Carnegie Mellon University



Broadband and IP for Public Safety

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Public Safety Traditions

- Dependable communications systems are essential to public safety and homeland security
- Public safety systems have traditionally assumed
  - Only voice communications are important
    - even though other capabilities are now practical
  - Technology should be designed for public safety
    - even though mass-produced commercial technologies are less expensive
  - Systems should be operated by *local* public safety agencies
    - even though planning over larger regions would improve dependability, save lives, and lower costs.

- How are innovative public safety agencies taking advantage of new technologies from other sectors? and serving needs beyond individual agencies?

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Broadband and IP

- Today's presentations describe systems using broadband, IP, or both.
- Broadband
  - Communications at higher data rates
- IP (Internet Protocol)
  - A packet-switching technology created for use in the Internet
    - Used to support many applications, including exchange of data files, email, web browsing, voice over IP (VOIP), video streaming, remote access to computers.
  - Use of IP does not imply use of the Internet

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Policy Context

- 9/11, Hurricane Katrina brought attention to issues
- The digital TV transition will release a large amount of premium spectrum, some for public safety.
  - No legacy equipment. No outdated policies.
  - A tremendous opportunity to address current weaknesses.
- FCC is developing rules that determine how this spectrum can be used for public safety.
- Congressional legislation and oversight
  - on grant programs to individual public safety agencies
  - on spectrum allocations and regulations for public safety
  - on more fundamental reform to address the more serious long-term issues with public safety communications
  - on IWN system developed only for federal emergency responders
    - Departments of Justice, Homeland Security, and Treasury

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Problems and Opportunities

- There has been considerable attention on one issue: *interoperability* among first responders
  - Ability to communicate and share info across agencies
- Interoperability is one important issue, but not the only important issue.
  - Not all communications are between first responders
  - Communications between first responders suffer from other problems
    - Dependability, security, inefficient spectrum use -> shortage, excessive costs
  - Attempts to improve one aspect (interoperability) often degrade other aspects (e.g. dependability)
- Today's panel includes interoperability issues, but is not limited to interoperability issues.

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Types of Communications and Information Systems

- The public communicates with 911 operator
  - connecting to public safety answering point (PSAP)
- Dispatchers communicate with first responders throughout region
  - Primary systems generally run by government agencies
  - A few agencies use secondary systems too
    - commercial cellular, municipal wifi, satellite, etc.
  - TV spectrum will soon be allocated for this.
- In a few cities, first responders also use short-range high-capacity communications systems
  - e.g. portable systems carried to site of emergency
- Information systems run over communications systems
  - Exchanging criminal records, building schematics, maps, medical files, ...

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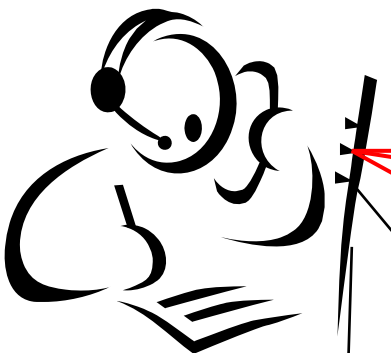
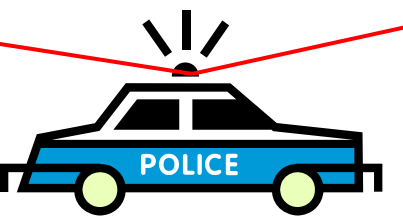
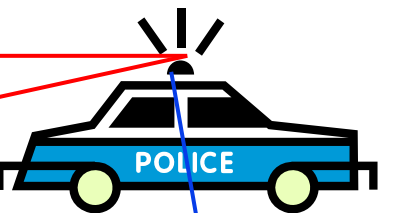
Communications Examples



PSAP

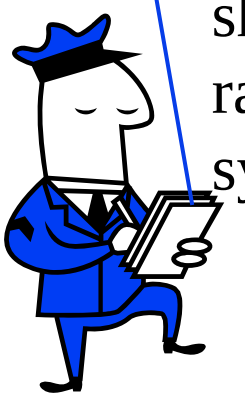
Communications to first responders

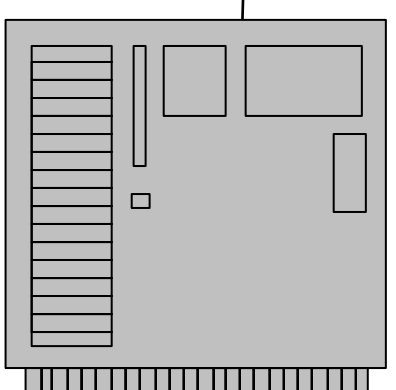




short range system







Statewide police records

Call to 911



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Different Roles for New Technology

- Public safety agencies have working systems
  - often based on old technology
- Cannot tolerate disruptions
- New technologies may be used
  - as a basis for next-generation systems
  - as a supplement to legacy systems
  - to facilitate the transition from old to new
    - allowing old and new to coexist

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Today's Panel

- Steve Correll, The International Justice and Public Safety Information Sharing Network
- Sgt. James Craige, Alexandria VA Police Dept.
- Mark Grady, Indiana 911 Project
- Maj. Dean Hairston, Danville VA Police Dept.
- Robert LeGrande, Deputy Chief Technical Officer for DC

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For more information on public safety communications,

see www.ece.cmu.edu/~peha/safety.html

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