INTEROPERABILITY
FREQUENTLY ASKED QUESTIONS

What is Interoperability?

The Public Safety and Wireless Communications Interoperability pamphlet prepared and published by the Public Safety Wireless Network (PSWN) program, indicates that, "Interoperability simply refers to the ability of public safety personnel to communicate by radio with staff from other agencies, on demand and in real time. Public safety agencies require three distinct types of interoperability – day-to-day, mutual aid, and task force."

What types of emergencies typically occur in your community, county, region, or state? What public safety agencies would respond to each emergency?

Idaho typically has incidents that can be classified into one of four categories of disciplines: Law Enforcement, EMS/Fire, Public Works, or any combination of the above. Law Enforcement incidents range from traffic stops and criminal investigation to correctional incarceration and administration. Emergency Medical Service (EMS)/Fire incidents cover a wide range of events from trauma and medical calls to structure fires, hazardous materials incidents, and large event stand-bys. Public Works incidents cover a wide range of services from roads to water, sewer, gas, and electrical supply. Road events can include: snow removal, sanding, removal of traffic hazards, bridge damage, and emergency road closures. Water and sewer incidents can include: flooding, loss of service from leaky or broken pipes, and shut off for fire incidents. Electrical supply issues can include pre-planned or emergency outages on a small or large scale and emergency shut off for Law Enforcement or EMS/Fire incidents.

In Idaho, incidents occur on regular bases that require a multidiscipline response. For example, a 'relatively speaking simple' motorcycle crash on State Highway 21. This crash would have Law Enforcement, EMS, and Idaho Transportation Department (ITD) personnel responding, and very likely an air ambulance from one of the non-governmental agencies providing that service. Examples of larger scale events that have occurred in Idaho can be found below.

What level of necessity, if any, exists that responding agencies be able to talk to each other as they are responding to an emergency?

The Department of Homeland Security has identified interoperability as a major necessity for all public safety personnel. This necessity has spurred the creation of a whole new branch of The Department of Homeland Security called SAFECOM. According to safecomprogram.gov, "SAFECOM was established to serve as the umbrella program within the Federal Government to help local, tribal, state, and federal public safety agencies improve public safety response through more effective and efficient interoperable wireless communications."

2/8/2007

SAFECOM has published "*The Statement of Requirements (SoR) for public safety communications and interoperability* which provides information on base level requirements for a system of interoperable public safety communications across all local, tribal, state, and federal "first responder" communications systems."

What were the key issues for development of statewide systems identified during The Boise, Idaho, Public Safety Wireless Network (PSWN) Program Symposium February 20, 2001, to February 22, 2001?

"Planning statewide systems can involve technical issues, political considerations, and coordination with peers in other organizations. As states nationwide have completed this process, several best practices have emerged. During the symposium, representatives from various states shared their experiences and some of these best practices. These best practices and additional considerations for developing statewide systems are listed below.

- **Executive-level support**. Senior government support is critical for successful statewide systems. Political champions can give a project credibility, ensure funding for the project's survival, and argue for the project against opposition. These individuals also provide needed support during the legislative process and in supporting requests for funding public safety wireless communications systems.

- **Buy-in from local entities**. Most successful statewide systems have found ways to involve local agencies in gaining support for system development. Well-developed and consistent presentations to important existing and potential stakeholders, including the use of professional quality videos, help obtain and maintain buy-in from the government executives, legislatures, the citizenry, and other key stakeholders.
- **Memorandum of understanding (MOU)**. An MOU is a detailed agreement that describes the purpose and intent of the shared system, defines the users, and defines the owner/operator responsibilities. MOUs are sometimes used to forge partnerships and are instrumental in the early stages of planning and partnering. The MOU often allows communication lines to be opened.

- **A shared vision**. A compelling vision, with an understanding of the urgent need to improve public safety communications, is required to achieve the needed level of support. Furthermore, the state must be willing and able to assume integration responsibilities for the system and work to overcome turf and coordination issues with local and federal partners.

Does the US congress have anything to say about wireless interoperability?

Yes. In the "Comprehensive Homeland Security Act of 2003" Subtitle C-- Interoperability of Information Systems, section 8301, the Act charges the Director of the Office of Management and Budget, and the Secretary of the Department of Homeland Security with endeavoring to make information technology systems for homeland security interoperable. Also, they need to assure appropriate funding for interoperability and provide a yearly report on the status of interoperability.

