Summit on
Implementing Wireless Communications:

Perspectives on Interoperability from the Law Enforcement Community

Sponsored by

U.S. Department of Justice
Justice Management Division
National Institute of Justice
Office of Community Oriented Policing Services

May 2-3, 2005
Seattle, Washington

Prepared by
Institute for Law and Justice
Alexandria, Virginia

Contents

I. Summit Overview

Mr. Paul Corts, Assistant Attorney General for Administration, Justice Management Division, U.S. Department of Justice (DOJ), Washington, DC, welcomed the summit's approximately 170 participants. He observed that DOJ has emphasized information sharing in recent years, especially since the terror attacks of September 11, 2001. In that spirit, the present conference was designed for sharing information on the interoperability of communication systems. Mr. Corts expressed his hope that participants on the front lines of developing interoperable communications systems would be able to share information with each other and gain information that they could put to use at home.

Chief Gil Kerlikowske of the Seattle Police Department welcomed participants to the city and thanked DOJ for holding the summit. News media often report that public safety workers are unable to communicate with each other. However, the challenge is not simply technological. Questions remain as to the best ways for public safety providers to communicate, especially in terms of when and with whom. Wise implementation of communications interoperability is essential.

Robert McCallum, Jr., Associate Attorney General, DOJ, expressed his hope that the summit would aid in improving communications capabilities across agencies. A key part of the solution, he observed, is cooperation and communication between federal, state, local, and tribal public safety agencies. Interoperability is a top priority for Attorney General Alberto Gonzalez and DOJ, as effective interoperability will improve agencies' ability to protect the United States from crime and terrorism. The terrorist attacks of September 11, 2001, especially pointed out the importance of interagency communication.

Much progress has been made across the country, Mr. McCallum noted. Most large cities have some degree of interoperability worked out, but there is still progress to be made, especially in suburban and rural areas. Many of the summit's participants, he observed, have already attained successes that may help other agencies improve their communications interoperability.

Mr. McCallum clarified that the goal of interoperability does not mean creating a system whereby every police officer can talk to every fire fighter and every emergency medical technician. In this context, interoperability means being able to communicate within proper command and control structures. The key is to determine what kind of interoperability adds real value.

DOJ realizes that the public safety community has important new responsibilities for homeland security. DOJ is supporting that responsibility through interoperability-focused grants from the Office of Community Oriented Policing Services (COPS) to large and small population centers. Since 1998, the National Institute of Justice (NIJ) CommTech Program has granted over $90 million to find solutions for state and local public safety. DOJ has partnered with numerous cities to support interagency communications capabilities and is working on the same issue with other federal agencies. Through its 25 Cities Project, the DOJ Justice Management Division works with cities to

provide various levels of interoperability, augmenting the work done by local officials. DOJ does not wish to impose cookie-cutter solutions, but the use of common standards may remove technical barriers to interagency communications and hold costs down. Another fundamental step in improving interoperability is the development of relationships between agencies: regional partnerships as well as personal relationships between the agency heads. DOJ has witnessed a tremendous cooperative spirit at the local level.

When he was Attorney General, John Ashcroft observed that the last line of the "Star-Spangled Banner"—*O say, does that star-spangled banner yet wave/O'er the land of the free and the home of the brave?*—is not a statement but a question. That question could have different answers, and summit participants' work is a vital part of keeping the answer right.

II. Overview of DOJ Interoperability Programs

A. COPS Interoperable Communications Technology Program

Michael Dame, Supervisory Senior Policy Analyst, Grants Administration Division, COPS Office, described the background of the COPS Interoperable Communications Technology Program (ICTP) and discussed grantees and available funding.

Among his key points were the following:

- COPS Office discretionary interoperability grants have included $66.5 million awarded to 14 jurisdictions in FY 2003 and $82.6 million awarded to 23 jurisdictions in FY 2004.

- The purpose of the grants, which are given to law enforcement agencies, is to enhance public safety wireless voice interoperability and data information sharing. In addition, the interoperability is meant to work across jurisdictions and agencies.

- These are "grants-in-aid." The COPS Office does not buy the technology or provide engineers. The 25 percent local cash match requirement shows local commitment.

- Federal partners in the program include the Office of Justice Programs (National Institute of Justice and Bureau of Justice Assistance), DOJ High Risk Metropolitan Areas Interoperability Project (25 Cities), SAFECOM (within the Department of Homeland Security), National Institute of Standards and Technology, Office of State and Local Government Coordination and Preparedness, and Federal Emergency Management Agency.

Program Characteristics

- Regional projects
- Multijurisdictional
- Multidisciplinary
- Strong governance structure and sound project management
- Grant-in-aid
- 25% local cash match
- Federal cap of $6 million
- Targeted program using Metropolitan Statistical Areas (MSAs)
- Large and smaller population centers

- One grantee, the Central Maryland Area Regional Communications Project (CMARC), includes six Maryland counties plus the cities of Baltimore and Annapolis. CMARC received a $5.1 million COPS grant in 2003. It features a strong governance structure and executive sponsorship at the elected official level. CMARC builds on existing infrastructure (800 MHz radio systems) using national calling and tactical channels. The project unified the incident command system involving mutual aid responses in both day-to-day and critical incidents.

- A project funded in Colorado is a partnership of the City of Colorado Springs, El Paso County, and the Pikes Peak Regional Communications

Network, which already existed as a regional communications system. The project was awarded a $4.5 million COPS grant in 2004. Distinctive characteristics of the location include mountains and numerous military bases. The region already operates an 800 MHz trunked system. The project will bring the system into compliance with the P25 standard and will upgrade portable radios. The new system will allow interoperability with the local military installations and numerous fire districts.

- For FY 2005, the COPS Office has appropriated over $90 million for the ICTP. The application deadline is July 15, 2005, and the COPS Office expects to fund 25-30 projects.

B. NIJ Interoperable Communications Technology Program

Joseph Heaps, CommTech Program Manager, Office of Science and Technology, NIJ, reiterated that interoperability is not about all people being able to talk to each other all the time. Rather, the mission is to help state and local public safety agencies communicate effectively and efficiently with each other across agency and jurisdictional boundaries. CommTech's major areas of work involve research and development, standards, testing and evaluation, outreach and technology assistance, and pilot programs.
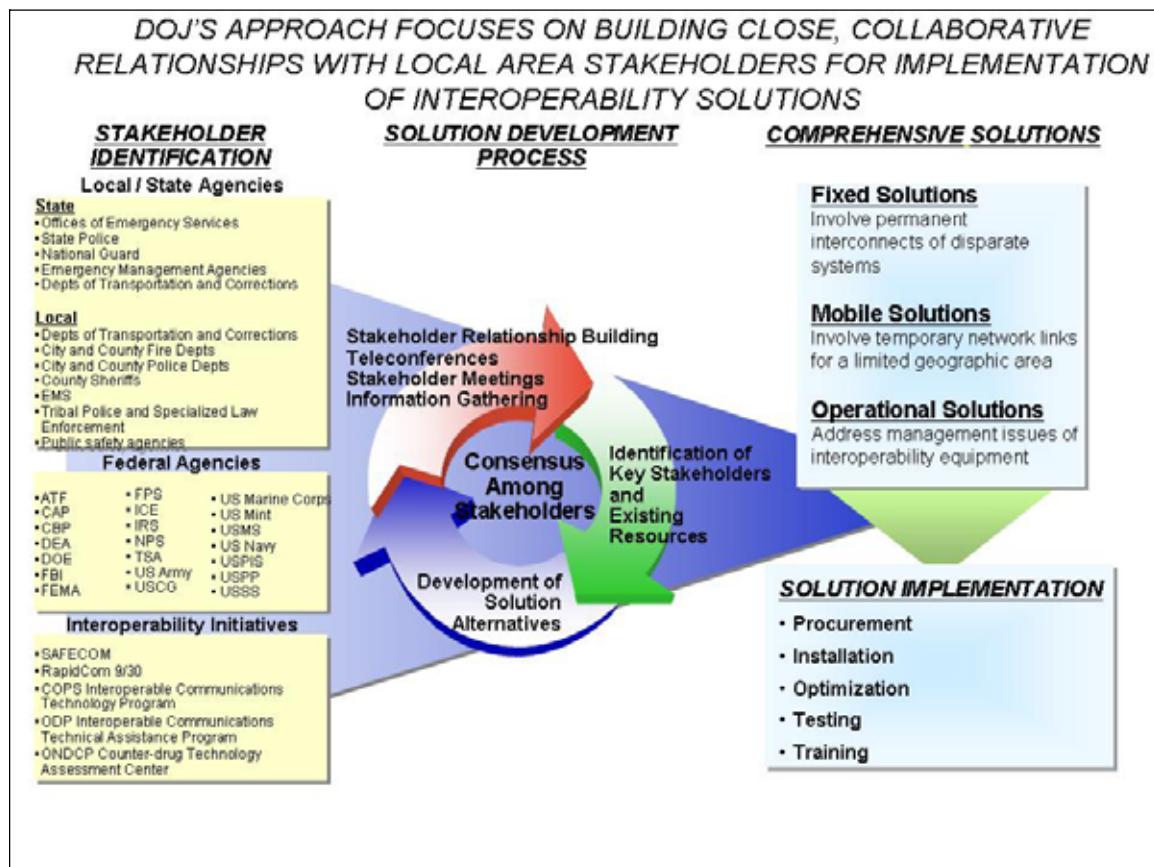
Mr. Heaps made the following points:

- CommTech's research suggests that regarding interoperability, public safety agencies most need antenna design, in-building coverage, and coverage in rural areas.

