 2008



# EMS Information Needs



➡ Situational Awareness

➡ Common Operating Picture

Sequential Processing ➡ Parallel Processing

Inability to Adopt Available Diagnostic Applications



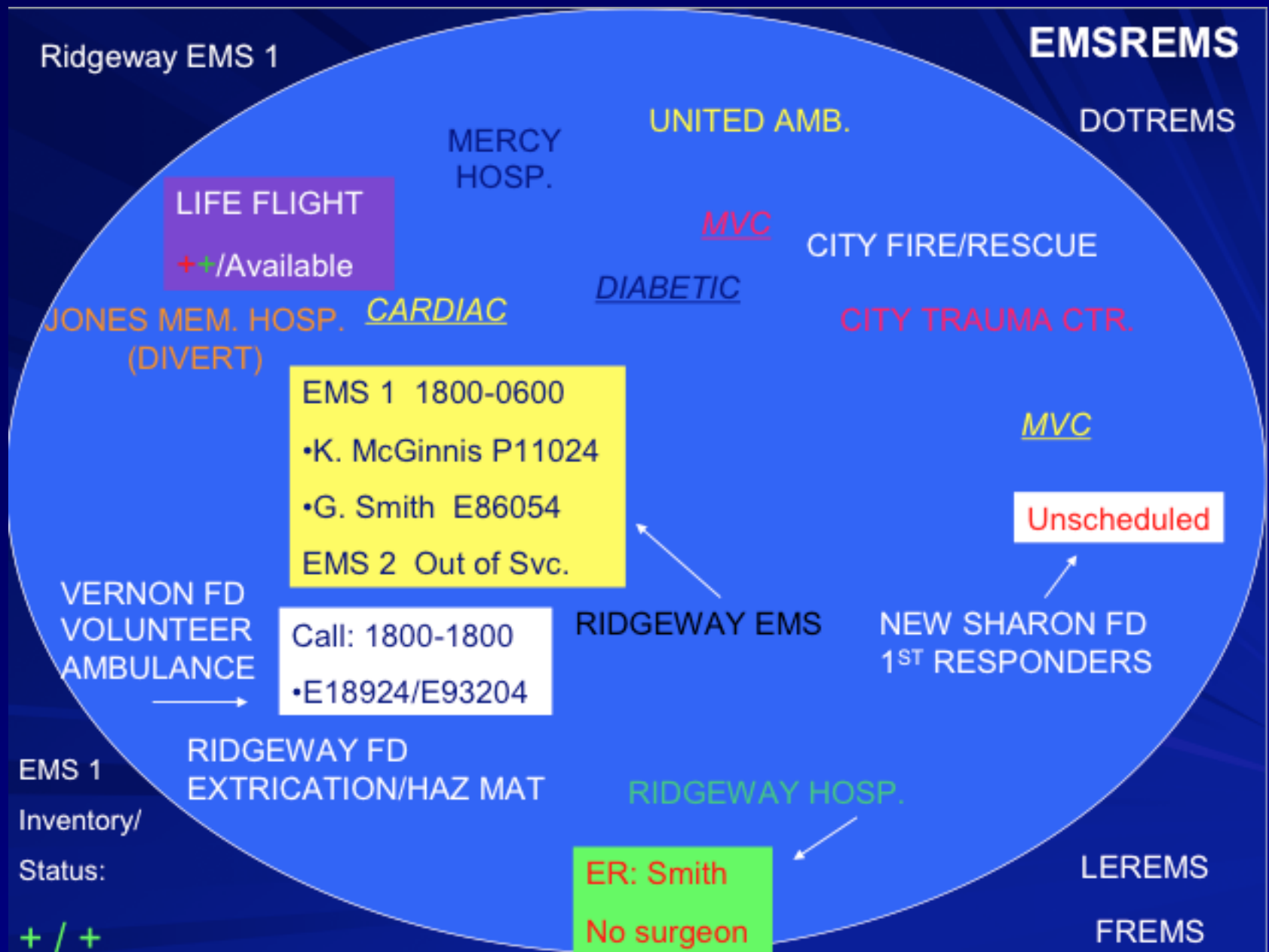
# What We Need to Improve Info:

## ■ Network of Data Bases

- Resource Status
- Events Status
- Adequate Bandwidth to Push/Pull/Park Data:
  - Voice
  - Other (Complex Biotelemetry, Video, Images)

## ■ GIS- (Visually) Based User Interfaces

- PDA, MDU, Desktop



**≠ 20+20+10+30+120+40 Minutes  
Nor 20+20+50+40 Minutes**



**Trauma, Heart Attack, Stroke.....**



Ridgeway EMS 1

EMSREMS

**ACN Alert**

MERCY  
HOSP.

UNITED AMB.

LIFE FLIGHT

MVC

CITY FIRE/RESCUE

CITY TRAUMA CTR.

2 Patients/45MPH  
1001 Hendrix Highway (Nash/Oak Sts.)  
Toyota Prius/Object/Head On

MVC

++Airbags ++Belts

++Severity

NEW SHARON FD  
1<sup>ST</sup> RESPONDERS

RIDGEWAY EMS

**MVC**

VERMONT  
VOLUNTEER  
AMBULANCE

RIDGEWAY FD  
EXTRICATION/HAZ MAT

RIDGEWAY HOSP.