What are the challenges that need to be addressed to achieve interoperability?

According to the NGA Center for Best Practices in their Issue Brief on *Strategies for States to Achieve Public Safety Wireless Interoperability,* "There are five challenges public officials must address to achieve interoperability:
1. incompatible and aging communications equipment,
2. limited and fragmented funding,
3. limited and fragmented planning,
4. lack of coordination and cooperation, and
5. limited and fragmented radio spectrum."

Challenge#1: Incompatible and aging communications equipment

What is the current compatibility of communications systems between community, county, region and state?

NONE. There is very little compatibility between different communications systems in Idaho.

Are there any other networks in Idaho that could be utilized to make access to a State-wide P25 system more readily available to all first responding agencies in the State?

Yes, IDANET is a Statewide broadband network built with brand name routers that utilize the same data format as P25 (Asynchronous Transfer Mode or ATM) and each router is capable of carrying multiple DS3's. Reference www2.state.id.us/itrmc/committees/htm#Idanet
And
www2.state.id.us/idanet (idaho.gov/idanet/)

What is already being spent on public safety communications in your area? What would the cost be if you do not develop interoperability?

In April 2001 the Public Safety Wireless Network Program (PSWN) documented in their post symposium report from Boise Idaho that, "Idaho's public safety communication network consists of 86 sites and covers approximately 1,200 miles. Currently, the system's microwave backbone is undergoing an eight-year modernization effort to upgrade it to a digital system at a cost of $14.5 million. This upgrade is scheduled for completion in 2003. The existing system is a collocated, analog conventional system that uses digital trunked two-way radios. The current system is organized into six districts covering more than 82,000 square miles. It provides service to the Idaho State Police, the Idaho Transportation Department, the Bureau of Emergency Medical Services, Idaho Public Television, the Bonneville Power Authority, the United States Forest Service, and the FBI."
The upgrade will double the existing capacity for public safety use, permit the distribution of digital broadcast television for Idaho Public Television, and provide additional capacity to foster better delivery of services to Idaho's citizenry, take a step closer to a seamless communication system, and provide for less agency duplication."

The cost of not having public safety wireless interoperability is counted in human lives. For example, during the World Trade Center Bombing of September 11, 2001, many fire fighters lost their lives because they did not get the evacuation order that the police officers received. This has been widely documented from "Why We Can't Talk" to presentations before Congress. The PSWN even acknowledges the cost of not having interoperability in their vision: "The PSWN Program vision is that of seamless, coordinated, and integrated public safety communications for the safe, effective, and efficient protection of life and property. Specifically, the program focuses on improving wireless interoperability between public safety entities at all levels of government."

What costs would be associated with updating or completely redeveloping the entire radio system for your community, county, region or state?

According to the SAFECOM, it's difficult to forecast or estimate the costs associated with an upgrade to the radio system. A thorough inventory of existing communications equipment, radios, and transmitter sites would have to be first conducted to ascertain its compatibility with an upgraded system. Those equipment items that will not be compatible should be replaced. At this point a rough calculation of the cost can be worked.

How could Idaho finically support an upgrade or complete replacement of the existing Communications System?

The SAFECOM Report on Funding Strategies lays out several strategies that the Federal government has made available:

1. **Federal Asset Forfeiture Programs:**
- In fiscal year 1994 the Department of Justice allotted a total of $134.6 million in forfeited proceeds and $7.3 million in forfeited property to be distributed to state and local law enforcement agencies.
- In Fiscal year 1995 the Department of Treasury forfeited proceeds totaling $111 million, $58 million of which was provided as revenue to state and local agencies.
2. **State and Local Asset Forfeiture Programs:**
- Many States and local jurisdictions have developed their own asset forfeiture programs. These programs are created either to deposit proceeds associated with participating in an investigation with another Law Enforcement agency or to deposit proceeds from seized assets within the individual jurisdiction.

Pros:
1. No increase in existing taxes
2. Asset forfeiture proceeds can be directed toward public safety communications.
3. Excluded from budget revenue projections.
Cons:
1. Intense competition for funds.
2. Forfeiture activity is not evenly distributed
3. May not provide adequate revenue.