- In its research and development efforts, CommTech is examining such emerging technologies as software-defined radio, cognitive radio, voice over Internet Protocol (VOIP), and advanced wireless data.

- CommTech also tests and evaluates technology platforms to provide unbiased information to the public safety community.

- CommTech's pilot programs provide a demonstration of cutting-edge technologies in an operational law enforcement environment. Pilot programs include the Metropolitan Interoperable Radio Systems, Capital Wireless Integrated Network, Syracuse Police Department Wireless Data, and Radio Interoperability for Integrated Border Enforcement Teams. Mr. Heaps noted that CommTech is interested in establishing more pilot programs and invited interested parties to contact him.

- Regarding standards, CommTech has been working on the P25 standard as well as standards for VOIP, software-defined and cognitive radio, and Mesa, a joint U.S./European project regarding digital mobile broadband.

- This year, instead of requesting full proposals, CommTech asked for 7-10 page concept papers, then winnowed them down to a smaller pool of applicants who were asked for full proposals.

Mr. Heaps told summit participants that if they have technical questions, they should contact CommTech, which can connect callers to active practitioners who can help.

C. High-Risk Metropolitan Areas Interoperable Program: The 25 Cities Project

Timothy Ritter, Director, Wireless Management Office (WMO), Justice Management Division, DOJ, described the 25 Cities Project. The project initially aimed to implement basic interoperability for emergencies in 25-30 high-risk cities. Key points are as follows:

- A five-phase process is followed in each city. The steps include identifying locations, gathering data, identifying gaps and solutions, developing a solution plan, and implementing the solutions. Most of the cities are currently in the fifth phase.

- The project worked toward comprehensive solutions, including fixed, mobile, and operational solutions. For example, in Seattle the project linked existing systems. The Atlanta project provides communications between federal and non-federal agencies. Denver now uses a communications van with a dish. In most cities, the solution involved a combination of fixed, mobile, and operational solutions. Communications exercises enabled users to gain experience with new equipment in a controlled environment.

DOJ'S APPROACH FOCUSES ON BUILDING CLOSE, COLLABORATIVE RELATIONSHIPS WITH LOCAL AREA STAKEHOLDERS FOR IMPLEMENTATION OF INTEROPERABILITY SOLUTIONS

- The 25 Cities Project has found that although people are looking for standards and best practices, most projects end up requiring custom solutions.

A summit participant asked whether DHS expects that future interoperability will enable a user to roam across jurisdictions and states. Mr. Ritter replied that the overall goal is for public safety communications to work as cellular phones do now. Integrated wireless network research represents the federal government's effort to create a system like that. A DHS representative noted that although that technical capability will be available at some point, operationally it may be better to stick to regional interoperability rather than national.

PROJECT LESSONS LEARNED OVER THE PAST TWO YEARS CAN BE LEVERAGED FOR SUCCESSFUL SUSTAINABILITY OF INTEROPERABILITY SOLUTIONS

- Interoperability solutions should be tailored to meet the unique operational requirements and environment for each metropolitan area
- Strong local or regional leadership has been critical in the development, implementation and sustainability of the interoperability solutions and efforts
- Independent interoperability committees and initiatives of respective metropolitan areas can be leveraged for key stakeholder input and resources for developing comprehensive solution sets for each city
- Best practices and lessons learned can be adopted in the process for developing additional interoperability support and solutions
- Stakeholder participation and ownership in the solution design and implementation process has been fundamentally imperative in the overall relevance and success of the interoperability efforts
- Successful interoperability solutions have addressed and encompassed both technical and operational considerations

A participant asked what the term "core network" meant in the context of this discussion. Mr. Ritter described it as a network that provides wide and thorough coverage as well as good functionality. In the Miami–Dade County, Florida, metropolitan area, public safety agencies were already connected to some degree, so the challenge was not to establish a core network but to expand it—that is, to bring more people together and add more functionality to the communication system. A follow-up question asked about the existence of any ongoing metrics regarding the cost-effectiveness or return on investment of interoperable wireless communications. Such information, the questioner observed, could help in obtaining local funding. Mr. Ritter said he was not aware of any such figures.

A participant asked Mr. Heaps to discuss CommTech's efforts regarding cognitive radio. He said that CommTech is currently examining the potential benefits associated with handheld commercial software-defined radio (SDR) products, which are currently shipping to the military and represent the state of the art in regard to production SDR technology. As part of that effort, CommTech is comparing the current production feature set to the regulatory and technical interoperability desires of public safety users, to the requirements of the spectrum regulatory bodies (FCC and NTIA), and to the manufacturers' position on making a version of this equipment Part-90 compliant, with features required for general public safety use. This work is the precursor to a potential pilot based on an experimental authorization using current production of this SDR equipment. In addition, CommTech is entertaining grant funding for both cognitive and software radio technology research in areas that would potentially benefit public safety.

III. Interoperability Cornerstones

This discussion addressed what is necessary in order to achieve a successful application of technology for interoperability in the law enforcement community. Mr. Duffy served as moderator.
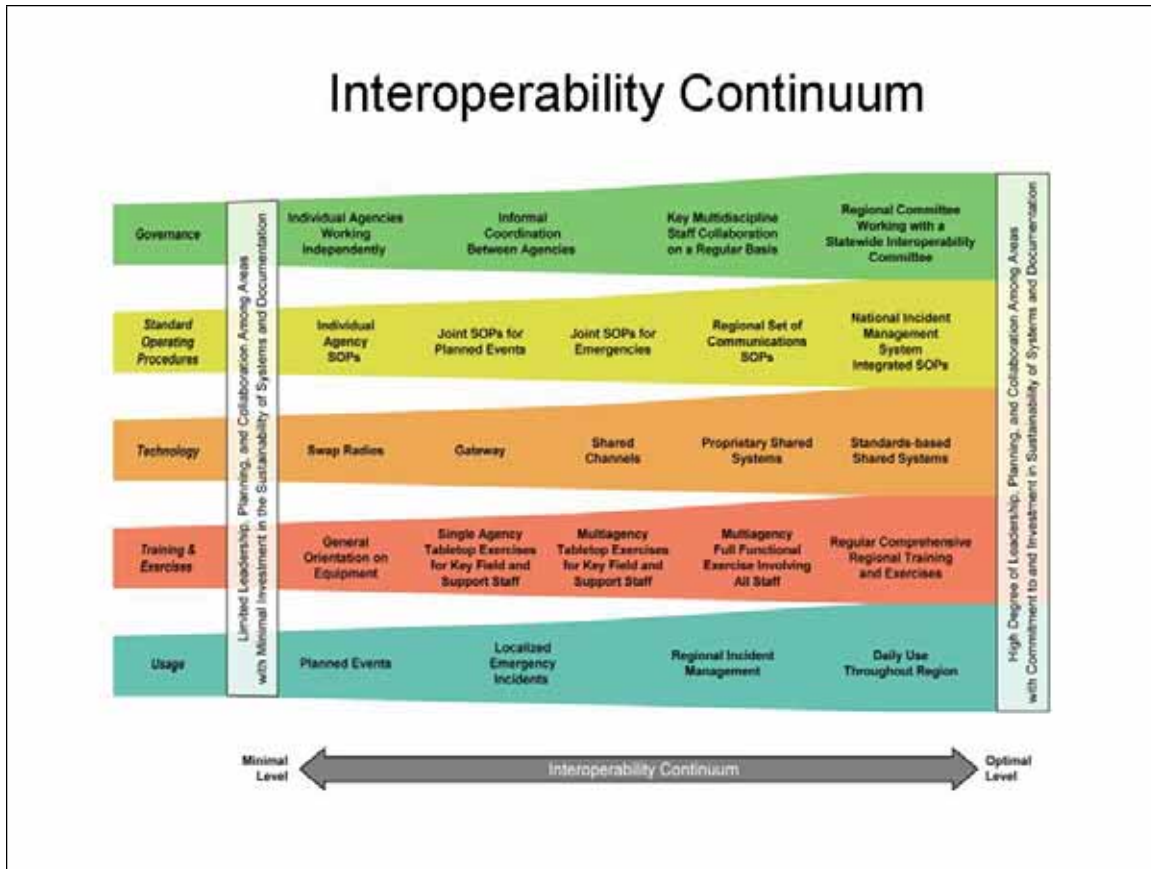
A. SAFECOM Interoperability Continuum Tool

For the presentation on SAFECOM, Thomas Coty, Director, Technology and Standards, SAFECOM, DHS, stood in for David Boyd, Director, Office of Interoperability and Compatibility, DHS. Wireless interoperability, he noted, is the ability of public safety service and support providers to talk with each other via voice and data on demand, in real time, when needed, and when authorized. Implemented correctly, wireless interoperability improves the ability of public safety practitioners to reduce the loss of life and property in emergencies, facilitates rapid and efficient interaction among all public safety organizations, and provides immediate and coordinated assistance in day-to-day missions, task force operations, and mass-casualty incidents.