Other Medical  
Alarms

# Injury Severity Predictor Allows Early Launch of Resources

Crash at 8:28 PM, 5/8/10

**Probability of Injury: 92%**

[Add/Edit Passenger Details](#)

Passenger	Age	Gender	Safety Belt	Entrapment	Ejection	Prob. of Inj.
1	40	F	N	Y	N	92.0%

**DeltaV: 30mph**

**PSAP Contact:**

PAYETTE  
1130 3RD AVE N  
PAYETTE, ID 83661  
(208) 642-6006

**Incident Information:**

Incident ID: 1438314045  
Event Notification: Vehicle Accelerometer  
Event Verified:   
Rollover: No  
Data Provider: OnStar  
Provider Contact: 800-486-7827

**Vehicle Information:**

Color: White  
Year: 2009  
Manufacturer: General Motors  
Make: Chevrolet (1)  
Model: Cobalt Sedan

[<< Previous Report](#)   [Next Report >>](#)   [Create Event](#)   [Close](#)

Direction of Force

☒ Airbag Deployed

Car Curb Weight (lbs):

Passenger Side Damage?

Rear Damage?

At A35. Look out for an accident.

ID: ONSTAR-1438314045.2  
Status: **CURRENT** [Auto-held \(updated\)](#)

Author: unknown  
Received: 10:25 PM, 5/8/10

**Recommended action based on probability of injury calculation:**

Provide information to PSAP and suggest vehicle extrication, helicopter request and closest and/or receiving hospital early notification.

Ridgewa

FREMS

TOYOTA

**PRIUS**

Gasoline-Electric Hybrid

*Emergency Response Guide  
(Revised)*



UNITED AMB.

**ACN Alert**

MVC

CITY FIRE/RESCUE

MVC

NEW SHARON FD

 **MVC** 

VERNO

RIDGEWAY EMS

RIDGEWAY FD

2 Patients/45MPH/Front Seats

2004 Toyota Prius Head On/Object

**++Doors ++Patients** (Driver Priority)

Ridgeway EMS 1

EMSREMS

# Parallel Processing

UNITED AMB.

DOTREMS

MERCY  
HOSP.

LIFE FLIGHT→

ETA: 12 Min's.

MVC

CITY FIRE/RESCUE

JONES MEM. HOSP. CARDIAC  
(DIVERT)

CITY TRAUMA CTR.

DIABETIC

Team On Alert for Pt:+

VERNON FD  
VOLUNTEER  
AMBULANCE

NEW SHARON FD  
1<sup>ST</sup> RESPONDERS

RIDGEWAY EMS

ED On Alert for Pt: +

 MVC 

RIDGEWAY FD  
EXTRICATION/HAZ MAT

RIDGEWAY HOSP.

Ames St. to Clark St. to Old  
Highway (E); 15.2 Mi.s;  
#3945 Old Highway

ETA: 10 Min's.

ROAD CLEARANCE

Lights + /Cars ++



FirstNet devices will improve accident triage and enable parallel processing.