3. Grants:

- Grants are a mechanism through which governments, and in some cases private entities, receive funding from another government entity. The pressing need for interoperability among public safety communications systems may make a federal grant program an appropriate way to address the financial aspect of interoperability.
  - Federal Grants Dedicated to Public Safety
  - State Grants Dedicated to Public Safety

  Pros:
  1. Flexibility to create programs
  2. Advance Policy goals and encourage coordination
  Cons:
  1. Elimination or shifting resources
  2. Administrative reporting requirements
  3. Competition for grant funding

Challenge: limited and fragmented funding

Can funding for an interoperable wireless system be done jointly?

Yes. Joint funding for interoperability can increase the amount of funding for the system, and increase multiple agency buy in. More funding can be realized when grants and funds from communications budgets are combined.

When agencies supply funding for a system they will also spend more energy in making certain that the system works. In other words, as the financial investment increases so does the investment of other resources.

Challenge: lack of coordination and cooperation

What vision of interoperability do the public safety agencies have? What do they hope to accomplish? What is the mission of the interoperability effort?

What are the goals and objectives of the interoperability effort? What problems do you want to solve? What systems need to be interoperable to solve the problems identified?

What can Governors do to help meet the challenges to implementing an interoperable wireless system?

According to the NGA Center for Best Practices in their Issue Brief on *Strategies for States to Achieve Public Safety Wireless Interoperability,* "Governors can employ the following strategies:
- institutionalize a governance structure that fosters collaborative planning among local, state, and federal government agencies;

- encourage the development of flexible and open architecture and standards;
- support funding for public safety agencies that work to achieve interoperability and reject agency budgets that do not include interoperable solutions; and
- support the efforts of the public safety community to work with the Federal Communications Commission (FCC) to allocate ample spectrum for public safety and create contiguous bands for public safety spectrum."

What are some ideas for getting multiple agencies to buy in on interoperability?

In *How Can We Work Together*, published by the U.S. Department of Transportation, they suggest several methods for getting multiple agencies to work together.

First, focus on joint concerns during initial discussions. This will build a foundation of the joint problem (lack of interoperability) and help to build to a joint solution. Second, have the agencies focus their strategic planning towards a common goal (interoperability). Third, give agencies incentives for working together, such as joint fundraising. They also suggest that efforts start small and increase in difficulty and technicality over time.

Additional suggestions include involving everyone in the planning process to include public agencies, private sector partners, and non-profit agencies. When getting these entities involved, start with a top down approach. Getting the leaders of entities involved should increase support for interoperability.

Finally, make certain that all stake holders, elected and appointed officials, and the general public are kept advised of the project goals. There will be more support for the project across the board if everyone knows how it will benefit them, and they are advised of the progress that is being made. This would necessitate involving the local media so they can advise the general public of the benefits of interoperability.

Who should be involved in developing the interoperability plan? What are the priorities of the plan?

The NGA Center for Best Practices has addressed the issue of what agencies should be involved in developing an interoperability plan in an Issue Brief titled *Strategies for States to Achieve Public Safety Wireless Interoperability*. In this Brief it is suggested that states "Institutionalize a governance structure that fosters collaborative planning among local, state, and federal government agencies." They report that this will "solidify relationships and bring various stakeholders to the table, but a governance structure provides a vehicle to explore innovative technologies and potential funding sources to achieve a given jurisdiction's vision of interoperability.

Local representation on the governance body and in interoperability planning is critical; local officials should be included in planning and decision making early."

What are the roles and responsibilities of all agencies that are involved?

According to the NGA Center for Best Practices Issue Brief on interoperability, "States should consider a system that provides incentives to local agencies, creating a statewide plan that accommodates local needs and guarantees efficient use of resources in an effective strategy."

This means that the state needs to develop a governance structure for interoperability that allows for the input of all the stake holders. The individual stake holders need to bring their ideas and requirements for interoperability to the table.

What kind of agreement do you need to create a governance board?

The creation of a governance board and management of an interoperable wireless system for public safety would require at least an MOU. A sample MOU titled State of Maryland, Queen Anne's County and Talbot County Communications Infrastructure Memorandum of Understanding, can be found on the web at:
http://www.publicsafetywins.gov/PolicySolutions/Coordination/SamMemofUnd.pdf .