Mr. Coty's key points include the following:

- SAFECOM is the first national program designed by public safety professionals for public safety professionals. Its executive committee includes local public safety officials, local elected officials, and federal agency representatives.

- SAFECOM achievements include these four cornerstones of interoperability: coordinated grant guidance, a statement of requirements, a statewide communications interoperability planning methodology, and the interoperability continuum (pictured in graphic on next page).

- SAFECOM is also working on a nationwide survey of the state of interoperability. Called the Baseline Project, it uses a geographically and demographically correct sample and measurable elements of interoperability to see if the nation is on the right track.

Interoperability Continuum

Governance		Individual Agencies Working Independently	Informal Coordination Between Agencies	Key Multidiscipline Staff Collaboration on a Regular Basis	Regional Committee Working with a Statewide Interoperability Committee
Standard Operating Procedures		Individual Agency SOPs	Joint SOPs for Planned Events	Joint SOPs for Emergencies	Regional Set of Communications SOPs
Technology		Swap Radios	Gateway	Shared Channels	Proprietary Shared Systems
Training & Exercises		General Orientation on Equipment	Single Agency Tabletop Exercises for Key Field and Support Staff	Multiagency Tabletop Exercises for Key Field and Support Staff	Multiagency Full Functional Exercise Involving All Staff
Usage		Planned Events	Localized Emergency Incidents	Regional Incident Management	Daily Use Throughout Region

B. Planning, Project Governance, and Local Partnerships

Dan Hawkins, Program Manager, Public Safety Technologies Program, SEARCH Group, described his organization as a private, nonprofit consortium of the states, governed by a membership group of gubernatorial appointees. For 36 years it has collaborated with and assisted state and federal grant recipients. Over the past two years, it has worked under the COPS Interoperable Communications Technology Program (ICTP) and DHS Interoperable Communications Technical Assistance Program (ICTAP).

Key points about planning, project governance, and local partnerships include these:

- The process of planning is more important than the product. Planning should be conducted in the context of operational, functional needs; other regional, state, and federal initiatives; a continuously changing technology environment; and a complex system of systems. Planning should also be done in the context of the agency's business plan; the agency's technology plan; regional, state, and national interoperability strategies; and the plans of response partners.

- Project governance is the decision-making structure that provides leadership and accountability; defines the business of the partners; analyzes technical environments, policies, and solutions; and effectively manages projects.

- Executive sponsorship is the seed, not the core, of the project.

- The project's steering committee should consist of high-level managers who are able to commit resources, ensure that project is managed, provide constant guidance and oversight, and make most decisions related to the project.

- Successful partnerships typically include charters, memoranda of understanding, standard operating procedures, training, and exercises. Charters set preliminary objectives, note assumptions, set initial timelines and budgets, describe the project methodology, outline the organizational structure, and are signed by the participants. They should improve the efficiency of how the partnership delivers services to the public.

C. Importance of Training, Exercises, and Comment Nomenclature

Captain Eddie Reyes of the Alexandria (Virginia) Police Department said that while interoperable communications technology is reaching a satisfactory level, training is not yet adequate. His other key points include these:

- The law enforcement community has looked up to fire and emergency medical services as leaders in interoperability.

- Training must include both operational and support personnel.

- Interoperability should be tested at various shifts and times. Often night shift employees receive the most training because they are the most available for training, but employees on all shifts need to be trained.

- Major issues that will affect the need for training include narrowbanding, the consensus plan, and others. (See adjacent box.)

- Many agencies and users are unaware that their radios can be programmed to communicate with other agencies. Training can raise awareness of that capability.

> ## Training and Licensing Issues
>
> - FCC requiring local and state public safety agencies on VHF & UHF bands to migrate to narrowband by Jan. 1, 2013
> - NTIA requiring federal agencies on VHF and UHF to migrate to narrowband by Jan. 1, 2008
> - There are approximately 112,000 Private Wireless licenses in the public safety pool–54% are VHF (150-174 MHz), 33% are UHF (421-512 MHz), and approximately 6% are 800 MHz (806-869)
> - Consensus Plan–Rebanding to begin on June 27, 2005
>   * Expected to last approximately 30 months
>   * Will occur in four waves (four geographic areas) in three-month intervals.
>   * First Wave – East Coast
>   * Second Wave – All other states except SE and certain Canadian & Mexican border states
>   * Third Wave – Southeast
>   * Fourth Wave – Remaining Canadian & Mexican border states.

- For successful regional training, it is essential to establish and nurture public safety partnerships. It is especially helpful to know people in the other agencies and feel comfortable calling them and asking for help.

Training Challenges

- 3 P's – People, Policy, and Paperwork
- Lack of funding/commitment to training
- Ineffective training committees–no follow through on action items
- Power struggles–disciplines, politics, and animosities
- During emergencies, expect radio chaos and expect leaders to doubt equipment. Very evident where training is weak.

- Lack of training will be especially apparent during the chaos of an emergency.

A participant observed that an educational effort may be needed to convince political leaders that the public safety field needs more bandwidth. Another participant asked what DOJ has been doing to convince the Federal Communications Commission (FCC) of that need. A panel member replied that both DHS and DOJ are working with the FCC. He added that it would have been useful if FCC representatives had been invited to this summit.

The first questioner noted that the FCC has been tasked with studying public safety spectrum needs. The FCC responded by asking for comments, giving only 30 days for response. The International Association of Chiefs of Police and Major City Chiefs Association hurried to meet that short deadline and submitted responses. Mr. Coty said SAFECOM is also working on the issue of obtaining sufficient bandwidth for public safety agencies.

A participant asked how the National Incident Management System (NIMS) is being factored into various communications plans. Mr. Hawkins replied that there is a requirement for NIMS-based incident command structure planning. However, much of that planning is currently oriented toward responding to wildfires and is not wholly applicable to an all-risk environment.

IV. Luncheon and Keynote Speaker

Charles Frahm, Special Agent in Charge, Counterterrorism Division, Federal Bureau of Investigation, spoke on counterterrorism operations in a multi-agency environment. He applauded DOJ for hosting a conference dedicated to enabling interagency cooperation.

Mr. Frahm said that his nine years on the Joint Terrorism Task Force (JTTF) in New York City helped him understand that multiple organizational cultures must come together to combat terrorism. To set the stage, he provided a brief history of recent terrorism. The extensive media coverage of the Palestinian murders of Israeli athletes in Munich in 1972 provided the first exposure to international terrorism for many people. More exposure followed with coverage of the Baader-Meinhof gang and violence in Northern Ireland. The Soviet invasion of Afghanistan in 1979 and the Iran hostage taking brought the world into the current era of terrorism. Next came the attack on the Marine barracks in Beirut and the kidnappings of CIA station chiefs. Within the United States, in 1979 and 1980 Puerto Rican nationalist groups staged several terrorist attacks in New York City. As a result, the first JTTF was formed there.

The 1993 bombing of the World Trade Center was a critical crossroads in collaboration. In investigating the attack, the FBI worked with the police, Central Intelligence Agency, and Immigration and Naturalization Service.

To illustrate the nature of today's threat, Mr. Frahm showed video footage of Islamic terrorists discussing their surveillances and attack plans and driving through New York's Lincoln Tunnel to decide where to place their bomb. FBI surveillance video showed some of the terrorists saying their prayers in the same room in which their colleagues were packing explosives and studying maps. Law enforcement's goal, and the goal of interagency collaboration, should be to capture such individuals before they carry out an attack.