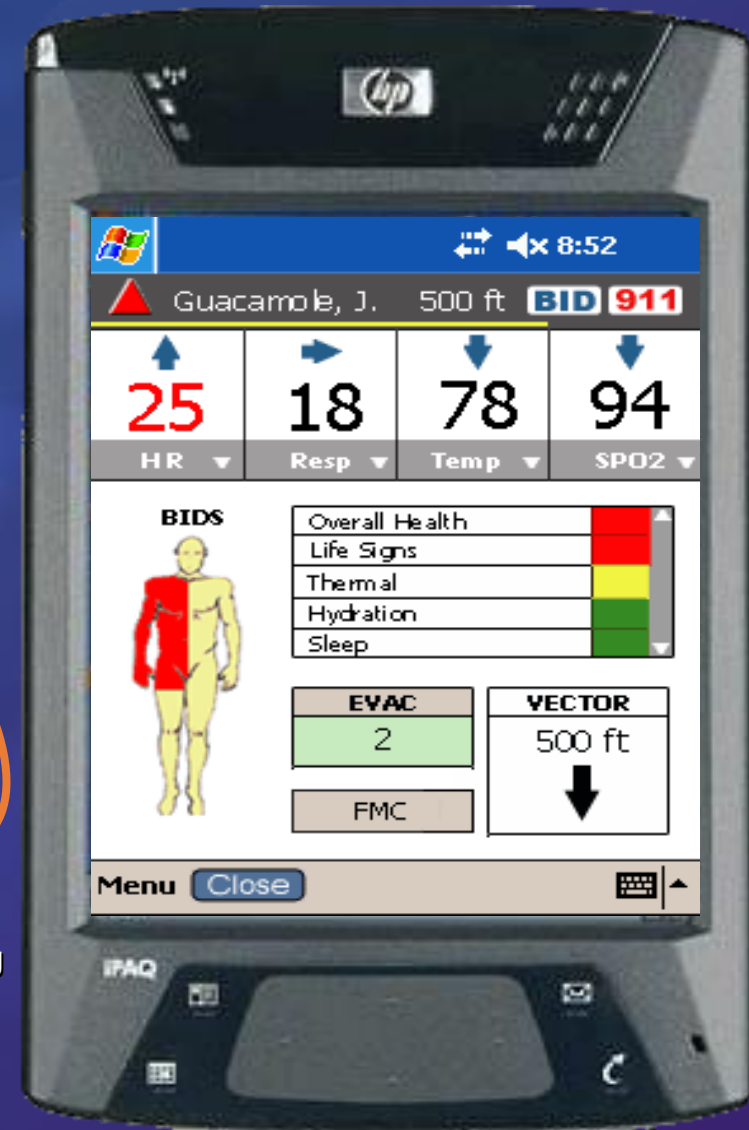
Electronic Health Record

Portable PSCD Type Platform

Speech Recognition Input



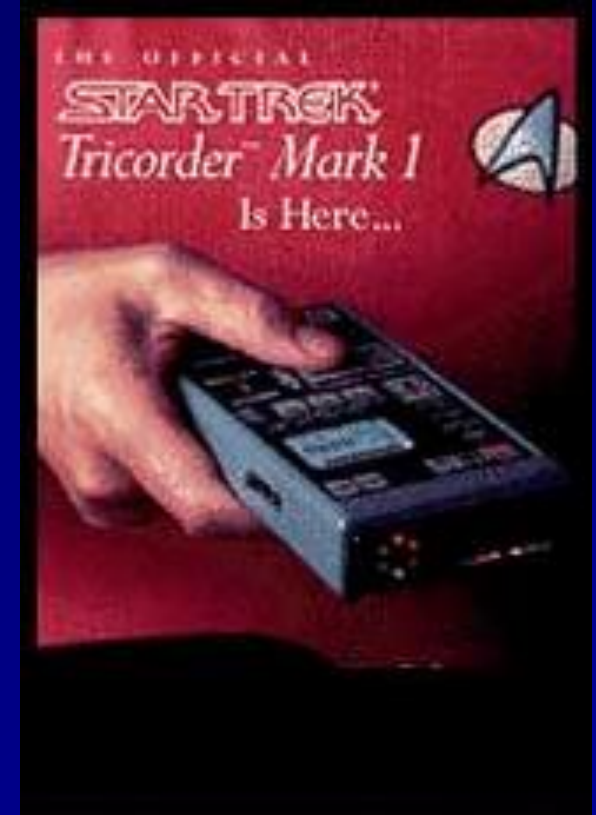
Wireless Patient Monitoring





## ■ Other Technologies

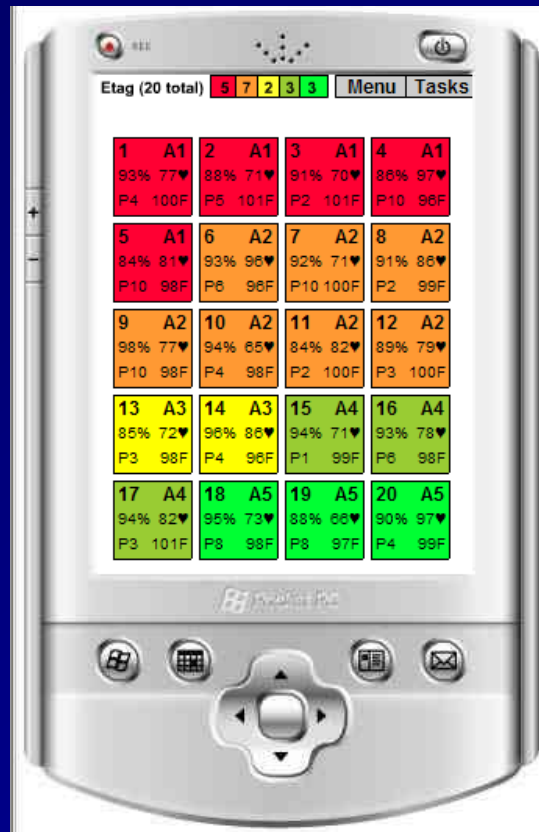
- 2 Way Video (Virtual MD/Community Paramedicine)
- Stand Off VS Monitoring
- Portable CT Scan (Images)
- Portable Ultra Sound (Video & Images)





# Other Technologies

- Multiple Patient Monitoring (Mass Casualty Incident)
- Multiple Responder VS Monitoring
- Infra Red Crowd Disease Detection



## ■ Other Predicted Technologies

- EMS Based Routine Patient Monitoring
- Automated Dispatching Based on Monitored Patients and Vehicles
- Audio/Video/Data Interfaces with “I’ve fallen” Systems
- Access to Searchable Patient Records/Images/Data
- Real-Time Vehicle Extrication Hazards Alerting Based on AACN Including Video/Images as Necessary
- Syndromic Surveillance and Quick Alerting to Specific Populations
- Physician Mediated Interface Between EMS Dispatch, EMS Crews and Nurse Call Centers

# VHF/UHF

## ■ Won't Cut It:

- Current:  $< 9.6$ + kbps @ 12.5KHz bandwidth

- Early Dial-Up: 14.4 kbps

- Current Dial-Up: 56 kbps

- V.S. Transmission: 76+ kbps

- Basic video (300-700 kbps)

