Homeland Security

Office of State and Local Government Coordination and Preparedness

FY 2005

ICTAP Interoperable Communications Equipment Survey

Findings for 905 Agencies Through June 30, 2005

Survey Overview

Over the last 18 months, the Interoperable Communications Technical Assistance Program (ICTAP) has been asked by a number of Urban Areas to assist in documenting the array of communications equipment currently in use in these regions. To date, ICTAP has surveyed a total of **14 urban areas (out of the 40 or so individual sites being supported) covering eight states, 74 counties and 47 cities** with a population of over 100,000. ICTAP has provided technical assistance to public safety agencies serving these urban areas. These agencies include 456 Law Enforcement Agencies (LEA), 320 Fire Departments and 129 Emergency Medical Services (EMS) for a total of **905 agencies**. Agency radio communication systems capabilities range from a simplex, two channel, VHF conventional system, supporting fewer than 100 users, to complex, state-of-the-art, 800 MHz trunking systems supporting up to 25,000 users.

THE INTEROPERABILITY CHALLENGE

Interoperability is the ability for public safety agencies to exchange voice and/or data with one another on demand, when needed, even when different communications systems are used. Historically, public safety agencies have operated independently, but the increasing complexity, size, and frequency of disasters and emergencies demand a coordinated multi-agency response.

Barriers that hinder well coordinated interoperability efforts are both technical and human. Different jurisdictions

may use different equipment and may communicate using different radio frequency bands. There is a limited amount of radio spectrum available to public safety; funding to replace aging communications equipment is limited and is subject to jurisdictional budget cycles.

Achieving interoperability requires management and control. Just as important as the technology is the need for uniform policies, procedures, standards and training, including exercises on communications interoperability in Weapons of Mass Destruction (WMD) or "all-hazard" events.

Effective and efficient emergency response requires co-ordination, communication, and sharing of information among numerous public safety agencies. Thousands of in-

Figure 1: The map illustrates the 14 urban areas surveyed by ICTAP to date.

cidents that require mutual aid and coordinated response happen each day. As the lead Federal agency responsible for strengthening State and local government's capacity to respond to a terrorist incident involving a WMD, the Office of State and Local Government Coordination and Preparedness (SLGCP) provides true interoperable communications support for State and local first responder agencies through on-site technical assistance.

INTEROPERABLE TECHNICAL ASSISTANCE PROGRAM (ICTAP)

ICTAP is a technical assistance program designed to enhance interoperable communications between Federal, State, and local emergency responders and public safety officials, and is associated with SLGCP's Urban Area Security Initiative (UASI) grant program. ICTAP is funded by SLGCP to provide guidance and suggestions to help the UASI site answer questions regarding planning, the roles and responsibilities of the UASI site, the extent of technical assistance that SLGCP can provide under ICTAP, and policy, operational, and technical decisions that need to be considered when developing interoperable communications.
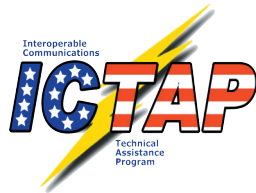
The goal of the ICTAP program is to enable local public safety agencies to communicate as they prevent or respond to a WMD attack. ICTAP also leverages and works with other Federal, State, and local interoperability efforts whenever possible to enhance the overall capacity for agencies and individuals to communicate with one another.

ICTAP Data Collection Process: The ICTAP data collection process uses three separate data collection methods. The first method uses data questionnaires completed by the agencies. These questionnaires capture subscriber unit types, system type, system infrastructure, frequencies being utilized, and talk group information. Another data collection process uses the ICTAP-developed CASM Tool. This tool is an on-line

> Pam Montanari, the Communications Chairman for Florida's Region 4, said, "The ICTAP team has come in and collected in a few months the type of data that we have always needed to collect. What's more, they have compiled that information in an impressive and attractive format that we can take back to our jurisdictions. We are grateful for their continued assistance."

form or questionnaire that captures system infrastructure data, site data, and subscriber information. The URL and password are provided to the urban area agencies allowing them convenient access.

The last data collection process is face-to-face interviews with urban area agencies, which provides better detail and understanding of the agencies representing the urban area.

