



**APCO**  
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# APCO 2013 WHILE WE WAIT FOR FIRSTNET

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# Nationwide Public Safety Broadband Network (NPSBN)

- FirstNet Board has been in place about 1 year
- Has made a lot of progress in this time
- Anxious to move forward and deploy the network
- Building new network from ground up is difficult process
  - Commercial network operator would have hundreds of engineers working on a project this size
  - FirstNet has less than 50 people devoted to the process
- Funding beyond the \$7 billion will be needed
  - In addition to building network, FN must determine who partners will be

# When Will the Network Arrive?

- Harris County Texas up and running
- BTOP Grant recipients will be next to build
  - These builds should be considered beta areas for the network
    - Used to prove out capabilities, capacity, operation of the network
  - These portions of the network will be proving grounds for FirstNet
    - Hopefully will include partnering to learn how it can accomplished most effectively

# Timeframe Moving Forward

- Lots of planning remains
- States only beginning to receiving their planning grants
- FirstNet has sent out large number of RFIs
  - Will need to be reviewed and refined
- NPSTC and APCO working on what is ‘Public Safety Grade’
  - Will serve as guideline for network build-out and hardening requirements
- Best Guess: Network build-out will start in 2014
- Will take several years to complete nationwide

While Waiting for FirstNet

# WHAT CAN YOU DO?

# Prepare, Test, and Learn

- Making use of the Broadband network will require
  - Agencies working together closer than ever before
    - At incidents involving law, fire, EMS
    - Bandwidth demands for all three
    - Priority traffic for all three
    - Some will also require capacity for ongoing field use
    - Network will have to be carefully managed

# Working Together

- Better use of Unified Command structure
  - Who needs bandwidth when
  - May not be enough for all, must be on “need to have” basis
- Pre-planning cross-agencies a must
- Start now to work closer together
  - Practice incidents, tabletops
  - Real incidents, how much data/video is needed

# Pre-Planning Is Essential

- Bringing video from the scene in a PSAP
  - Implications for dispatchers
  - How video priorities will be set, by whom
  - What is acceptable video resolution
    - From incident to IC/PSAP
    - From PSAP to IC and others at incident
  - There are companies working on video resolutions/compression/switching systems



# During an Incident

- Who determines what video is needed
  - Initial response
  - After incident command has been established
  - After incident is under control
- How much capacity do EMS teams need
  - From scene for vital signs/ultrasound
  - For video triage
- Who else needs access

# There Will Be a Learning Curve

- Not only in what network will do
- How each city/county will allocate network resources during incidents
- This will be a nationwide network controlled locally
- Local control means managing the network
- Across ALL first responder services

# Commercial Networks for Broadband

- Commercial 3G and 4G caveat
  - Commercial MAY offer some form of priority access, but not pre-emptive priority access
    - One reason Congress agreed Public Safety needs its own network
  - During times of major incidents, commercial networks may be overcrowded; Public Safety may not have access
  - If device cannot communicate with signaling channel, network will have no idea you are attempting to access it

# Commercial Networks for Broadband (2)

- For this reason and others
  - Do NOT consider commercial networks as mission-critical networks
  - Understand their shortcomings as well as their advantages
- However
  - Making use of commercial networks before, during, and after NPSBN is deployed makes sense.

Hands-on with LTE

# MAKING USE OF COMMERCIAL NETWORKS

# Start Now with Commercial Networks

- Four commercial networks are deploying LTE
  - AT&T Wireless
    - Fall-back to HSPA and HSPA+ (3G)
  - Verizon Wireless
    - Fall-back to CDMA EV-DO Rev A
  - Sprint/Nextel
    - Fall-back to CDMA EV-DO Rev A
  - T-Mobile
    - Fall back to HSPA+
- Networks continue to roll out more LTE coverage
  - Only AT&T, Verizon have deployed 700-MHz LTE
- Data speeds usually “throttled back” but very good

