APCO 2013
WHILE WE WAIT FOR FIRSTNET

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August 18, 2013
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.
MAKING USE OF COMMERCIAL NETWORKS

Hands-on with LTE
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

- 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
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

Support for
- 3G
- LTE
- FirstNet
- Wi-Fi/4.9 GHz
- Bluetooth

GPS-enabled

Onboard security

Multiple Network support

VPN enabled cross-networks
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
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
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!**
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