Swap Radios

One way to provide interoperability among agencies jointly responding to an incident is to have on-scene responders from all agencies swap their incompatible radios with those from a radio cache. This allows all responders to use a common, compatible set of radios. Less than five percent of the agencies maintain a radio cache, which is defined here as a dedicated store of radios, ready for immediate use. Many agencies have "spare" radios that can be used. One of the reasons agencies do not maintain a radio cache is that the Federal Emergency Management Agency (FEMA) will pay for rental of radios during an emergency. Hence, if the emergency is known beforehand (like a hurricane) and there is time for planning, agencies can request rental radios to be drop-shipped from their vendors with no cost to the agency.
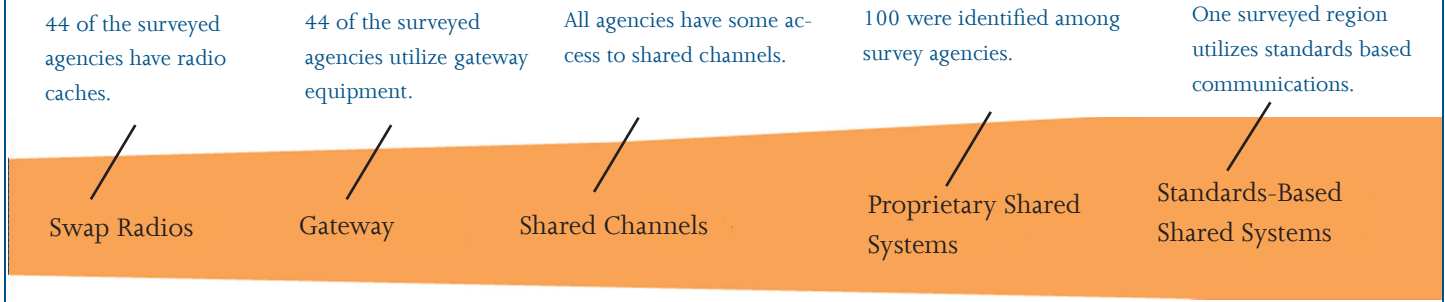
Difficulties encountered with a cache of radios is maintaining charged batteries, distribution of the radios and maintaining control of the inventory—making sure that

Figure 2: Officers line up to recieve compatible radios from a cache after Hurricane Charley.

one recovers all radios handed out. Typically, distribution is done on site. Figure 2 shows a distribution of cached radios in Punta Gorda, Florida, shortly after Hurricane Charley made landfall in 2004.

Gateway

Gateways provide connections between two or more radio networks, allowing users on one network to communicate with users on other networks. For example, a group of users on an ultra-high frequency (UHF) channel used by Agency A can be connected to a group of users on a very-high frequency (VHF) channel used by Agency B. Gateway systems normally monitor the voice output from a radio and connect the voice signal to the voice input of another radio. In some instances the voice is digitally encoded for transmission over the Internet, which is commonly known as Voice-Over-Internet-Protocol, or VOIP. Interconnects are created by connecting two or more radio channels or voice paths with a gateway device or console patch. Gateway systems can be configured to support a limited number of interconnects, typically five to 30.

Gateway systems are relatively easy to use after they have been setup, which can take about a half-hour per path, and requires a skilled technician. A dispatch operator

The State of Florida purchased nine Emergency Deployable Interoperable Communications Systems (EDICS) in 2004. These units are allocated by giving one for each of the seven Regional Domestic Security Task Force regions, one for the Florida Department of Law Enforcement (FDLE) and one for Florida's Department of Emergency Management (DEM).

can select the appropriate paths to interconnect usually through a graphical interface at the console. With many gateways, multiple interconnect sessions involving distinct groups can be established at any given time by the gateway operator. The maximum number of simultaneous interconnect sessions in progress depends on the gateway system. Examples of gateways include M/A-Com's Network First, Raytheon's JPS ACU-1000, Motorola's "Moto-Bridge," and Sytech's RIOS.