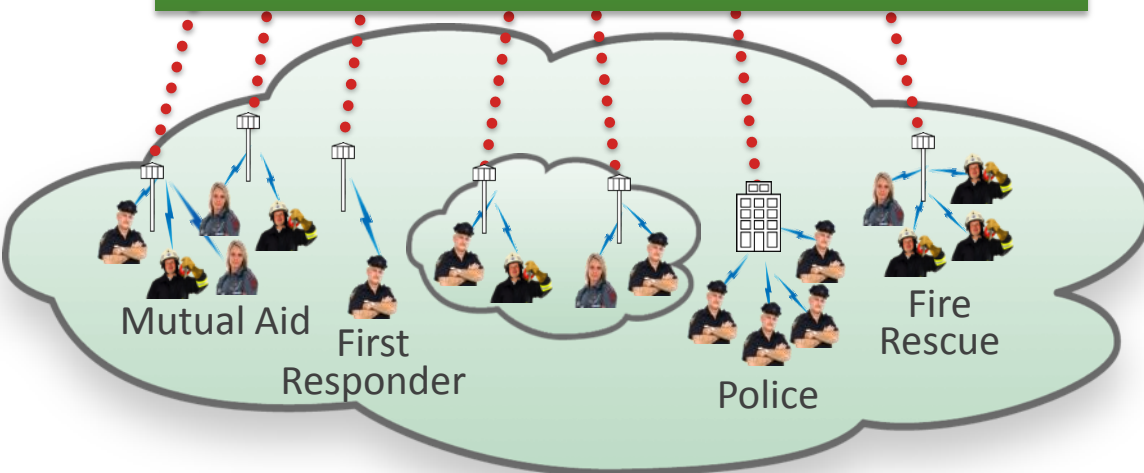
- Ultrasound/CT?

## ■ So Where Did That Leave Us?

Today, public safety communicates over different networks.

### Voice

Over 10,000 Separate Private LMR Networks



### Data

Commercial Wireless Networks



### The Downside

- Communication barriers
- Limited buying power
- Higher costs

- Not public safety-grade
- Network overload or failure
- No priority access



Communications shortcomings are amplified during emergencies.



**After 9/11, the public safety community fought hard to convince Congress that it needed a dedicated, reliable and interoperable network to provide advanced data communications capabilities nationwide ...fulfilling the last remaining recommendation of the 9/11 Commission.**

**Middle Class Tax Relief  
and  
Job Creation Act  
February 22, 2012**



# Meeting 1,300+ Detailed Requirements



NPSTC Requirements	Number
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 Interoperability Specifications	Number
Requirements (Must)	46
Considerations (Should)	55
Interfaces (Architectural)	11
Recommended Interfaces Requirements	9

## FirstNet plans to:

- ▀ Leverage all of the good work already done in these areas by the relevant PS groups:
  - Start from a baseline of 1,300 requirements and then add the full FNN specific suite
- ▀ Seek vendors who will meet or exceed the key PS needs, but broaden the requirements to increase flexibility and decrease costs.



# How Will FirstNet Help?

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**What is FirstNet?**

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**How Will FirstNet Impact Public Safety?**

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**Who is FirstNet?**

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**Plans for Creating FirstNet**

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**Working Together to Benefit Public Safety**

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# What is FirstNet?



## WHAT IS FIRSTNET?

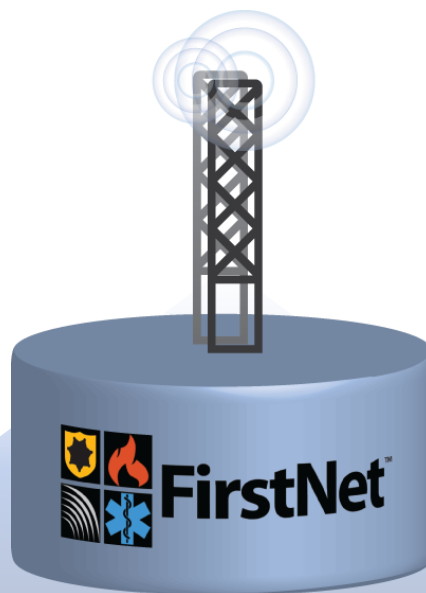
**FirstNet will be the first high-speed, broadband and data network dedicated to public safety.**