The FBI works in partnership with many agencies in that effort. For example, the New York JTTF includes approximately 36 agencies. Maintaining a spirit of "one team, one fight" requires much coordination and leadership, and squabbles are inappropriate and unproductive. State and local agencies should contribute information to federal databases so the information can be shared with partners and cross-referenced with data from other parts of the country. Mr. Frahm said he had just returned from Baghdad, where military personnel who obtain leads about terrorism send the data to the FBI immediately for analysis.

Mr. Frahm gave an example of the necessity of good working relationships between law enforcement agencies. Terrorists may drive freely between New Jersey and New York, whereas law enforcement officers who wish to do so must first arrange for permission or notifications. In another example, the FBI became aware of three anti-U.S. terrorists in London and asked the British government to arrest them. British law enforcement agents were then able to uncover the rest of the terrorist cell. Mr. Frahm called communications interoperability a key part of the global war on terrorism because such interoperability facilitates interagency cooperation.

V. Applying Technology to Achieve Interoperability

This session provided a discussion of key tenets of managing technology to achieve interoperability. Hyuk Byun, Program Executive for Communications and Information Technology, Office of Science and Technology, NIJ, served as moderator.

A. Interoperability Standards

Thomas Coty, Director, Technology and Standards, SAFECOM, DHS, provided summit participants with a view of SAFECOM's direction for the future. He noted the following:

- SAFECOM receives many ideas from practitioners. One recommendation was to see public safety practitioners rather than the vendors driving product development. Attaining that goal will require unifying the interests of the nation's thousands of law enforcement agencies in order to get the attention of the vendor community. He hoped that 18 years from now there would be a system of systems, not a one-size-fits-all approach. That outcome will require standards for interoperability.

- The life cycle of standards development consists of several stages: defining public safety requirements, creating a public safety architecture framework, identifying interface specifications and standards, conducting a gap analysis, performing testing and evaluation, revalidating the requirements, and implementing the standards.

- SAFECOM is establishing a standards process organization.

- SAFECOM is working on a Public Safety Statement of Requirements, which attempts to project future needs based on scenarios involving various disciplines. Once the requirements are developed, the resulting architecture framework will provide a common, pragmatic approach to developing a system of systems.

Dereck Orr, Program Manager, Public Safety Communication Standards, National Institute of Standards and Technology (NIST), spoke about the Project 25 communications standard, also known as P25:

- Mr. Orr described a disciplined approach to developing future standards, but some standards exist already. P25 is a suite of eight interface standards. Only one has been developed to the point where several vendors are making equipment that meets it.

- It is important that users be confident that P25-labeled equipment conforms to the P25 standard, but currently there is no enforcement mechanism to ensure that confidence. The Office of Law Enforcement Standards conducted performance testing of P25 radios, and not one met all the elements of the P25 standard. Currently, prospective purchases must rely on the supplier's declaration that the product meets the P25 standard. It

would be better to have a third-party declaration of compliance (along the lines of Underwriters Laboratories' listing of appliances).

- For that reason, a P25 conformity assessment program is being developed. In that system, laboratories accredited by NIST would test the radios and post the findings. Vendors would supply radios for testing, and users could not buy the radios with federal money if they failed the test.
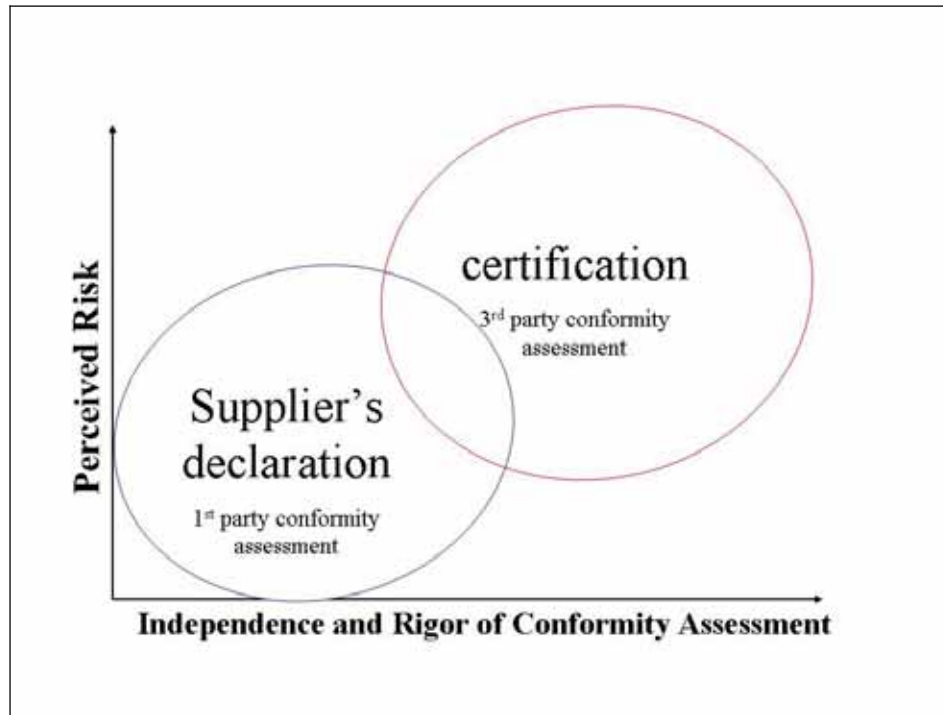
B. Discussing the Challenges of Implementing Interoperable Infrastructure

Joseph Noce, Jr., 800 MHz Project Manager, Public Safety Communications, Mesa (Arizona) Police Department, described the Mesa–Phoenix Regional Communications System:

- The Phoenix–Mesa system covers about 2,000 square miles. There are two systems but one network with 177 800 MHz channels.

- The system includes cached radios for sharing. Maintenance and inventory control are particular challenges. The area's heat affects battery life, and the radios' value (about $4,000 each) makes it imperative to get the radios back after they have been lent to users.

- During presidential debates in Tempe, Arizona, local, state, and federal law enforcement worked together, using a great variety of radio types and frequencies. Challenges arose more from turf issues and user expectations than from technical issues. However, the interoperability worked because of careful command and control and good radio etiquette.

- With a P25 radio, the Phoenix–Mesa system can authenticate a user, who is thereby authorized to use the system. Security is provided via encryption using over-the-air rekeying.

- A key issue in the mind of users is whether a radio's orange emergency button works.

- Reaching the necessary agreements was difficult, and the interoperability almost ended a year ago. However, a concern regarding encryption keys was worked out, and the system was maintained.

Lessons Learned

- Operational plans are a must
- Plans must be exercised
- Technology is the easy part
- Effective communications are essential
- Formal governance agreements needed

C. Sharing Lessons Learned from Interoperability Through Interconnects

Captain Eddie Reyes of the Alexandria (Virginia) Police Department discussed gateway solutions in interoperability:

- It is important to ask whether an interoperability solution is really needed. Sometimes, especially in the smallest agencies, the answer is no.

- If interoperability is needed, the first step is to start a formal planning process. It is advantageous to include all relevant agencies. Any who are left out may become the biggest barriers to success.

- Protocol—that is, deployment procedures—should be considered at the beginning.

- The procurement process is one of the most important decisions an agency or region must make before purchasing equipment. Captain Reyes recommended visiting agencies or regions that are using the system under consideration and interviewing users, not just program managers.

- It can be useful to allow vendors to make site visits to demonstrate how well their equipment works in the particular geographic area.

- During implementation, it is wise to start small. If the system will eventually include 10 agencies, perhaps only three or four should be integrated at first. As the solution becomes stable, agencies can be added.

- User training is of utmost importance, and the equipment should be tested often.

Summit participants then asked several questions. One asked whether third-party testing was likely to add substantially to radios' cost. The response was that radios are already required to undergo testing by the Federal Communications Commission and that vendors only need to send in one radio of each type, so any increase in cost should be minor. In fact, testing may spur competition and drive the price down.

A participant asked whether the process of creating interim standards might slow down progress on finalizing the P25 standard. Mr. Orr said that NIST informed the P25 group that it must speed up its efforts to finalize the standard, and the group has done so. Mr. Orr said he expects to see a Telecommunications Industry Association P25 standard completed soon. Mr. Noce said it remains to be seen how effective the P25 standard will be.

Another participant asked how companies can be selling P25 technology—both infrastructure and subscriber units—if the standard is not yet fully developed. Mr. Noce affirmed that at least five manufacturers offer equipment that meets the P25 standard.

A participant who is also on the P25 steering committee observed that it would be useful to have more users on the committee to help ensure that the features that will be in the standard are the features that users actually need.

VI. Federal Perspectives on Improving Interoperability

Carl Peed, Director, COPS Office, said DOJ recognizes the importance of supporting the development of interoperable communications and added that summit participants are contributing to the evolution of public safety—that is, the nation's safety. He felt that the observation that a radio is a computer with an antenna seems particularly insightful.