Security Issues:

What security issues does an interoperable system need to address?

According to the PSWN there are four main security issues to be addressed by any public safety wireless network; these issues are: Physical security, Network security, Communications security, and Administrative security.

What is Physical security?

Physical security refers to the safety and reliability of the physical structures in the communications network. These include communications centers, mountain top sites, radios, and computers. Every physical item in the communications network needs to be secure from vandals, terrorists, etc.

What is Network Security?

Network security is concerned with the protection of the systems hardware, software, and associated interfaces. This means the computer system utilized for the communications network needs to be secure from hackers. Methods to increase network security include: maintaining user accounts, controlling passwords and access to the network, performing regular system checks and backups, and making certain that unnecessary sensitive information is removed from the system.

What is Communications Security?

Communications security refers to the security of radio transmissions. This is of particular importance to any system attempting to achieve interoperability. A truly interoperable public safety communications system necessitates law enforcement participation. If law enforcement communications security is compromised, the criminals whom the public safety

personnel are attempting to catch will be able to either escape or set an ambush for the law enforcement personnel.

Methods to increase communications security and information integrity include using encryption, regular reprogramming of encryption keys (so the encryption coding is not broken), and securing the encryption codes and software.

What is Administrative Security?

According to the PSWN, "administrative security involves the use of procedural controls to ensure the confidentiality, integrity, and availability of communications systems. An administrative security program would include security plans, procedures, and documentation; on-going security awareness training; and personnel security."

Technical Issues:

Has a set of requirements for public service radio systems been established on the national level?

Yes. The Department of Homeland Security has published *The Statement of Requirements (SoR) for public safety communications and interoperability*.

What requirements are detailed in the SoR?

Here is a listing of the requirements that are detailed in section 5 of the SoR:

1) Services
   - Voice
   - Data
2) Required Features / Functional Requirements
   - Mobility
   - Security for voice and data
   - Call types
   - Scalability
   - Command and control, maintenance, and operations
   - COTS-based products
   - Standards based design
   - Backwards compatibility
   - Migration path for legacy systems
   - Spectrum and network efficiency
   - Ergonomic and environmental
   - Extensibility
   - Modularity
3) Performance

- Quality of service
- Availability
- Reliability
- Survivability
- Restorability

What are some suggested technical solutions to the challenge of interoperability?

The Public Safety Wireless Network Program (PSWN), which is part of SAFECOMM, has published a document titled: *Informational Material – Local and Regional Interoperability Solutions Map*. This document details possible solutions to the challenge of interoperability. Here is a summary of the solutions presented in the document:

I. Multiple Subscriber Units: agencies carry radios from multiple networks
   A. On-scene Distribution
      1. Advantages
         a. Immediate interoperability between agencies
         b. No licensing or coordination necessary
      2. Disadvantages
         a. Inventory Control
         b. Equipment and procedural familiarity for guests
   B. Permanent Installation
      1. Advantages
         a. No licensing needed
         b. No coordination of new frequencies needed
      2. Disadvantages
         a. High cost of putting new radio(s) in units
         b. Getting multiple agencies to agree to carry multiple radios.

II. Shared Cannels
   A. Mutual Aid: dedicated channels for shared use by agencies
      1. Advantages
         a. Minimizes confusion, everyone knows which channel to use
         b. Dispatchers can monitor and control use of channels
         c. Dispatchers can provide support when necessary
         d. Can be used over a wide coverage area with agreements in place.
      2. Disadvantages
         a. Requires multijurisdictonal coordination
         b. Additional equipment may be necessary
   B. Established Channel Sharing Agreements:
      1. Advantages
         a. Agreements allow for recurring interoperability needs to be met.
         b. Does not necessitate additional infrastructure or equipment
         c. Dispatchers can monitor and control use of channels
         d. Dispatchers can provide support when necessary
      2. Disadvantages
         a. Coordination

     b. Significant work may be necessary for a MOU

     c. Cost of tools and technicians required to reprogram radios.