**FirstNet will be a bigger, more reliable, resilient and secure wireless “pipe”.**

### Public Safety-Grade

- Reliable
- Hardened
- Redundant
- Secure



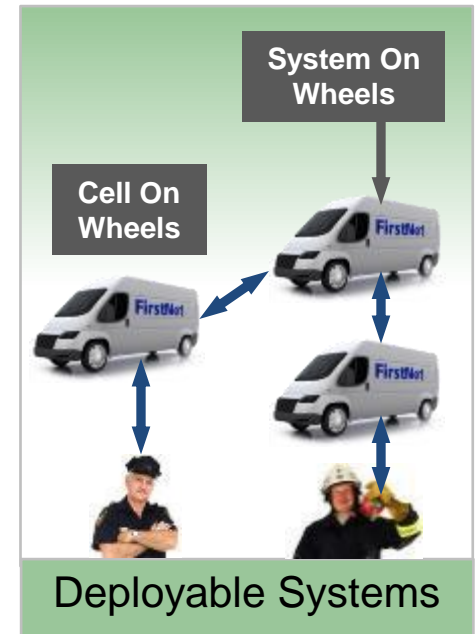
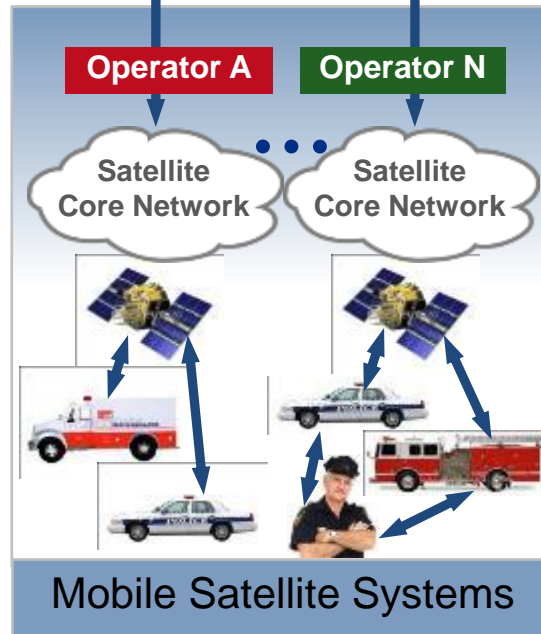
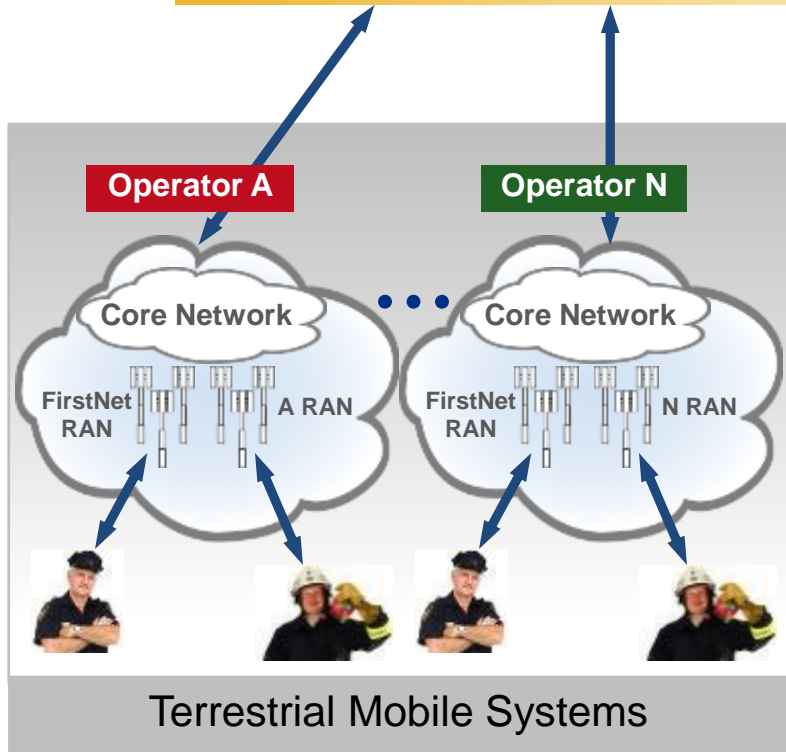
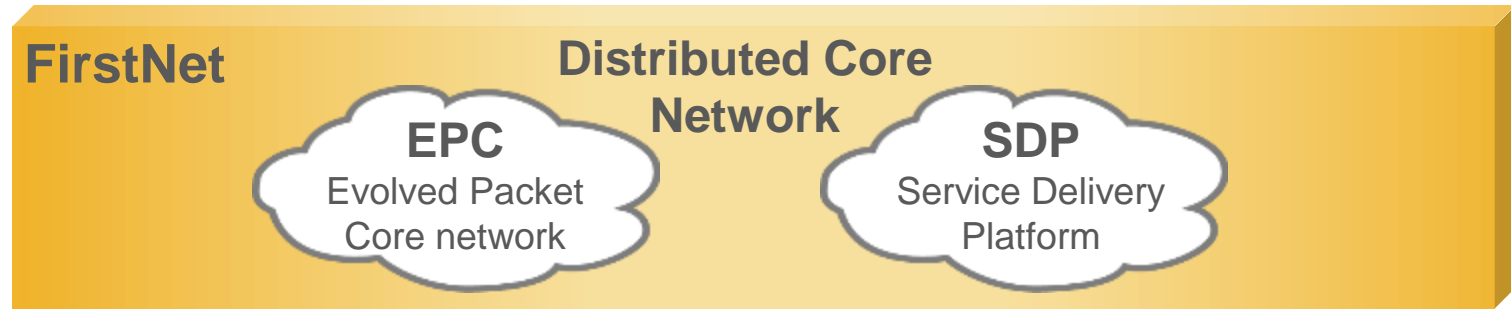
### Public Safety Applications

- 4G data for video & web
- Non mission-critical voice
- Existing and new applications

## Public Safety Effectiveness

- Dynamic Priority Access
  - Force Multiplier

# FirstNet “3-in-1” Nationwide Network Concept





# How will FirstNet Impact Public Safety?



## What will FirstNet do for public safety?



### Communication

- Data
- Video: 1-to-many
- Messaging/Group Text
- Images
- Voice Non-mission critical initially

### Applications

- Your applications (Private, Selective sharing)
- FirstNet Applications
- Syndicated Applications



### Services

- Data Storage
- Recordkeeping
- Search
- Databases (CJIS, etc.)