Mr. Peed said that when he rides with police chiefs, he now regularly asks about the radio systems they use and how well they work. The information age has changed the way people live and work. Gone are the days when any jurisdiction was an island unto itself. Criminals are not limited by jurisdictional boundaries, and emergencies spread widely. Interoperable systems are a vital part of the law enforcement response to those trends. The COPS Office believes the larger population centers are most at risk. It has spent some $10.6 billion since 1994 on supporting state and local law enforcement to advance community policing, to hire new law enforcement officers, and to purchase new crime-fighting technologies.

VII. Report Back from Working Groups and Discussion of Next Steps

Summit participants were divided into six subject-matter groups with facilitators. Each group met twice and then presented its findings at the final plenary session.

1. Future Trends and Directions

Dennis Cobb, Deputy Chief, Technical Services Division, Las Vegas Metropolitan Police Department, served as reporter for this group.

It is important for users to articulate their needs as they look to future interoperability standards and equipment. It might also be useful to include training as a requirement for certification. Currently, many users are excited about software-defined radios, but it may take a while until that equipment's potential is realized.

Several environmental factors will affect the future of interoperable wireless communications:

- Radio congestion will increase.

- Spectrum will continue to be limited.

- Infrastructure development will remain costly.

- Federal funds will be limited.

Factors within the communications industry will also affect the future:

- Competition is limited.

- Engineers listen to other engineers more than to end users. They tend to add functionality because they can, not necessarily because users want it.

- Designers often misunderstand or do not inquire enough about user needs.

- Commercial products set expectations for the performance of law enforcement radios.

The group offered the following recommendations:

- The federal government and state and local governments should partner with commercial companies to provide primary data coverage and backup for voice.

- State and local governments need more experienced engineers working for public safety. Such engineers could more accurately assess needs and better communicate with designers and vendors. They could also obtain assistance from independent experts or university partners.

- All levels of government (including state police officer standards and training commissions) should mandate more training for end users of wireless communications equipment.

- The federal government should clear the 700 MHz band and reserve it for public safety use.

- Local requirements must force a holistic approach to design, considering human engineering factors in addition to technical and field operations.

- The federal government should sponsor research into developing a modular approach to radio design. Such a design could start with a "mainframe box" to which desirable features could be added.

- Software defined radios seem to be one key solution of the future.

- The federal government should direct the development of open standards. Among other benefits of such standards would be improved competition among vendors.

- Requests for proposals should include life-cycle replacement costs. The federal government should encourage that in grants.

2. Building Partnerships

Sergeant Thomas Golder, Communications Bureau, Nassau County (New York) Police Department, served as reporter for this group. The group made a number of observations about the process of building interoperability communications partnerships:

- Good communication is a cornerstone that is essential for strong partnership. It helps partners understand the mission and commit to the project.

- Cultural differences are a challenge, especially with nontraditional partners. It is important to understand and respect those differences. It may be necessary to create culture particular to the new partnership.

- Building a partnership takes time.

- It is vital to obtain buy-in or commitment from executive sponsors, users, and the public. The education process never ends because individuals leave, new ones join, and technology evolves.

- Federal partners are crucial as support providers and periodic users of interoperable systems. Their membership as partners benefits all.

- Stakeholders include more than public safety. Public services, utilities, schools, transportation, and health care organizations can all add resources and intelligence.

- The very process of building partnerships can improve interagency relationships over the long term—at both administrative and operational levels—even if those relationships were strained at first.

3. Practical Applications of Technology

Sergeant Steven Fisher, Special Operations, Orangetown (New York) Police Department, served as reporter for this group. He reported first on the group's general discussion of lessons learned and then on some specific recommendations.

Lessons learned in applying technology—and a few remaining questions—include the following:

- Agencies need a centralized location to access information on technologies that are either established or under development. The location could be a secure Web site, message board, or chat room. Vendors might observe those sites and respond to concerns.

- Antenna placement for the ACU-1000 system is critical in multiband environments.

- What should the protocol be when multiple ACU units or multiple agencies with ACUs arrive on scene?

- What is the current level of network security? How can administrative control and environmental integrity be managed?

- It is important to be prepared for situations where an encrypted radio is introduced to an interoperable network.

- It is essential to establish clear governance within interoperability environments.

- Managing interoperability projects is substantially more challenging when the persons responsible have more than one job.

- Training must include instruction, experience, and behavioral change. It must continue until the student demonstrates competency.

- Even when equipment is available without cost, some agencies need maintenance to be included as well.

- If a network is to operate well, it is essential that all partners maintain their equipment. Therefore, interoperability arrangements should include a means whereby maintenance expenses are covered.

- Users need technical support contact information to be readily available, as equipment breakdowns do not always occur during business hours.

- Interoperability is possible without high tech or expensive equipment.

The group offered the following recommendations regarding ways in which the federal government could help:

- NIJ should observe technology projects in the field to verify capabilities, collect lessons learned, and gauge training needs. Such validation would be independent of any conducted by manufacturers or grantees.

- The federal government should support and disseminate a data interoperability standard, but the details of any standards should be driven by users, not the government or vendors.

- It would be useful to have an independent evaluator collect metrics on equipment performance. The evaluation would be along the lines of a *Consumer Reports* evaluation.

- The federal government should provide more pilot funding to implement solutions.

- The federal government should find a way to "push" interoperability information to users instead of relying on users to "pull" it.

4. Future Trends and Directions

Breakout group 4 addressed the same topic as breakout group 1: future trends and directions in wireless communications interoperability. The reporter for breakout group 4 was Lieutenant Stephen Webb, Communications Division, Los Angeles County Sheriff's Department. In general discussions, the group noted the following:

- Governance is a major factor in the success of any implementation.

- In choosing a vendor, it is especially useful to examine the vendor's system in use in another location.

- One way to lessen the implementation burden carried by supervisors and middle managers is to request more help from the selected vendor.

- There is overwhelming interest in having long-range broadband that can cover rural areas (especially for data transmission).

- The public safety community may not be capturing the attention of the FCC.

- To keep pace with technology, agencies should build equipment life-cycle costs into their budgets. Also, agencies should purchase only necessary equipment and features ("leading edge, not bleeding edge").

- Interoperability appears to be improving from year to year.

- As lessons learned are shared, operational policies and procedures will improve.

- Factors for interoperability include systems integration to establish interim interoperability solutions; regional coordination and formation of an interoperability governing board that can provide multi-jurisdictional coordination, planning for interoperability during emergency response, and cost savings; and sharing of system control.

The group recommended that the communications industry assist law enforcement by doing the following:

- Compete more vigorously.

- Make standards a reality.

- Share towers and sites.

- Have the Federal Partnership for Interoperable Communications share technology findings with local and state agencies.

There are several ways in which the federal government may be able to help:

- Require that grant applications be submitted by regional committees in order to drive governance.

- Provide funding and grant guidance.

- Develop standards.

- Drive development of multiband and other technologies.

- Standardize radio frequency systems to aid planning.

- Provide more spectrum to public safety agencies.

5. Building Partnerships

Breakout group 5 addressed the same issue (building partnerships) as breakout group 2. The reporter for breakout group 5 was Valerie Eveland, Technical Systems Coordinator, Benton County (Washington) Emergency Services. This group combined its findings into a single category, which it called best practices and lessons learned. The following are the group's recommendations for agencies attempting to build interoperability partnerships:

- When and where appropriate, attempt to incorporate federal agencies.

- Address governance and planning issues first. If possible, leverage existing regional governance structures or committees.

- Recognize that it is easier to build partnerships among agencies within a single county than with organizations in neighboring counties, as each county has its own agenda and mission.

- When partnering for interoperability solutions, sign agreements or memoranda of understanding (MOUs).

- Expend sufficient energy in training users. Police officers may have all the capabilities in the world with their radios, but if they do not know what those capabilities are, they cannot use them.

- Allow partner agencies to take ownership and provide input for a solution.

- Hold monthly meetings to allow potential partner agencies to discuss solutions and training requirements.

- Attempt to remove politics in order to seek partner agencies.

- To avoid political battles, attempt to stay "under the radar" and focus on solution requirements.

- Conduct outreach efforts to inform agencies of interoperability capabilities.

- Ensure that potential partner agencies have sound, reliable systems.

- Know where to define the boundaries of a regional system.

- Allow a project "champion" to sell ideas to politicians and inform them of the benefits to their constituents.

- Seek partnerships on all levels of government.

6. Interoperability Cornerstones

Breakout group 6 divided its findings regarding the cornerstones of interoperability into three categories: project management, training, and planning. In its recommendations regarding project management, the group called for developing a charter that would do the following:

- Identify and engage all stakeholders.

- Welcome empowered representatives from each entity.

- Allow for equal representation from all stakeholders.

- Identify the problem to be addressed.

