



International Association of Fire Chiefs

Fire and rescue departments from different jurisdictions routinely work together to provide emergency services to the public, but they cannot always communicate with each other. It is critically important that the entire fire and emergency services community support the need for improved communications interoperability and additional interoperability spectrum. This publication is the first of its kind to comprehensively discuss the interoperability obstacles faced by emergency personnel.

Richard A. Dyer

Richard A Dyer, IAFC President



National Association of State EMS Directors

The ability of Emergency Medical Service agencies and providers to communicate with one another during an emergency is vitally important. Time is frequently the difference between life and death. This booklet is noteworthy for succinctly pointing out the critical issues that are impeding interoperability.

Tim Weidrich

Tim Weidrich, NASEMSD President



International Association of Chiefs of Police

In order for law enforcement agencies to accomplish their mission of protecting the citizens they serve, communications interoperability is essential to facilitate rapid and efficient interaction among all public safety organizations. Our combined task is to work collectively to promote the concept of communications interoperability and to voice the absolute need for additional radio spectrum to support that objective.

Ronald Neubauer

Ronald Neubauer, IACP President

PUBLIC SAFETY

and Wireless

Communications

Interoperability



Critical Issues Facing Public Safety Communications



This guide was prepared by the Public Safety Wireless Network (PSWN) program. This program is a joint initiative of the Department of Justice and the Department of the Treasury. For more information, visit the web site at www.pswn.gov or call (800) 565-PSWN.

When a family is trapped in the fiery wreckage of an automobile accident, the seconds it takes to respond are measured in lives. Local, county, and state police officers all rush to the scene. Nearby fire and rescue personnel are quickly dispatched to aid in the rescue efforts. Emergency medical technicians care for the injured en route to local hospitals.

None of these public safety agencies works in isolation. Their joint response is the key to a successful rescue. In fact, the ability of the public safety community to provide a coordinated response to criminal activities, fires, medical emergencies or natural disasters can mean the difference between life and death.

To provide immediate and coordinated assistance, the Nation's public safety workers must be able to communicate with each other effectively, swiftly and securely. In the mobile environment where public safety personnel do their work, radio communication is the lifeline. Without it, both life and property are put at significant risk.

What Is Interoperability?

"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.

"Police lose robbers on wild highway ride" September 19, 1998

In a bizarre series of events, the robbers managed to elude pursuers from at least four law enforcement agencies: Baltimore City Police, Howard County Police, the FBI, and the Maryland State Police. Virginia State Police and Prince George's County Police briefly joined the search as well... "There was a variety of agencies involved. There were problems in communication linking up radio contacts," FBI spokesman Peter Gulotta said... With dozens of police cars involved from different jurisdictions and officers using different radio frequencies, confusion surrounded much of the chase.

Day-to-day interoperability involves coordination during routine public safety operations. Interoperability is required, for example, when firefighters from around a county join forces to battle a structural fire or when neighboring law enforcement agencies must work together during a vehicular chase.

“Operations chief breathes sigh of relief: ‘Unbelievable’”
July 9, 1998

...to assist Volusia County in fighting the wildfires... Wilder oversaw a crew of nearly 1,000 firefighters and a fleet of equipment including 117 fire engines, 47 bulldozers and more than a dozen aircraft... Through crackling radios and unreliable cell phones, the days passed at a dizzying pace as Wilder coordinated operations among ground crews, pilots and planning staff. He often spoke with more than one person at a time, using both cell phones and radios simultaneously.

Mutual aid interoperability involves a joint and immediate response to catastrophic accidents or natural disasters and requires tactical communications among numerous groups of public safety personnel. Airplane crashes, bombings, forest fires, earthquakes and hurricanes are all examples of mutual aid events.

Task force interoperability involves local, state and federal agencies coming together for an extended period of time to address a public safety problem. Task forces lead the extended recovery operations for major disasters, provide security for major events and conduct operations in response to prolonged criminal activity.