### Capabilities

- NOC Status
- Activation
- Product Ordering
- Dynamic Priority Access



# Who is FirstNet?



FirstNet is an independent authority within NTIA with a mandate by law including:

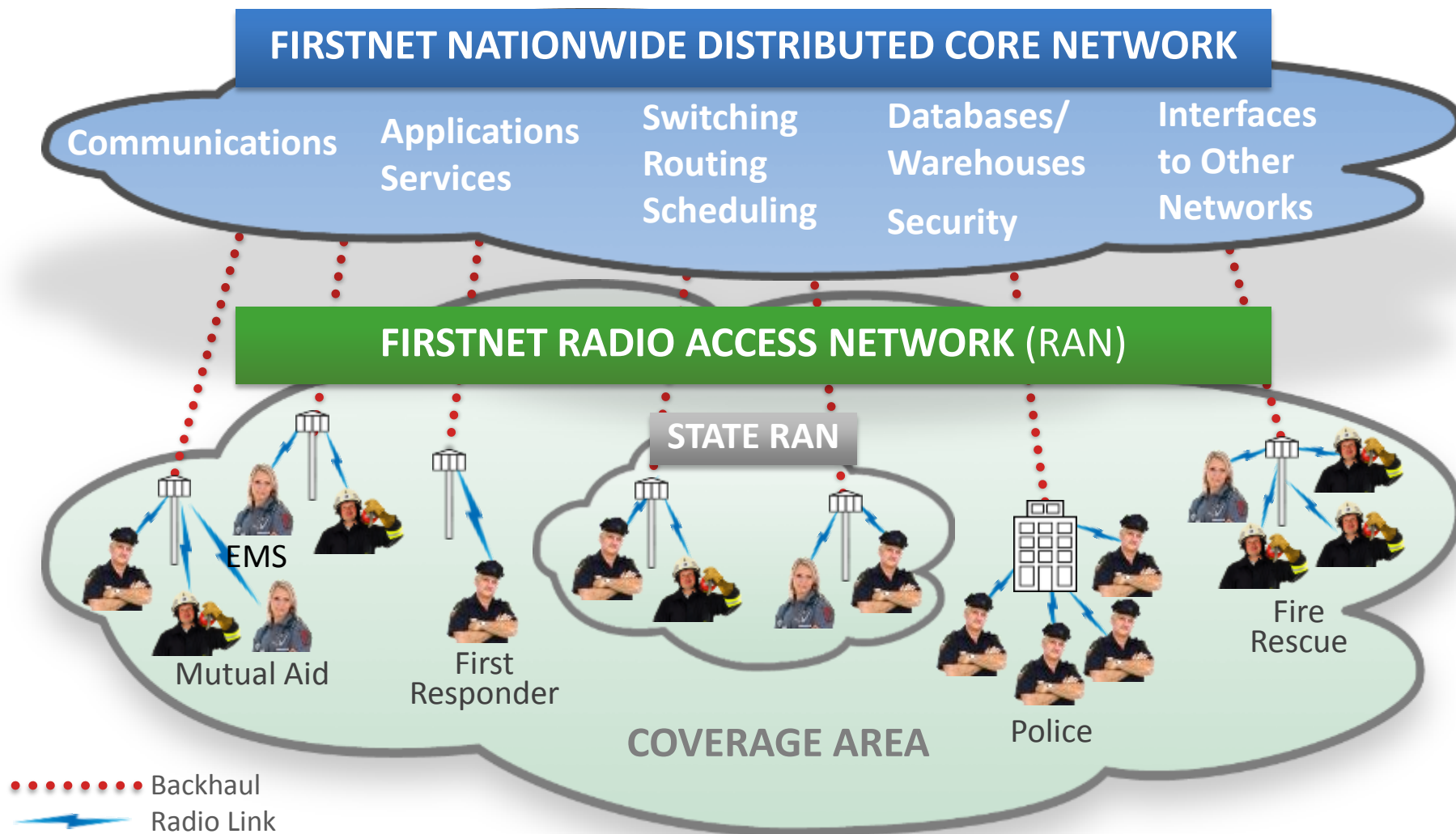
PURPOSE	To create a nationwide, wireless, interoperable public safety broadband network
Network	Single network architecture, LTE technology
Spectrum	700 MHz D Block
Funding	\$7B through spectrum auctions proceeds
Sustainability	Self-funded through fees



# Plans for Creating FirstNet



**FirstNet will have a nationwide core connected to local RANs.**



American Association of State Highway & Transportation Officials;  
Association of Public-Safety Communications Officials-International,  
American Public Works Association,  
Forestry Conservation Communications Association,  
Governors Homeland Security Advisors Council,  
Interagency Board, International Association of Chiefs of Police,  
International Association of Emergency Managers,  
International Association of Fire Chiefs, International City/County Management Association,  
International Municipal Signal Association, Major Cities (Police) Chiefs Association,  
Major County Sheriffs' Association, Metropolitan Fire Chiefs Association,  
National Association of Counties,  
National Association of Emergency Medical Technicians,  
National Association of Regional Councils, National Association of State Chief Information Officers,  
National Association of State EMS Officials, National Association of State 9-1-1 Administrators,