- Identify the project's goals, objectives, and scope.

- Develop political and executive-level commitment.

In its recommendations regarding training, the group called on law enforcement agencies to do the following:

- Tailor training for various audiences.

- Use various training media, such as table top exercises, videos, computer-based training, and live system training.

- Repeat the training and follow varied training schedules.

- Identify training resources.

- Develop a comprehensive training plan.

Finally, in its recommendations regarding planning, the group urged law enforcement agencies to take these steps:

- Develop a formalized communications plan.

- Identify funding mechanisms to establish and sustain the system.

- Anticipate funding sources.

- Prepare requests in advance in order to take advantage of any funding sources that may materialize.

- Develop a strong business case.

Appendix

Agenda

Summit on Implementing Wireless Communications:
Perspectives on Interoperability from the Law
Enforcement Community

Sponsored by
U.S. Department of Justice
Justice Management Division
National Institute of Justice
Office of Community Oriented Policing Services

AGENDA

May 2-3, 2005
Seattle, Washington

Monday, May 2, 2005	

7:30 a.m. – 8:30 a.m.	**Registration and Continental Breakfast**	*Courtyard Foyer*
8:30 a.m. – 9:00 a.m.	**Welcome and Opening Remarks**	*Courtyard Ballroom*

R. Gil Kerlikowske
Chief of Police
Seattle Police Department
Seattle, Washington

Robert D. McCallum, Jr.
Associate Attorney General
Office of the Associate Attorney General
U.S. Department of Justice
Washington, DC

9:00 a.m. – 9:15 a.m.	**Summit Overview**
Summit Moderator:	**Paul R. Corts**

Assistant Attorney General for Administration
Justice Management Division
U.S. Department of Justice
Washington, DC

9:15 a.m. – 10:15 a.m.   U.S. Department of Justice Interoperability Programs

Overview of several complementary initiatives the U.S. Department of Justice launched to help the law enforcement community meet inter-agency communications objectives.

COPS Interoperable Communications Technology Program

Michael E. Dame
Supervisory Senior Policy Analyst
Grants Administration Division
Office of Community Oriented Policing Services
U.S. Department of Justice
Washington, DC

NIJ Interoperable Communications Technology Program

Joseph F. Heaps
CommTech Program Manager
Office of Science and Technology
National Institute of Justice
U.S. Department of Justice
Washington, DC

High-Risk Metropolitan Areas Interoperability Project: The 25 Cities Project

Timothy S. Ritter
Director
Wireless Management Office
Justice Management Division
U.S. Department of Justice
Washington, DC

10:15 a.m. – 10:30 a.m.	Break

10:30 a.m. – 12:00 p.m.   Interoperability Cornerstones   *Courtyard Ballroom*

Discussion of what is necessary in order to achieve a successful application of technology for interoperability in the law enforcement community.

Moderator: **Michael Duffy**
Deputy Chief Information Officer
Justice Management Division
U.S. Department of Justice
Washington, DC

SAFECOM Interoperability Continuum Tool

David G. Boyd
Director
Office of Interoperability and Compatibility
U.S. Department of Homeland Security
Washington, DC

Planning, Project Governance, and Local Partnerships

Dan M. Hawkins
Program Manager
Public Safety Technologies Program
SEARCH Group
Sacramento, California

Importance of Training, Exercises, and Common Nomenclature

Eddie L. Reyes
Captain
Alexandria Police Department
Alexandria, Virginia

12:00 p.m. – 1:15 p.m.	**Luncheon and Keynote Speaker**	*South/West*

Counterterrorism Operations in a Multi-Agency Environment

Charles Frahm
Special Agent in Charge
Counterterrorism Division
Federal Bureau of Investigation
New York, New York

1:15 p.m. – 2:45 p.m.	**Applying Technology to Achieve Interoperability**	*Courtyard Ballroom*

Discussion on key tenets of managing technology to achieve interoperability.

Moderator: **Hyuk Byun**
Program Executive for Communications and Information Technology
Office of Science and Technology
National Institute of Justice
U.S. Department of Justice
Washington, DC

Interoperability Standards

Thomas Coty
Director
Technology and Standards
SAFECOM
U.S. Department of Homeland Security
Washington, DC
and
Dereck Orr
Program Manager
Public Safety Communication Standards
National Institute of Standards and Technology
Gaithersburg, Maryland

Discussing the Challenges of Implementing Interoperable Infrastructure

Joseph Noce, Jr.
800 MHz Project Manager
Public Safety Communications
Mesa Police Department
Mesa, Arizona

Sharing Lessons Learned From Interoperability Through Interconnects

Eddie L. Reyes
Captain
Alexandria Police Department
Alexandria, Virginia

2:45 p.m. – 3:15 p.m.	Break

3:15 p.m. – 4:45 p.m.   **Breakout Sessions: Working Group Discussions on Key Issue Areas**

All attendees are pre-assigned to breakout groups (see flyer in your summit folder). Each group will discuss issues and present recommendations on improving interoperability programs and efforts in the future.

Breakout #1: Future Trends and Directions   *Columbia*

Facilitator: **Michael Duffy**
Deputy Chief Information Officer
Justice Management Division
U.S. Department of Justice
Washington, DC

Breakout #2: Building Partnerships *East*

Facilitator: **Michael E. Dame**
Supervisory Senior Policy Analyst
Grants Administration Division
Office of Community Oriented Policing Services
U.S. Department of Justice
Washington, DC

Breakout #3: Practical Applications of Technology *James*

Facilitator: **Joseph F. Heaps**
CommTech Program Manager
Office of Science and Technology
National Institute of Justice
U.S. Department of Justice
Washington, DC

Breakout #4: Future Trends and Directions *North*

Facilitator: **Hyuk Byun**
Program Executive for Communications and Information Technology
Office of Science and Technology
National Institute of Justice
U.S. Department of Justice
Washington, DC

Breakout #5: Building Partnerships *Spring*

Facilitator: **Rob Zanger**
Attorney/Advisor
Justice Management Division
U.S. Department of Justice
Washington, DC

Breakout #6: Interoperability Cornerstones *Washington*

Facilitator: **Dan M. Hawkins**
Program Manager
Public Safety Technologies Program
SEARCH Group
Sacramento, California

Tuesday, May 3, 2005

7:30 a.m. – 8:00 a.m.	**Continental Breakfast**	*Courtyard Foyer*
8:00 a.m. – 8:30 a.m.	**Federal Perspectives on Improving Interoperability**	*Courtyard Ballroom*

John S. Morgan
Assistant Director for Science and Technology
Office of Science and Technology
National Institute of Justice
U.S. Department of Justice
Washington, DC

Carl R. Peed
Director
Office of Community Oriented Policing Services
U.S. Department of Justice
Washington, DC

8:30 a.m. – 10:00 a.m.	**Breakout Sessions: Working Group Discussions on Key Issue Areas (Continued)**

Breakout #1: Future Trends and Directions	*Columbia*
Breakout #2: Building Partnerships	*East*
Breakout #3: Practical Applications of Technology	*James*
Breakout #4: Future Trends and Directions	*North*
Breakout #5: Building Partnerships	*Spring*
Breakout #6: Interoperability Cornerstones	*Washington*

10:00 a.m. – 10:30 a.m.	**Break**

10:30 a.m. – 11:30 a.m.   **Report Back from Working Groups**   *Courtyard Ballroom*
                                 and Discussion of Next Steps

Paul R. Corts
Assistant Attorney General for Administration
Justice Management Division
U.S. Department of Justice
Washington, DC

11:30 a.m. – 12:00 p.m.   **Wrap-Up and Summary**

Michael Duffy
Deputy Chief Information Officer
Justice Management Division
U.S. Department of Justice
Washington, DC

Attendees

Lou Amell
Communications Director
Las Vegas Fire Communication
    Center
Las Vegas, NV

Spencer L. Bahner
Associate
Sparling
Seattle, WA

Dennis Baucom
Communications Division Direc-
    tor
BSS/Communications
City of Charlotte
Charlotte, NC

Michael E. Bennett
Director
Electronic Systems Division
Maryland State Police
Pikesville, MD

Aubrey Berendsen
System Administrator
IWN/JPO
U.S. Department of Justice
Bothell, WA

Cindy Bernal
Radio Systems Manager
Miami-Dade County Enterprise
    Technology Services
Miami, FL

Eric W. Bibb
Director
Information Technology
Louisville Metro Police Depart-
    ment
Louisville, KY

Thomas Bland
Electronic Technician
Federal Bureau of Investigation
Atlanta, GA

David M. Borden
Support Services Administrator
Public Safety and Division of
    Support Services
City of Columbus
Columbus, OH

Hugh Bradshaw
Communications Coordinator
Operations Division
New York City Office of Emer-
    gency Management
Brooklyn, NY