“...Suspect still eludes search...”
July 19, 1998

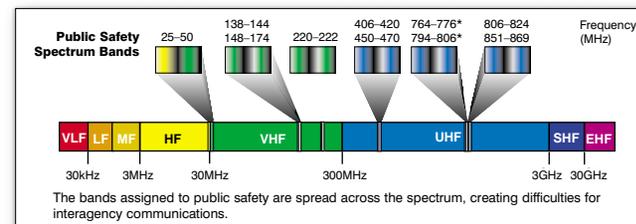
Again, the recovery of an abandoned pickup truck allegedly driven by Eric Robert Rudolph brought scores of investigators to the dense woods of far western North Carolina last week... More than 200 federal, state, and local law enforcement officials from more than 15 agencies are on the ground now, with more arriving every day. A command post and staging area remains in place at Appletree Campground... Investigators are employing sophisticated technology to get their man, including... mobile communication towers.

What Is the Problem?

Two 1998 surveys of more than 2,000 public safety agencies document the major obstacles to interoperability. The law enforcement, fire and emergency medical service agencies surveyed rated **spectrum** and **funding** limitations as their biggest obstacles to interoperability. They identified **incompatible technologies** and the lack of adequate **systems planning** as additional obstacles.

Spectrum Limitations

Public safety radio spectrum refers to the array of channels, like those on a television, available for communications transmissions. These channels are a finite natural resource — they cannot be created or discovered. In many communities, *not enough spectrum* is available for public safety use in general. Even less is available for interoperability purposes. Scarce spectrum results in congested radio channels and increased interference, limiting the ability of public safety personnel to communicate.



“Officials consider new radio system, department would pay fee for dispatchers”
January 14, 1998

A new police communications system may be on the horizon for the city of Bellefontaine Neighbors... Police Chief William Cira said he has some reservations about contracting with the county... Cira said he feels it's important to have communication with Bellefontaine Neighbors' nearby cities. He is concerned that if all the cities weren't on the same frequency, communication would break down. "If they are in pursuit of a felon or just a high speed chase, we need to know, and the only way that would be is through radio communication," he said.

Additional spectrum is needed to meet current communication needs and to support the deployment of new technologies.

The current public safety channels are located in several portions of the radio spectrum, resulting in separate spectrum “islands” that isolate public safety operations and jurisdictions. This *fragmentation of spectrum* impedes interoperability and joint public safety operations. Because no single radio can span all of the public safety channels, agencies using different portions of spectrum cannot talk with each other. Responders often end up using multiple radios or other ad hoc means of linking communications.

Funding Limitations

Many existing public safety communications systems cannot support modern technologies that are needed for interoperability. Replacement of outdated systems or system expansions are expensive. Inadequate funding for upgrades often prevents a public safety agency from purchasing the technology and equipment that can enhance interoperability and improve organizational effectiveness. To obtain the necessary funding, public safety agencies must convince public officials and concerned citizens of the critical need for modern radio communications.

“Lease lets rural fire districts tap into upgraded radio system” November 27, 1998

District 12 Fire Chief Larry Bartel was in a bind... Like most fire districts, his budget is so tight it squeaks. So how could he afford to spend \$90,000 to tap into the county's ultra-modern, ultra-expensive... radio system? ...“I'd love to buy the system, but we've got to give up too much to get there.” The district sets aside \$100,000 a year for equipment purchases and other capital costs. The purchase of... radios would cost nearly the entire amount.

Incompatible Technologies

A variety of new radio technologies are becoming increasingly popular as agencies plan to replace or upgrade their existing systems. Despite these new technologies, competing equipment vendors continue to manufacture, and public safety agencies continue to purchase, equipment that is not interoperable. Radio communications equipment

produced by multiple vendors uses proprietary and incompatible technology schemes. These incompatibilities prevent interoperability even when the radios operate in the same spectrum bands. Without technical standards, vendors are producing “closed systems” that create significant barriers to interoperability for the public safety community. Industry and the public safety community must work together to foster the development of standards and compatible equipment.

Lack of Systems Planning

A lack of adequate planning during systems development can preclude interoperability. Thousands of jurisdictions throughout the nation will be procuring replacement systems within the next five to ten years. A broad range of complex architectural, operational and organizational issues must be addressed in planning system upgrades, including coordinating and sharing resources to develop joint communications systems,

“Cops ask millions for radio system, communication tough with hodgepodge of gear” April 27, 1998

“The day gunman Gerald Atkins ran through an auto plant spraying bullets was the day police agencies in Oakland County realized just how bad their hodgepodge of radio systems is...“It was a nightmare,” said Capt. Michael McCabe of the Oakland County Sheriff's Department who was at the scene trying to help coordinate police response that day. “You've got a guy with a high-powered rifle, one dead, two wounded, and you can't even notify other departments... that he's headed their way,” McCabe said.