National Association of State Technology Directors, National Association of Telecommunications Officers and Advisors, National Congress of American Indians  
National Criminal Justice Association, National Conference of State Legislatures,  
National Council of Statewide Interoperability Coordinators,  
National Emergency Management Association,  
National EMS Management Association, National Emergency Number Association,  
National Governors Association, National League of Cities,  
National Public Safety Telecommunications Council,  
National Sheriffs' Association, National Consortium of Justice Information Statistics,  
U.S. Conference of Mayors, SAFECOM Exec,  
Fire Non-Management First Line Responder,  
Police Non-Management First Line Responder

- 41 Members
- Executive Committee had a two-day briefing with FirstNet technical team in March and met during PSCR in June
- Executive committee will meet monthly for updates with the General Manager
- Outreach for conferences
- Handling specific projects
  - User impacts of a shared network
  - Applications support
  - Training needs

**RFIs and RFPs will help us create 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**



To date FirstNet has issued 11 RFIs. Six more are in the works.

### ***Devices***

#### **RAN RFIs**

***Network Partnering and RAN Provisioning***

***Antenna Systems***

***Microwave Backhaul Equipment***

***Deployables***

***Satellite Service***

#### **CORE RFIs**

***Enhanced Packet Core (EPC)***

***Transmission/Transport***

***Data Center***

***Network Management Center/Operations Management Center (NMC/OMC)***

***Network Service Platform***

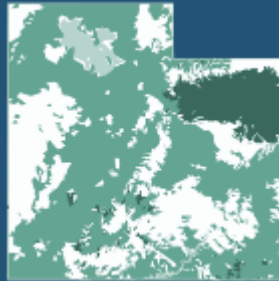
The FirstNet Board approved a \$194M budget to address six key initiatives.