Patricia Broderick
Sheriff's Radio Liaison
Public Safety
Orange County Sheriff's Office
Orlando, FL

Doug Broglie
Senior Consultant
Wireless Services
Booz Allen Hamilton
McLean, VA

David Brooks
Radio System Manager and
    Communications Engineer
ComNet/BIS
City of Portland
Portland, OR

Edward Brundage
Technical Systems Manager
Kansas City Police Department
Kansas City, MO

Boyd Bryant
Supervisor
Technical Services
Everett Police Department
Everett, WA

Michael Burney
Associate
Booz Allen Hamilton
Terrell, TX

Hyuk Byun
Program Executive for Communi-
    cations and Information Tech-
    nology
Office of Science and Technology
National Institute of Justice
U.S. Department of Justice
Washington, DC

Carol J. Campbell
Communications Bureau Manager
Police Communications Division
Avondale Police Department
Avondale, AZ

William J.Carter
Supervisor
Electronic Operations
Chicago Office of Emergency
    Management and Communica-
    tions
Chicago, IL

Peter Caruso
Communications Director
New Orleans Fire Department
New Orleans, LA

Captain Anthony Catalanotto
New York Fire Department
Brooklyn, NY

Major Piper Charles
Special Investigations
Charlotte-Mecklenburg Police
    Department
Charlotte, NC

Michael Chorn
Telecommunications Specialist
Bureau of Alcohol, Tobacco,
    Firearms and Explosives
Seattle, WA

Deputy Chief Dennis Cobb
Technical Services Division
Las Vegas Metropolitan Police
    Department
Las Vegas, NV

Denis Collins
Network Engineer
U.S. Department of Justice Wire-
    less Management Office Support
Northrup Grumman
Garden City, NY

Gary Conklin
Associate
Booz Allen Hamilton
McLean, VA

Edward F. Connors
President
Institute for Law and Justice
Alexandria, VA

Sheryl Contois
Division Manager
Technical Services Division
Palo Alto Police Department
Palo Alto, CA

Dr. Paul R. Corts
Assistant Attorney General for
    Administration
Justice Management Division
U.S. Department of Justice
Washington, DC

Thomas Coty
Director
Technology and Standards
SAFECOM
U.S. Department of Homeland
    Security
Washington, DC

Dave Craig
San Diego County Lean Chairman
    and Motorcycle Traffic Officer
Coronado Police Department
San Diego County Law Enforce-
    ment Assistance Network
Coronado, CA

Christopher Cunnie
Executive Director
Emergency Communications
    Department
City and County of San Francisco
San Francisco, CA

Michael E. Dame
Supervisory Senior Policy Analyst
Grants Administration Division
Office of Community Oriented
    Policing Services
U.S. Department of Justice
Washington, DC

Margaret D'Elia
Lead Program Specialist
Grants Management Division
Office of Community Oriented
    Policing Services
U.S. Department of Justice
Washington, DC

Adrian DeLuna
Telecommunications Specialist
Seattle Field Division
Drug Enforcement Administration
Seattle, WA

Bruce Dennis
Communications Electronic
    Technician
Electronic Engineering Bureau
Denver Police Department
Denver, CO

Major Vickie D. Diaz
Services Division
Jacksonville Sheriff's Office
Jacksonville, FL

Joseph P. DiLonardo
Electronics Division
Special Operations Division
Federal Bureau of Investigation
New York, NY

David Dong
Telecommunication Managaer
Federal Bureau of Investigation
New York, NY

Kenneth, Doughty
Electronic Technician
Federal Bureau of Investigation
Houston, TX

Michael Duffy
Deputy Chief Information Officer
Justice Management Division
U.S. Department of Justice
Washington, DC

Assistant Chief Francis Dunlap
Communications Division
Jacksonville Sheriff's Office
Jacksonville, FL

Doug Edmonds
Executive Director
Northwest Central Dispatch Sys-
    tem
Arlington Heights, IL

Sheila Evans
U.S. Department of Justice Con-
    tractor Support
Systems and Communcations
Booz Allen Hamilton
McLean, VA

Valerie Eveland
Technical Systems Coordinator
Benton County Emergency Ser-
    vices
City of Richland
Richland, WA

Lieutenant Joseph Finch
Data Processing
Indianapolis Police Department
Indianapolis, IN

Sergeant Steven Fisher
Special Operations
Orangetown Police Department
Orangeburg, NY

Norm Forshee
911 Coordinator
911 Division
St. Clair County Emergency Tele-
    phone System Board
Belleville, IL

Deborah Fox
Director
MetroSafe
Louisville Metro Government
Louisville, KY

Charles Frahm
Special Agent in Charge
Counterterrorism Division
Federal Bureau of Investigation
New York, NY

Linda Fuchs
Project Manager
State Technology Office
Tallahassee, FL

Jim Goebel
Technical Liaison
Emergency Communications
    Department
City of San Francisco
San Francisco, CA

Sergeant Thomas M. Golder
Communications Bureau
Nassau County Police Department
Mincola, NY

Detective Stuart Goldstein
Technical Assistance and Re-
    sponse Unit
New York City Police Depart-
    ment
New York, NY

Mark Gray
Manager of Communications and
    Engineering
City of Portland
Portland, OR

James T. Griffin
Deputy Team Leader
Interoperability Program
Grants Administration Division
Office of Community Oriented
    Policing Services
U.S. Department of Justice
Washington, DC

Michael Griffin
Assistant Chief
Law Enforcement Branch
California Governor's Office of
    Emergency Services
Oakland, CA

Deputy Chief George Gudmund-
    sen
Support Division
Nassau County Police Department
Mincola, NY

Dan Guild
Telecommunications Manager
Federal Bureau of Investigation
Norfolk, VA

Chief Jenny Hansen
Public Safety Services Bureau
State of Montana
Wensten Building
Helena, MT

Philip Harris
Senior Communications Manager
National Law Enforcement Tech-
    nology Center - NE
Rome, NY

Dan M. Hawkins
Program Manager
Public Safety Technologies Pro-
    gram
SEARCH Group
Helena, MT

Joseph F. Heaps
CommTech Program Manager
Office of Science and Technology
National Institute of Justice
U.S. Department of Justice
Washington, DC

Cathy Hess
Senior Consultant
DOJ 25 Cities Suppport
Booz Allen Hamilton
Eatontown, NJ

Carol J. Hladki
Chief of Services
Jacksonville Sheriff's Office
Jacksonville, FL

Robert J. Hlivak
Radio Engineer
Information and Communications
    Services Division
State of Hawaii
Honolulu, HI

Jolene Hollingshead
ICTAP Site Lead
Space and Naval Warfare Systems
    Center
San Diego, CA

Edmund J. Horace
Deputy Inspector
Communcations Bureau
Nassau County Police Department
Mincola, NY

Mike Hougen
Division Manager
Information Technologies
City of Las Vegas
Las Vegas, NV

Dave Hudicka
Telecommunications Manager
Federal Bureau of Investigation
Baltimore, MD

Joseph James
Deputy Commissioner
Communications Division
Department of Public Property
City of Philadelphia
Philadelphia, PA

James Jarvis
Consultant
44 Milburn Circle
Pasadena, MD

Ole Johansen
Senior Electrical Technician
Special Operations Division
Federal Bureau of Investigation
New York, NY

Kevin Kearns
Director
Information and Telecommunica-
    tions Services Division
King County
Seattle, WA

Fred Keithley
Director of Community Services
Communications, Criminal Jus-
    tice, and Police Training
North Central Texas Council of
    Governments
Arlington, TX

Chief R. Gil Kerlikowske
Seattle Police Department
Seattle, WA

Christopher R. Kindelspire
Director Electronic Operations
Emergency Communications
    Division
Corundy County 911
Morris, IL

Lieutenant Gary Kirby
Research and Development
San Jose Police Department
San Jose, CA

Arnold Kishi
Project Director
Information and Communication
    Services
State of Hawaii
Honolulu, HI

Alan Komenski
Operations Manager
Eastside Public Safety Communi-
    cations Agency
Bellevue, WA

Jay Kopstein
Inspector
Operations Division
New York City Police Depart-
    ment
New York, NY

Dr. Andrew Kun
Assistant Professor
Electrical and Computer Engi-
    neering Department
University of New Hampshire
Durham, NH

Joe Kuran
Technical Systems Manager
Washington County and Clacka-
    mas County
Beaverton, OR

Sergeant Tom Labombarda
Aventura Police Department
Aventura, FL

E. Michael Latessa
Interim Director
Office of Unified Communica-
    tions
Washington, DC

Cecil Lawson
Chief Information Officer
San Jose Police Department
San Jose, CA

Thomas Levy
Assistant Communications Director
Fire Communications
New Orleans Fire Department
New Orleans, LA