“City, county may adopt joint communications” February 18, 1997

Allen County has taken two steps to modernize and rein in the cost of its police communications system, and the door is still open for the city to come along... By tying in with the county, the city could save in equipment costs, like new antennas, necessary to make the system work.

developing operational requirements for coordinated emergency responses and implementing system security measures. It is important that the many jurisdictions replacing their radio systems understand the effects that these choices will have on their ability to interoperate with other public safety agencies.

What Has Been Done?

In January 1998, the Federal Communications Commission reallocated an additional 24 MHz of spectrum for public safety use. A portion of that spectrum has been designated to support nationwide interoperability among local, state and federal agencies. The process of assigning

this spectrum to public safety is moving forward. Also during 1998, the Attorney General convened an interagency working group to develop a program that would provide federal seed money to the states to plan state-wide public safety wireless communications and provide money for demonstration projects. The

President's Fiscal Year 2000 budget contains \$80 million for this program. The standardization efforts are making incremental progress on addressing difficult issues such as sharing proprietary information and developing standards that improve interoperability and ensure competition among multiple vendors. The Public Safety Wireless Network (PSWN) program, a joint initiative of the Departments of Justice and the Treasury established by



Vice President Gore's National Partnership for Reinventing Government, is working to foster interoperability among local, state and federal public safety agencies.

What Needs To Be Done?

Improving interoperability, and thus public safety communications as a whole, is a multi-dimensional challenge. The Congress, regulatory agencies, state and local governments and the entire public safety community need to maintain a long-term focus on interoperability as decisions are made and as planning takes place for communications systems. Decision makers must be educated about the need for additional and appropriate public safety spectrum, particularly for interoperability purposes. A continued push at all levels of government for funding is necessary to provide for upgrades to interoperable technology and to enable shared systems development. Active participation in standard setting initiatives is needed to ensure an open and competitive market that meets public safety operational needs. Improved systems planning and the coordinated planning of shared systems is essential for realizing potential cost and spectrum efficiencies and resolving technical, operational and organizational issues related to interoperability. And perhaps most importantly, active and constant coordination among public safety officials and politicians from all levels of government is needed to share information and build on effective solutions for fostering interoperability.



Why Does It Matter?

Effective public safety communications is an issue that affects us all. Our police officers, firefighters and emergency response personnel must be able to communicate with each other to save lives. As noted in the *Final Report of the Public Safety Wireless Advisory Committee*,

immediate measures are taken to spectrum shortfalls and promote interoperability, public safety agencies be able to adequately discharge obligation to protect life and property in a safe, efficient, and cost effective manner.”



For Additional Information

Federal Communications Commission, Wireless Telecommunications Bureau, Public Safety and Private Wireless Division

For information on spectrum-related issues, hot topics, regulatory actions and decisions, Public Safety Wireless Advisory Committee reports, regional plan action, radio services and licensing, frequency coordination, spectrum refarming, and FCC rules, call 202-418-0680 or visit <http://www.fcc.gov/wtb/publicsafety>

National Telecommunications and Information Administration, U.S. Department of Commerce

For information on public safety-related spectrum and telecommunications programs within the Federal Government, Public Safety Wireless Advisory Committee reports, or the Telecommunications and Information Infrastructure Assistance Program grants, call 202-482-1726 or visit <http://pswac.ntia.doc.gov/pubsafe/index.html>

National Public Safety Telecommunications Council

For information on issues related to public safety telecommunications activities, including the availability of spectrum for public safety communications and spectrum licensing, visit <http://rmlectc.dri.du.edu/npstc>

National Institute of Justice, National Law Enforcement and Corrections Technology Center, U.S. Department of Justice

For studies, reports or a video ("*Why Can't We Talk?*" *When Lives Are at Stake. NCJ-172213*) related to public safety radio spectrum and interoperability issues, call 800-248-2742 or visit <http://www.nlectc.org>

Public Safety Wireless Network Program

For information regarding public safety communications interoperability and wireless communications systems planning and implementation, call 800-565-PSWN or visit <http://www.pswn.gov>