Of the 905 agencies surveyed, fewer than 50 gateway systems are utilized. These include substantial fixed-site gateways, as used in both Lakewood, Colorado, and Hillsborough County, Florida.. Other than the few fixed site gateways, these gateways are mobile and are deployed as needed. Some are deployed as part of a large "Command/Communication" bus whereas others are deployed as tactical units, sometimes located in cars.

Florida's EDICS' gateways are tied to radios covering 800 MHz Type 1 and EDACS, VHF high and low bands, VHF aircraft band, UHF high band, and satellite services. In addition, PSTN is supported. It is estimated that once on scene, the EDICS can be fully operational within several hours. Gateway limitations include the requirement of a channel from every participating system in a talkpath as well as coverage being limited to the area of overlap from all participating systems.

Shared Channels

All surveyed agencies utilize shared channels. "Shared channels" refer to common frequencies or channels (such as those of a participating agency) that have

been established and are programmed into radios to provide interoperable communications among agencies. Shared channels and shared systems are the only types of interoperable communications equipment that are always available because they are included and always operational in each piece of equipment. There are a number of nationally recognized frequencies, designated as interoperability channels spanning the range from low-band VHF through 800 MHz.

Proprietary Shared Systems

The term "Shared systems" refers to the use of a single or common radio system infrastructure to provide service to most agencies within a region. These systems are typically built upon trunking architecture and are considered to be an available interoperability resource if the majority of public safety users within the region access a common system. In the case where less than a majority of public safety users have access to a common system, there may be several incompatible systems shared by subsets of users within the region. Operation of a common radio system allows subsets of users to achieve interoperability.

Of the 905 agencies surveyed at least 102 shared systems are available. One of the largest shared systems is the MA/COM Enhanced Digital Access Communications System (EDACS) operated by Miami-Dade County providing service to over 25,000 subscribers.

Standards-Based Shared Systems

One of the surveyed regions currently utilizes a standards-based shared system for interoperable communications. Project 25 (P25) is a public safety communications standard dedicated to ensuring interoperability in communications. P25 is the Project Name / Number, given by the Association of Public-Safety Communications Officials, Intl. (APCO) to a joint project with the National Association of State Telecommunications Directors (NASTD), federal agencies, and equipment manufacturers to develop a public safety digital land mobile radio (LMR) standard. P25 equipment provides the ability to interoperate with other P25 equipment regardless of manufacturer, so that users on different systems can talk via direct radio contact.

Surrounding Denver, the State of Colorado owns and operates a large-scale Motorola SmartZone system using multiple zone controllers to interconnect agencies throughout the State. Like Miami, this system supports some 20,000 subscribers.

NEXT STEPS

Data Collection for Tactical Interoperable Communications Plans (TICP [a requirement of DHS urban area grants]): By May 1st, 2006 the ICTAP program will have received data from 72 metropolitan areas representing all 50 States. While these equipment inventories will not be as extensive as previously collected, the information will be adequate for inclusion into the TICP for creating a table-top exercise geared for interoperable communications, and to assess each area's interoperable capability.

CASM Tool: The Communication Asset Survey and Modeling (CASM) Tool is currently in development by ICTAP. Its purpose is to provide an easy-to-use, Web-based, tool that agencies can use to store and update radio communication infrastructure information and assess their current interoperable communications capability. The CASM database is accessible only by authorized participating agencies. Not only does this data reflect the current regional communications inventory as a whole, it also provides the region a snapshot of its current state of interoperability. It graphically provides a picture of how the agencies communicate. For example, if Agency A is communicating to Agency B, the display may show that the interoperable link consists of the National Public Safety Planning Advisory Committee's (NPSPAC) CALL and Tac1 800 MHz channels as well as through a gateway linking one of Agency A's UHF channels to one of Agency B's 800 MHz channels. The data can be updated by the corresponding agencies and can be used in future assessment. In a major incident, this tool can be useful in accessing and determining each agency's resources to provide an efficient inter-agency communications interoperability solution.

ICTAP will continue to utilize the information collected through these surveys, as well as the feedback from the over 40 individual sites currently supported to ensure that the program's technical assistance offering meets the needs of the Nation's emergency responders.

For additional information, please contact the SLGCP Centralized Scheduling and Information Desk (CSID) by calling (800) 368-6498 or e-mailing askcsid@dhs.gov.