  C. Talk Around

    1. Advantages

     a. Can be utilized when responders are out of repeater range

     b. Can be used for on-scene communications between multiple agencies and systems

    2. Disadvantages

     a. No dispatcher monitor or control

     b. Range is limited to line of sight

III. Interconnects

  A. Patching

    1. Advantages

     a. Easy to implement

     b. Low Cost

     c. Dispatchers can establish and remove patches in a variety of configurations

    2. Disadvantages

     a. Delay while patches are established

     b. Not easily compatible between trunked and conventional systems

  B. Crossband Repeater

    1. Advantages

     a. Little to no dispatcher involvement

     b. No new equipment required at the end used level

     c. No additional spectrum required

    2. Disadvantages

     a. Users need to be licensed on rebroadcast frequency

     b. Repeater equipment is costly

     c. Agencies need to agree upon which agency has primary control of interoperability equipment

  C. Audio Switches: use of digital signal processing to link communications devices on different protocols and frequencies

    1. Advantages

     a. Allows interoperability between any combination of radio systems

     b. No additional licensing or frequencies necessary

     c. Allows quick configuration

    2. Disadvantages

     a. Cost

     b. Coordination between agencies

     c. Requires significant work for MOU

  D. Networked Trunked Land Mobile Radio (LMR) Systems (800 MHz)

    1. Advantages

     a. Operational consolidation and system reliability

     b. Reduces existing infrastructure

     c. Strengths security, control and reliability

    2. Disadvantages

     a. Requires high level of coordination
     b. Depends on proprietary architecture
     c. Cost is extremely high (King County Washington system cost as of 1995 is $57.6 Million, ref: www.metrokc.gov/emd/800MHz.htm)

IV. Standards-Based Systems

 A. Project 25 (P25): "The P25 standard is a suite of standards for LMR equipment. The suite includes digital and analog modulation schemes and protocols, and trunking and conventional architecture guidelines that require equipment to be backward compatible (i.e., operate on both digital and analog systems) and non-proprietary. Ultimately, the standard ensures that all the defined services are accessible to any subscriber unit or system built to the P25 specifications."

  1. Advantages
    a. Backward compatible – allows for growth and compatibility between areas that have not switched to digital.
    b. Spectrally efficient
    c. Supports wide area roaming

  2. Disadvantages
    a. Limited number of manufacturers for P25 equipment
    b. Requires new infrastructure
    c. Cost is extremely high for all new equipment

 B. Voice-Over Internet Protocol (VoIP)

  1. Advantages
    a. Increased speed, security, and efficiency for voice and data
    b. Software based – reduces "back-room electronics"
    c. Increases flexibility

  2. Disadvantages
    a. As of February 2003 there was no P25 VoIP standard
    b. Private data network is required
    c. Currently only available for 800MHz band.

Do any of the above solutions satisfy the requirement detailed in the Department of Homeland Security's SoR?

   Yes; according to the Telecommunications Industry Association (TIA) "The Department of Homeland Security specified P25 as the preferred standard for obtaining federal funding for interoperability grants." (*Project 25, Public Safety Communications Interoperability - Frequently Asked Questions*; published by TIA, July 2004)

Do the disadvantages listed for P25 in *Informational Material – Local and Regional Interoperability Solutions Map* apply to the State of Idaho?

   Not all of the disadvantages apply to Idaho. Idaho has the infrastructure to handle a P25 system. The major costs for Idaho to upgrade to P25 would rest with the end users: the agencies that would need new radios. Much of that cost, however, could be addressed through federal grants.

According to the TIA there are several manufacturers of P25 equipment. The TIA website indicates the following:

Manufacturers Offering P25 Equipment
(if known, * indicates supplier of infrastructure and radios)
Daniels Electronics*
Datron World Comm
DTC Communications
E.F. Johnson Radio*
General Dynamics
IFR Systems
Kenwood Communications
King Communications USA*
M/A-Com (Tyco)*
Motorola*
RELM Wireless/BK Radio Inc.*
Technisonic Industries
Thales Communications (formerly Racal)
Westel Wireless (formerly ADI Ltd)*
Wulfsberg Electronics
Vendor contact information may be found on the P25 Technology Interest Group web site at www.project25.org

According to the TIA, who endorses and what major entities are using P25?