# Getting Started

- If you have not already deployed commercial broadband
  - Take it slow: You don't have to equip all first responders at first
  - Make sure police, fire, EMS all have subscribers to experiment with interoperability between departments
  - Choose devices that meet your needs
    - Vehicular modems for laptop-equipped vehicles
    - Tablets for Chiefs, Command Staff, Investigators, Incident Command
    - Smartphones
  - Work with network operators/vendors for security of the network
    - Virtual Private Network (VPN) connections, secure applications
    - Locked devices in the field

# FirstNet Will Start at Street Level

- Vehicular modems are best place to start
  - If you already use laptops, new LTE modems can be easy deployed
  - If you already use low/speed text-based applications, today's LTE modems will let you move into more robust data and video world
  - You can purchase modems “FirstNet”-ready



# Choosing a Commercial Network

- Caveat
  - During Incidents, commercial networks may become overloaded and not available
- Determine which network provides best coverage in your area
  - Which has best overall coverage to handheld devices
  - Ask for drive test information from each

# Choose One or More Networks

- It is possible to contract with more than one network operator
  - There is no LTE roaming between major networks today, but some devices will enable a session to remain up when switching
  - One contract for each network *OR* primary contract with one and a bucket of data from a second network
    - Play them against each other

# LTE Commercial Contracts

- The more users you sign up, the less the cost per user (normally)
  - Work cross-agency in your area to achieve maximum number of units and best pricing
- Commercial networks want your business
  - Now and after FirstNet is live
  - Will work with you and your organization to have you up and running over broadband

# What You Can Do over LTE

- Send and receive videos
- Send and receive pictures
- Faster, more complete license plate checks
- Building plans to first-in responding units
- More advanced EMS diagnostics
- Much more

# What Applications Are Available

- APCO Application Community (APPCOMM)
  - Various applications including FBI Child ID, EMS, utilities, local police, fire and EMS applications, learning tools, resource books, many more
- Smith Micro, Motorola Solutions, many more
- Many in development

# Applications

- GPS and voice-enabled navigation apps
  - Real-time route traffic updates
- Location of needed incident resources
  - Location of all responders regardless of agency
  - Other resources such as fire hydrants
- NCIC access (must be secure)
- Online report preparation and submittal
- Missing persons pictures
- Fingerprints from the field

# CAD to the Field

- Many CAD companies have, or are developing CAD extensions for sending call data to responding units
- Many existing text-based apps being upgraded to take advantage of broadband
- Harris County Texas has number of applications up and running
- More to come soon!

# Once You Are Connected

- Try the network, both data and video
- Send and receive information not only with your own department but to other first responders in your jurisdiction as well
  - Get used to sharing incident information among law, fire, and EMS
- Use it to augment dispatch
- Find out what it can do and what it cannot!



# Voice over LTE

- AT&T, Verizon and Sprint
  - All offer push-to-talk over their networks
  - Each network has its own PTT service
  - They are *NOT* compatible or interoperable with each other
  - All work well for *NON*-mission-critical communications
  - Can be interconnected to LMR systems

## Voice over LTE (2)

- PTT over LTE is *NOT* mission-critical in nature today
- There is *NO* LTE PTT standard for either commercial or FirstNet broadband
- Keep LMR for voice, use broadband *ONLY* for data and video services
- PTT over LTE may become available at some point
- Harris County using PTT over LTE but it too is a priority technology from its vendor and could provide some interesting test results

# Learning about Broadband Now

- Makes sense
- Will reduce training time on FirstNet
- Will teach how to share data
- Will jumpstart advantages of data and video capabilities
- First responders will learn to work closer together
- Remember: Commercial networks are *NOT* mission-critical and can become congested
- During major incidents, commercial networks may not be available for use

# BROADBAND DEVICES

# Broadband Devices

- Start out with mobile-only modems
- Next, tablets for command, control, reporting
- Others will evolve over time
  - Separate LTE and LMR handheld devices
  - Combined LTE and LMR devices
- SOMEDAY perhaps a single LTE device for voice, data, and video

# LTE Mobile Devices Available Today

- Several types of mobile modems
  - Network-specific for each commercial network
  - Multi-network modems AT&T and Verizon
  - LTE modems for one commercial network and FirstNet
  - LTE modems for multiple commercial networks
  - Multiple technology/multiple network modems
- All FirstNet-capable modems should have been tested by Public Safety Communications Research (PSCR)
- Any modem purchased should be FirstNet-capable and/or upgradable to FirstNet LTE standards

