

Fundamental Reform in Public Safety Communications

Jon M. Peha
Carnegie Mellon University

Associate Director, Center for Wireless & Broadband Networks
Professor of Electrical Engineering & Public Policy

www.ece.cmu.edu/~peha

Dangerous Myths

- Myth 1: “The problem” is interoperability
 - There are many serious problems
 - Blindly improving interoperability can exacerbate other problems
 - A comprehensive solution is needed.
- Myth 2: We can “fix” interoperability through incremental changes in technology or policy.
 - The US system was designed to have interoperability problems.
 - We accepted these problems to have other benefits, like greater local autonomy.
 - Fundamental reform is now needed.
- Myth 3: Fundamental reform is too expensive.
 - Fundamental reform could save money in the long run.
 - We are wasting resources to maintain the current approach.

The Biggest Problem

- By tradition, public safety is a local issue.
- 50 thousand public safety agencies in the US.
- Many design and operate their own communications systems.

Outdated Assumptions of Today's Public Safety Infrastructure

- Each local agency should make independent decisions
- Only government infrastructure can serve public safety
- Public safety cannot share spectrum
- Voice communications is the dominant application

Consequences of These Assumptions

- Unnecessary interoperability failures
- Wasted spectrum, unnecessary spectrum shortages
- Fragile undependable systems
- Lack of advanced capabilities
- Excessive costs, wasted tax-payer dollars

DTV Transition Is An Opportunity

- Transition to digital TV will make 24 MHz of additional spectrum available for public safety in 2009
- No incumbent users or legacy equipment
- A place for a new system with superior technology and effective policy.
- Once new system is in place, users of outdated technology may migrate to new system over time.
- But only if we establish new policies in this spectrum

Integrated Wireless Network (IWN)

- IWN Program to support federal emergency responders
 - Depts. of Homeland Security, Justice, Treasury
- No services for state and local public safety agencies
- Significant resources
 - \$3 to \$30 billion
 - spectrum

A Nationwide Network

- We need a nationwide broadband network with a consistent architecture
- Should meet public safety requirements and take advantage of all available wireless networks
 - A primary system to guarantee support for mission-critical communications.
 - Secondary systems where available, e.g.
 - Commercial cellular
 - Municipal wifi
 - Ad hoc networks
 - Satellite

The Primary System

- Primary system could be run by
 - A federal government agency or organization
 - A confederation of regional government entities
 - using a common architecture and coherent design
 - A commercial company
- A government-run network is feasible and more cost-effective than what we have now.
- With a commercial company, potential benefits are greater, challenges and risks are greater.
 - Could save money and spectrum, especially if public safety shares infrastructure with general public.
 - Commercial company may be unwilling to adequately serve rural areas.
 - A monopoly commercial provider may choose to raise prices and neglect dependability, security, coverage

What Federal Policy-Makers Can Do

- Federal government should proceed on two fronts
 - Advance government-run nationwide network
 - Evaluate proposals from industry
- Begin defining the architecture of next-generation nationwide broadband network based on open standards
 - with leadership from federal government.
- Engage experts outside government by funding research programs in HSARPA, NSF, perhaps elsewhere
- Reevaluate IWN
 - Possibly expand program to support *all* first responders.
 - Possibly terminate program, using funding and spectrum for a more complete solution to public safety problems.

What Federal Policy-Makers Can Do

- Provide spectrum for a nationwide public safety network
 - In this spectrum, all infrastructure must be consistent with national architecture.
 - FCC must reject current plans and proposals, most of which emphasize flexibility over standards and regional planning.
- Further consider allocating some spectrum to be shared by public safety and other users.
 - Public safety has priority, but rarely needs the spectrum.
- Examine proposals from potential commercial providers
 - Determine whether provisions can insure that public safety requirements are met without deterring commercial providers.

Local Agencies Must Be Engaged

- Local agencies should play a critical role in defining the nationwide architecture
- Federal and local roles must be clear
 - Local agencies should not fear loss of autonomy in core public safety missions.
- Financial incentives are the key
 - Federal funding and new efficiencies will help participating local agencies save money on communications
 - No more federal grants to prop up the old inefficient system

For more information, see
www.ece.cmu.edu/~peha/safety.html

Jon M. Peha

Carnegie Mellon University

Associate Director, Center for Wireless & Broadband Networks

Professor of Electrical Engineering & Public Policy

www.ece.cmu.edu/~peha