Entities Endorsing Project 25 Interoperability
National Associations Supporting Project 25
Association Contact Name Telephone #
Association of American Railroads Ed Kemp 402-271-4883
Association of Public Safety Communications Officials, Robert Gurss, Washington Counsel (202)662-4856
International Association of Chiefs of Police, Harlin McEwen, Chair, Comm. & Technology Committee (607)227-1664
National Sheriffs Association, Harlin McEwen (607)227-1664
National Association of State Telecommunications Directors, Craig Jorgensen (801)583-1099
Telecommunications Industry Association, Dan Bart (703)907-7703

Federal Agencies that have Adopted Project 25 States Implementing Project 25
Department of Defense Alaska
Department of Energy Colorado
Department of the Interior Connecticut
Department of the Treasury Delaware
Drug Enforcement Administration Illinois
Federal Bureau of Investigation Indiana
Federal Communications Commission Iowa
National Communications System Kentucky

National Institute of Justice Michigan
National Security Agency Minnesota
National Telecomm. & Information Admin. New Hampshire
U.S. Border Patrol Ohio
U.S. Customs South Carolina
U.S. Defense Information Systems Agency South Dakota
U.S. Fish and Wildlife Service Utah
U.S. Forest Service Wisconsin
U.S. Immigration & Naturalization Service
U.S. Marshal Service
U.S. Park Police
U.S. Secret Service

Challenge: limited and fragmented radio spectrum

What is the 700 MHz band?

A 24 MHz portion of the radio spectrum that is currently occupied by TV Channels 63, 64, 68, and 69. The FCC has "adopted a band plan for the 700 MHz band whereby 12.6 MHz of spectrum was designated for General Use, 2.6 MHz for Interoperability and 8.8 MHz as Reserve Spectrum. (FCC WT Docket No. 96-86, January 17, 2001, ¶3)"

What does the FCC plan to do with the 700 MHz band?

The FCC has made eight major decisions regarding the 700MHz band. These decisions are written out in the Fourth Report and Order and Fifth Notice of Proposed Rule Making released on January 17, 2001. The summary written by the FCC follows.

"We determine that the administrative and technical oversight of operations on the Interoperability spectrum should be performed at the state level. In the event that a state declines to do so, we determine that such functions should be performed by the 700 MHz band regional planning committee for that state.

We make determinations regarding certain operational requirements for use of the 700 MHz band spectrum, such as channel designation and access priority.

While we do not mandate trunking on the Interoperability channels, we permit trunked operations on eight of the Interoperability channels on a secondary basis under certain circumstances.

We adopt Project 25 Phase I, a standard based on 12.5 kHz channels, as the voice standard for communication on the 700 MHz band Interoperability channels, and decide to revisit the issue of migration to a 6.25 kHz technology for these channels at a later date. In addition, we adopt the data standard incorporated in the Project 25 suite of standards for narrowband data communications on the 700 MHz band Interoperability channels.

Equipment designed exclusively for voice communications is not required to be data-capable. Similarly, equipment designed exclusively for data applications is not required to be voice-capable.

Licensees may employ encryption on any Interoperability channel, except the two calling channels, provided that they use the encryption standard specified by the Commission.

Licensees that employ encryption must ensure that it may be disabled by the radio user using a readily accessible switch or other readily accessible control.

We defer disposition on the issue or receiver standards for the 700 MHz band pending recommendations from the NCC on this matter.

In the Fifth Notice, we seek specific comment on a migration path to 6.25 kHz technology for the 700 MHz and General Use channels."

KEY POINTS OF DISCUSSION:

1. "Interoperability requires more than equipment-critical incident management; training, and operational policies and procedures that govern interoperable communication systems need to be in place as well". "Why We Can't Talk", Safe Comm., pg 18.

2. "True interoperability must comprise a comprehensive strategy that combines radio communication systems, radio training and drills, common terminology, standard operational procedures, and a unified incident command when the situation warrants it". "Why We Can't Talk", Safe Comm., pg 18.

3. **Cost-cutting measures,** "The highest degree of interoperability is achieved when government entities agree to migrate to a single communications system that provides coverage for all". "Why We Can't Talk", Safe Comm., pg 44.

4. **Use of Existing Infrastructure, "**If a governmental entity owns infrastructure that can be used for the new system or commercially available infrastructure can be found, significant reductions in costs can be realized". "Why We Can't Talk", pg 45.

5. **What Can I do Right Now?** "There are a number if interim solutions that can be implemented in the short term to improve the level of communications interoperability". (Refer to entire brief on interim solutions), "Why We Can't Talk", pg 30 & 31