# oMG Vehicle Router

## InMotion Technology Vehicle Router

### Connects using

Ethernet

Serial connection

USB

Wi-Fi

Bluetooth

### Network Autosense for best network selection

### Supports multiple wireless broadband networks

4G LTE

FirstNet

4.9-GHz Public Safety

### GPS



# Teldat Mobile Router

## Teldat Mobile Router

### Support for

3G

LTE

FirstNet

Wi-Fi/4.9 GHz

Bluetooth

**GPS-enabled**

**Onboard security**

**Multiple Network support**

**VPN enabled cross-networks**





# Motorola VML700 LTE

## VML700 LTE

### Supports

FirstNet LTE

Verizon LTE

Verizon 3G

Wi-Fi 802.11 b/g/n  
(2.4 GHz only)

### GPS

**Auto-Router for best Network**

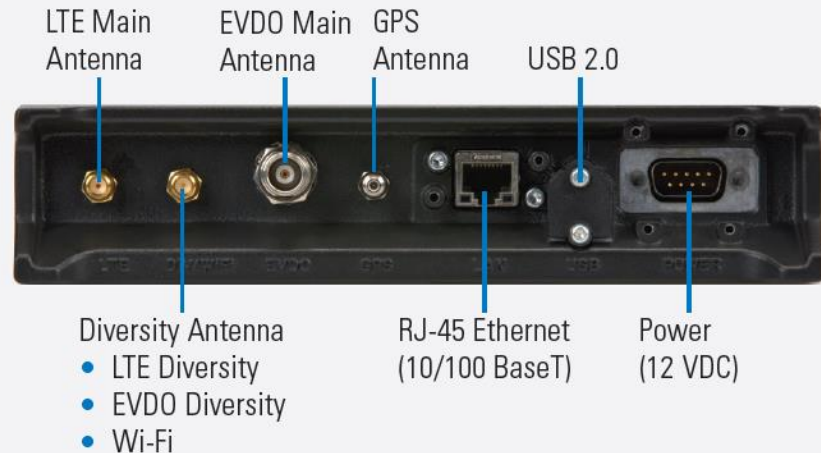
**Select homed network**

**Connects via**

Ethernet

USB 2.0

### PORTS



# General Dynamics Modem

## GD Calamp Modem

### Bands Supported

LTE AT&T *OR* Verizon

LTE FirstNet

HSPA+ (AT&T network)

3G EV-DO (Verizon)

Wi-Fi 802.11 b/g/n (2.4)

### Connects via

USB 2.0

Bluetooth (option)

ZigBee (option)



# LTE Vehicular Modems

- More on the APCO Show Floor
- Questions to ask
  - How many networks are supported?
  - Does it support seamless network roaming?
  - Has the modem been submitted to PSCR for testing? Are the results available?
  - Does the modem include Virtual Private Network (VPN) support?
  - Does it support Public Safety 4.9 GHz?
  - Will vendor guarantee full compliance with FirstNet?
  - Does the modem support MIMO? (2 antennas), Externally mounted?
  - What software is provided? Can they be managed remotely over the air?

LTE Public Safety

# TABLETS

# Harris RF-3590 LTE

## RF-3590 LTE

### Communications

LTE: Public Safety

LTE: Verizon Wireless

Wi-Fi (802.11n)

GPS

Bluetooth

### Other

Android O/S

Ethernet

USB 2.0

RS-232

Docking connectors

Dual SIM support

Ingress protection: IP67



# Tablets at APCO Show

- There should be a number of tablets
- What to look for
  - LTE Public Safety
  - LTE Commercial: AT&T or Verizon (extra points for both)
  - 2G and 3G commercial (at least 3G services)
  - GPS, Bluetooth
  - Support for Wi-Fi *AND* Public Safety 4.9 GHz
  - Daylight readability (check in bright lighting)
  - Has it been submitted to PSCR?
  - Will vendor guarantee FirstNet compatibility?