Bob Luke
Commander
Communications Bureau
Tampa Police Department
Tampa, FL

Dawn Lutz
Unit Chief
Federal Bureau of Investigation
Quantico, VA

John MacLean
Network Administrator
Office of Emergency Management
City of Philadelphia
Philadelphia, PA

Karen L. Manser
Deputy Chief of Police Operations
Lynnwood Police Department
Lynnwood, WA

Juan Martinez
Information Technology Manager
Information Management Systems
Orange County Sheriff's Office
Orlando, FL

Robert D. McCallum, Jr.
Associate Attorney General
Office of the Associate Attorney
   General
U.S. Department of Justice
Washington, DC

Harlin R. McEwen
Police Chief (Retired)
Chairman, Communications
   Committee
International Association of
   Chiefs of Police
Ithaca, NY

Sandra McNulty
Consultant
Booz Allen Hamilton
McLean, VA

Major Rodney Milburn
Administration Services`
Louisville Metro Police Department
Louisville, KY

Pam Montanari
Radio Systems Manager
Emergency Communications
Pinellas County Government
Largo, FL

Barbara Montgomery
Project Manager
ARJIS
San Diego, CA

Roy Morales
Chief Technology Officer
Houston Emergency Center
City of Houston
Houston, TX

Joseph Noce, Jr.
800 MHz Project Manager
Public Safety Communications
Mesa Police Department
Mesa, AZ

Claude Oden
IWN Program Management Staff
Wireless Management Office
Justice Management Division
U.S. Department of Justice
Fairfax, VA

Peter Ohlhausen
President
Ohlhausen Research, Inc.
Annandale, VA

Dan O'Leary
Chief Warrant Officer
Communcations and Security
   Division
District 13 Information Technology and Communications
U.S. Coast Guard
U.S. Department of Homeland
   Security
Seattle, WA

Patrick O'Rourke
Superintendent
Fire Alarm Division
Boston Fire Department
Boston, MA

Dereck Orr
Program Manager
Public Safety Communication
   Standards
National Institute of Standards
   and Technology
Gaithersburg, MD

Norman D. Parrish
Communication Trainer
Public Safety and Division of
   Support Services
City of Columbus
Columbus, OH

Gary R. Pasicznyk
Technician
Electronic Engineering Bureau
Denver Police Department
Denver, CO

Carl R. Peed
Director
Office of Community Oriented
   Policing Services
U.S. Department of Justice
Washington, DC

Jose P. Perez
Infrastructure Supervisor
Radio Division
Miami-Dade County
Miami, FL

Joe M. Peters
Communications Project Manager
Sheriff's Association of Texas
Austin, TX

Perry L. Pierce
Assistant Director
Orange County Sheriff's Office
Orlando, FL

Billy Pinson
Telecommunications Manager
Federal Bureau of Investigation
Houston, TX

Robert Pletcher
Program Manager
Texas Department of Public
   Safety
Austin, TX

John S. Powell
Senior Consulting Telecommunications Engineer
National Institute of Justice
U.S. Department of Justice
National Public Safety Telecommunications Council
SAFECOM
Denver, CO

Steve Precker
Assistant Director
Public Safety Programs
G & H International Services, Inc.
SAFECOM Support
Washington, DC

Charlie Radabaugh
Telecommunications Manager
Federal Bureau of Investigation
Seattle, WA

George L. Ramsey, Jr.
U.S. Department of Justice
Contractor Support
Systems and Communications
Booz Allen Hamilton
McLean, VA

James C. Reed
Electronics Tech Project Manager
Information Technology Division
Radio Systems Development Unit
FBI Academy
Quantico, VA

James Reno
Deputy Chief of Administration
Indianapolis Police Department
Indianapolis, IN

Captain Eddie L. Reyes
Alexandria Police Department
Alexandria, VA

Timothy S. Ritter
Director
Wireless Management Office
Justice Management Division
U.S. Department of Justice
Fairfax, VA

Heather Robey
SAFECOM Support
Office for Interoperability and
    Compatibility
U.S. Department of Homeland
    Security
Washington, DC

Dr. Lori Rodefer
Technical Site Lead for Northern
    California
SPAWAR System Center, San
    Diego
San Diego, CA

Jeff Rodrigues
Deputy Director
Emergency Management
Chicago Office of Emergency
    Management and Communica-
    tion
Chicago, IL

Rex E. Roebuck
Lieutenant and Telecommunica-
    tions Branch Chief
District 13 Information Technol-
    ogy and Communications
U.S. Coast Guard
U.S. Department of Homeland
    Security
Seattle, WA

Jeffrey D. Ross
Integrated Wireless Network
    Northwest Zone Manager
JPO/IWN
U.S. Department of Justice
Bothell, WA

Joe Russo
Engineering Manager
Electronic Services Division
Washington State Patrol
Tumwater, WA

Russ Ryan
Systems Engineering and Systems
    Design
BAE Systems
Rockville, MD

Pam Scanlon
Executive Director
ARJIS
San Diego, CA

Lorri Schafer
Contract Manager
Procurement
West Electronics
Poplar, MT

Robert Sedita
Commander
Technical Services Division
Los Angeles County Sheriff's
    Department
Norwalk, CA

Christopher Siebert
Communications Officer
Western District of Washington
U.S. Marshals Service
Seattle, WA

Joseph J. Sirles
Telecommunications Manager
Federal Bureau of Investigation
New Orleans, LA

LeRoy Sisley
Firefighter, Haz-Mat Technician,
    and Communication Unit
    Leader
Seattle Fire Department
Seattle, WA

Sergeant Peter F. Small
Syracuse Police Department
Fabius, NY

George Speer
Program Manager
Federal Bureau of Investigation
Quantico, VA

Richard C. Spinale
Electronics Technician
Special Operations Division
Federal Bureau of Investigation
New York, NY

Charles Stephenson
Senior Communications Specialist
Advanced Technologies and Law
    Enforcement Sector
CommTech
Rome, NY

Oliver E. Stokes
Administrator of Communications
Communications Managemenet
    Division
Houston Police Department
Houston, TX

Dr. Greg Stone
Department of Homeland Security
Alexandria, VA

Carrie Supko
Program Support Analyst
CommTech Program
Lockheed Martin
National Institute of Justice
U.S. Department of Justice
Washington, DC

Steve Taylor
Manager
Public Safety Communications
City of Tacoma
Tacoma, WA

Tom Thompson
Field Service Manager
Michigan Public Safety Commu-
    nications System
Lansing, MI

Sean Thrash
Wireless Information Officer
Wireless Management Office
U.S. Department of Homeland
    Security
Fairfax, VA

Lieutenant Rhonda Tillman
Emergency Communications
    Division
Detroit Police Department
Detroit, MI

Sergeant Clark R. Tompsett
Special Operations
New Mexico State Police
Santa Fe, NM

Major James Treadway
Technical and Support Bureau
New Orleans Police Department
New Orleans, LA

David Troup
Director of Telecommunications
Boston Police Department
Boston, MA

James E. Turk
Program Manager
Interoperable Communnications
    Equipment Grants Program
Office for Domestic Preparedness
U.S. Department of Homeland
    Security
Washington, DCCliff Twilley
U.S. Department of Justice Sup-
    port
Booz Allen Hamilton
McLean, VA

Chris Ulrich
Computer Services and Acting
    Facilities Manager
Computer Services Executive
    Staff
Federal Detention Center - Seatac
Seatac, WA

Sergeant John M. Vallarelli
Metropolitan Transportation Au-
    thority Police Department
New York, NY

Craig T. Vance
Telecommunications Manager
Federal Bureau of Investigation
Atlanta, GA

Kimberly Walker
Senior Analyst
Wireless Management Office
U.S. Department of Homeland
    Security
Fairfax, VA

Lt. Stephen Webb
Communications Division
Los Angeles County Sheriff's
    Department
Los Angeles, CA

James A. Wilson
Communication Systems Manager
Southern Nevada Area Communi-
    cations Manager
Las Vegas, NV

Jon Wiswell
Manager of Radio Communica-
    tions
Information Technology
City of Seattle
Seattle, WA

Robert Wright
Electronic Technician
Facilities
Federal Detention Center - Seatac
Seatac, WA

Sherman Zang
Superintendent
Fire Communications - Technol-
    ogy
Kansas City Fire Department
Kansas City, MO

Rob Zanger
Attorney/Advisor
Justice Management Division
U.S. Department of Justice
Fairfax, VA

David A. Ziegler
Communication Systems Coordi-
    nator
Department of Public Safety
Division of Support Services
City of Columbus
Columbus, OH

Jeremy Zollo
Senior Consultant
Booz Allen Hamilton
Leesburg, VA