**Network  
Partners**



**Mandates**



**Early Mover  
Projects**



**Portable  
Hotspots**



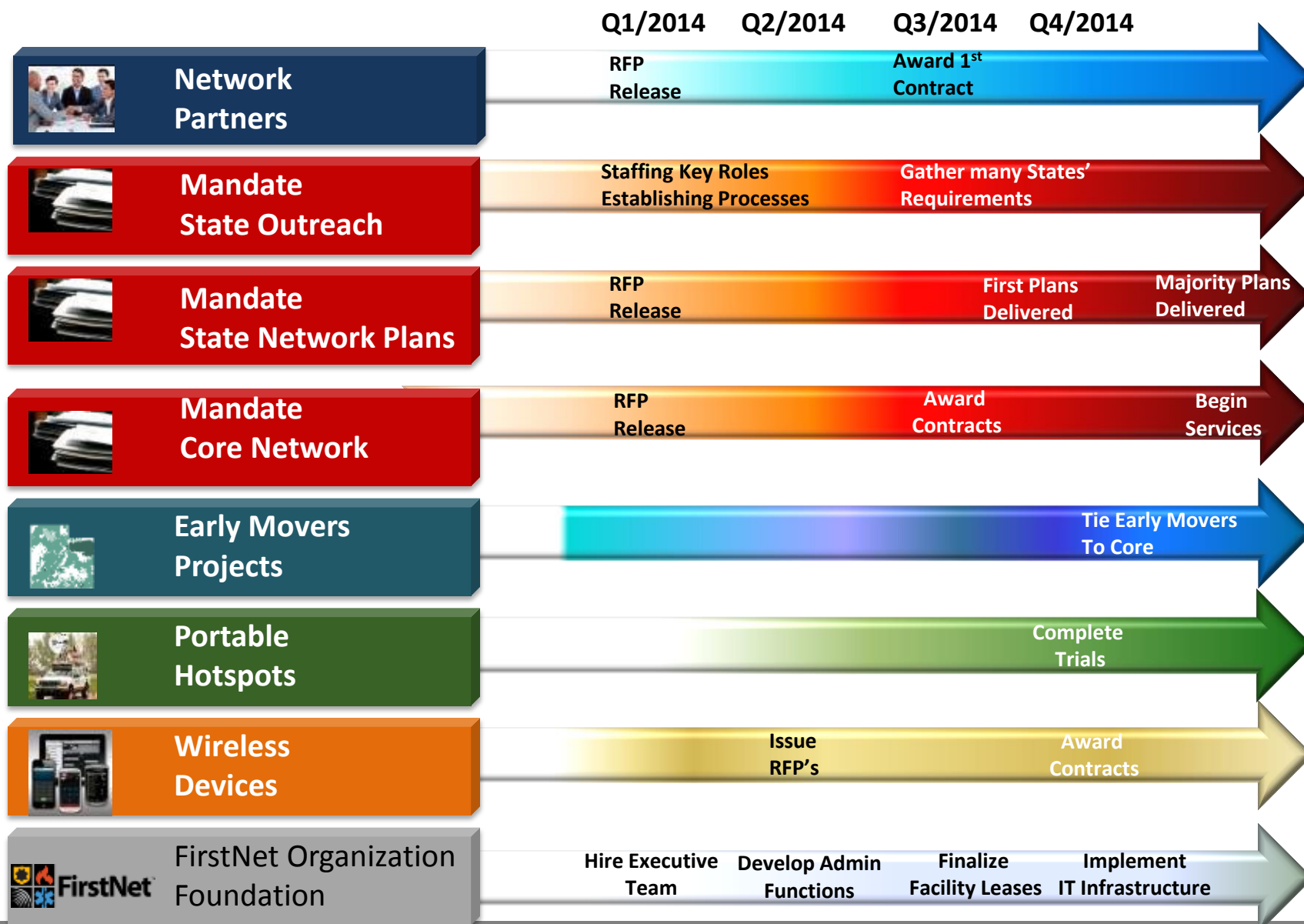
**Wireless  
Devices**



**FirstNet™**

**FirstNet Organization Foundation**

# 2014 BUSINESS PLAN MILESTONES



# Working Together to Benefit Public Safety

State Consultation Process





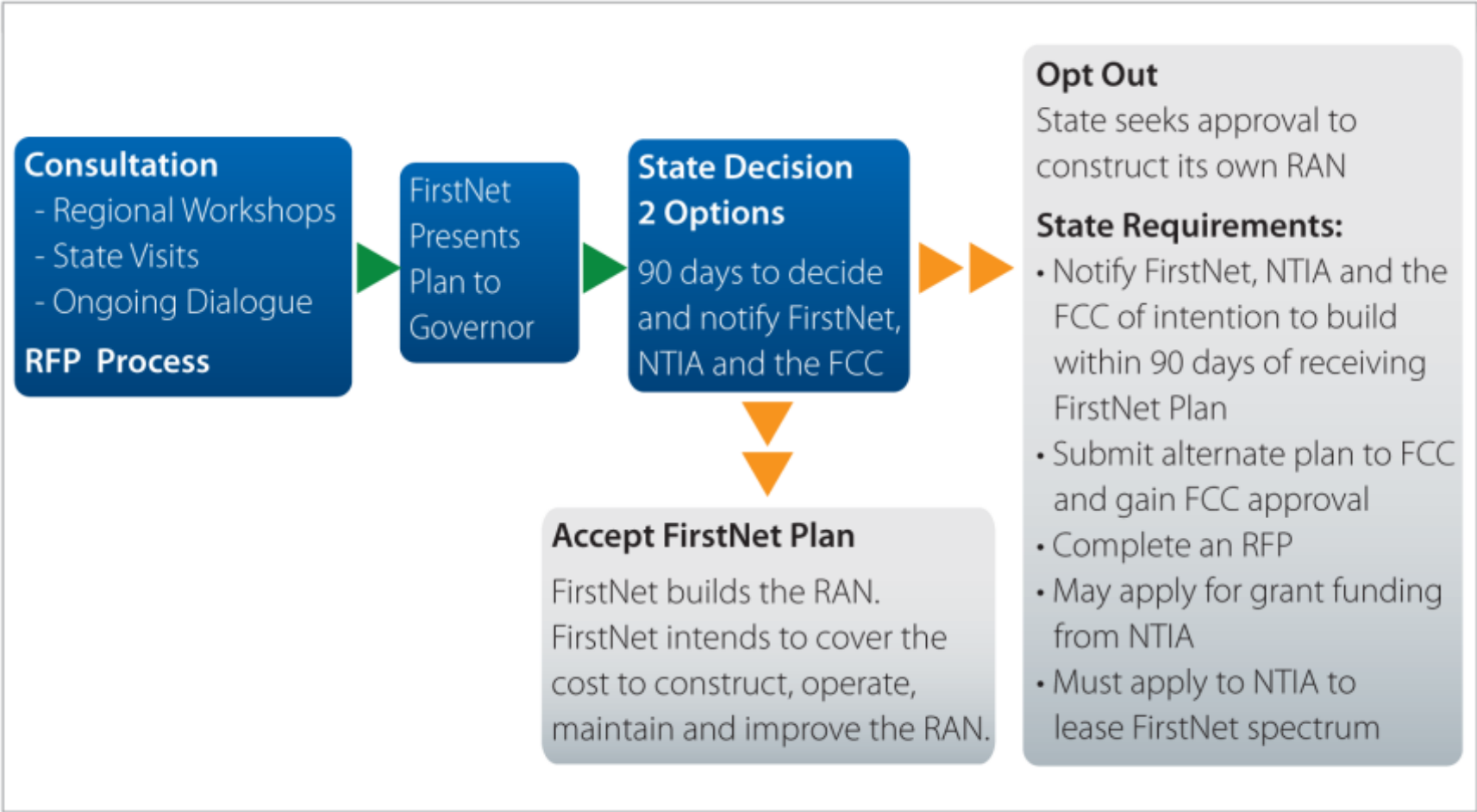
## STATE CONSULTATION (AND TRIBAL AND FEDERAL) PROCESS

FirstNet will continue to consult with the states, tribes, territories and localities to gather requirements for developing state network build-out plans.

Activities	When
Nationwide, Regional Workshops	Conducted May – June 2013
Pre-Consultation Coverage Workshops	To be scheduled with DHS OEC prior to state visits
Individual State Visits	After FirstNet staff is hired and pre-consultation coverage workshop with OEC
Federal and Tribal Outreach	Planning is underway to address the needs of these key users
Data Collection	Commencing with Phase 2 SLIGP Funds Release



FirstNet will collaborate with states to develop and deliver a RAN deployment plan that meets their needs.





And It's Just Been a Year.....

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