LTE Band 14

# HANDHELD DEVICES

# First Responders and Smartphones

- Today's smartphones are not one-handed devices
  - Require two hands to operate
  - Most use touchscreen
  - Not a problem when first responder is patrolling or sitting in a vehicle *BUT* it is a problem when on an incident
  - Today's smartphones not designed for harsh environments
  - Touchscreens not conducive to use when wearing gloves
- Hardened devices are coming but most vendors do not understand one-handed requirements of Public Safety
  - If used in the field, will augment but *not* replace existing LMR radios for the next few years at least



# Motorola LEX 700

## LEX 700

### LTE Supports

LTE

Wi-Fi

Bluetooth

### Connectivity

Interconnects to P25 radios  
(Motorola)

**Can change channels, listen to audio *BUT* must use LMR radio for transmissions; LMR radio mic must be used**

**Provides dial-up voice over Verizon, if FirstNet adds voice, over FirstNet as well**



# Harris InTouch RPC-200

## InTouch RPC-200

### Communications

LTE Public Safety

Commercial Networks

LTE either AT&T/Verizon

AT&T 2G and 3G

Verizon 2G and 3G

Push-to-Talk BeOn

(Harris proprietary)

### Other

Android O/S

Touchscreen

Speaker/Mic/Bluetooth

Front and rear cameras

Ip-67 compliant



Getting Ready to

# MOVE FORWARD WITH LTE

# Commercial Networks

- Commercial 3G, 4G networks have good coverage today
  - AT&T, Verizon use 700-MHz band for LTE so coverage and building penetration will be similar
  - Sprint, T-Mobile deploying LTE on higher spectrum
    - Coverage will be good but different from 700-MHz coverage
- Commercial operators want your business
  - Make them earn it with pricing and compatibility guarantees
  - How much will it cost per user per month?
  - Remember, you will have to pay for both commercial and FirstNet service, don't get into long-term commercial contracts that cannot be changed

# Once You Choose Your Network

- Stage the equipment
- Check it out before installation
- Pre-load applications from your network
  - *DO NOT* install more than a few applications to start
  - Choose the ones that will be most used and of benefit in the field
  - Train those who will be using the applications
  - Start slow, get feedback from the field—insist on it!
  - Seed your field users
    - Give some units to those who adapt to technology quickly
    - Give some to those who resist using new technology
  - Make sure you can manage the devices over the air

# Questions that Need Answers

- Adding broadband capabilities to augment existing LMR voice services will require a learning curve
  - What can it be used for?
  - How much video can be used over the network?
    - How do we manage video streams?
  - What types of applications can it support?
    - How do we secure our applications?
  - How is capacity and bandwidth managed across all of the agencies?

# Questions that Need Answers (2)

- Ideal to use now to shorten learning curve for FirstNet
- What types of devices should be given to which types of first responders?
- How secure are the devices? How do we make them more secure?
- How secure is the network? How do we make it more secure?

Recapping

# CONCLUSION



# Recommendations

- Get together with all first responder organizations in your jurisdiction
  - Make a group purchase/lease agreement
    - Pool data between all agencies
    - Make sure devices are interoperable between agencies
  - When dealing with vendors
    - Make sure to purchase FirstNet upgradable devices
    - Get a guarantee that the vendor will replace/upgrade devices
  - Go slow...remember that LTE is about data and video
  - FirstNet is a network to *AUGMENT* voice not replace it!

# Recommendations (2)

- Experiment with coverage for mobile and handheld devices
  - Coverage will be different
  - Check in-building coverage
  - If Wi-Fi roaming is available make sure it has same security levels
- Experiment with applications and video
  - Check your applications; make sure what you have on commercial network will be nearly the same on the Public Safety network

# One Final Reminder

- Using commercial LTE will help prepare for FirstNet!
- *BUT* understand the differences between commercial networks and what is coming on FirstNet
- On commercial networks you will have
  - No priority access
  - Slower data speeds (good for learning)
  - Differing capacity issues depending upon how many commercial users are sharing same cell sector
- MOST OF ALL
- ***DURING MAJOR INCIDENTS YOU MAY HAVE NO ACCESS!***

# Q & A



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