

WIRELESS INTEROPERABILITY

EXECUTIVE SUMMARY

A fundamental aspect of emergency response is effective communication; the accurate and timely transfer of information. In large catastrophic events covering multiple jurisdictions it is critical that communications equipment provide flawless interaction between those deployed to an incident. Risk is high in emergency situations, and success is measured in human lives saved or lost. It is imperative that communications solutions provide faultless interaction as federal, state, and local agencies converge to manage major events.

In the aftermath of September 11th, the Federal Office of Homeland Security imposed new requirements for interoperable communications on states. Using lessons learned while hosting the 2002 Winter Olympics, the State of Utah initiated and completed two communications initiatives that have been validated by recent evaluations: creation of a State Interoperability Executive Committee (SIEC) to serve as a coordination point for communications issues; and, the installation of Omni-Link, which provides a common gateway for voice communications statewide.

Homeland Security grants have provided funding for these communications initiatives. The resultant system requires \$650,000 annually to cover ongoing costs for circuits and maintenance. Circuits are used to connect the various public safety dispatch centers (police, fire, medical, emergency management, and the National Guard) statewide. These centers are now interconnected in such a way that every conventional radio channel and trunking talk group (channel) can be shared and/or patched as needed.

With the disparate funding mechanisms and technologies used to purchase and deploy radio communication networks around the state, attempting to create interoperability at the application layer is virtually impossibility. Other states and regions have attempted to do so using “gateway” technologies, such as JPS-1000 devices, which allow specific channels to be patched by physically hooking up two or more end-user radio devices to a central dispatching/patching mechanism. Utah’s approach toward interoperability is to take advantage of Homeland Defense funding to get each dispatch center on the same level of technology. Once this is done, all radio channels, talk groups, and even telephone lines, are available assets to every other dispatch center connected to the network.

Emergency 911 centers have assigned back-up centers which will receive overflow calls, or can even be completely reverted to if the initial 911 call center has to be evacuated for some reason. With the new interoperability solution, not only can all 911 calls be re-routed to a backup center, but so can the associated radio operations. Access between centers is a mere mouse-click away.

DESCRIPTION OF PROJECT

Descriptions of the Business Problem

Utah's 2.6 million citizens are located throughout 29 counties which contain virtually every kind of terrain imaginable. With elevations from 2,350 feet to over 13,528 feet, communications challenges are already enormous. The challenges increase exponentially as we add multiple, proprietary vendor communication systems.

Purpose and Objectives

The project consisted of three major objectives:

Upgrade Rural Centers—This upgrade consisted of installation of two major components. First, the central electronic bank (CEB), which allows local radio channels to be shared, regardless of frequency or type, with any other dispatch or emergency operations center in the state. Dispatchers are also able to patch any radio channel to any other radio channel statewide. Second, console computer systems that interact with the CEB, allowing an operator to interface with the Omni Link gateway system, were upgraded. These are now located in almost all dispatch centers and emergency operations centers within the state.

Omni Link—In 2003, the Utah Communications Agency Network (UCAN) operated on a Motorola Smart Zone system, at full capacity, servicing 109 agencies. Using Homeland Security funds, the Utah Department of Public Safety purchased a Motorola Omni Link controller system for \$3,200,000 which upgraded UCAN's Smart Zone system. When Omni Link was installed in May 2004, it doubled the capacity of UCAN's system, allowing an additional 60 National Guard radios and 17,000 public safety radios in rural Utah to communicate via the gateway. Local first responders in the rural areas were not required to purchase new radios to use this system. Omni Link creates the statewide capacity to connect first responders, emergency management centers, and the Utah National Guard, even when they operate in different frequency bands and/or technologies.

800 MHz Coverage—Limited conventional 800 MHz base radio equipment has been installed at existing 150 MHz sites as funding was made available. These provide 800 MHz radio coverage to 800 MHz radio users in rural areas. These base units are connected to the nearest regional center, allowing control from any console on the system, providing public safety communications to the metropolitan 800MHz users when they travel into the rural areas of the state.

Solution Description

Utah's approach focused not on the application layer, where proprietary technologies so easily divide communication networks, but rather on a more fundamental network layer. Addressing interoperability at this level means local government agencies can implement virtually any wireless technology that fits their requirements and budget. By focusing on a regional hub of communication—the dispatch centers—we now deal with a single unifying communication center, rather than the myriad of end-user devices in the hands of the public servants.

Length of Time in Operation

The core components of this integrated wireless network solution have now been in place for almost three years.

SIGNIFICANCE TO IMPROVED GOVERNMENT OPERATION

Operational Maturity

When the Omni Link solution was first deployed, the intent was simply to unify three separate Motorola Zone Controllers. Dispatch centers on the UCAN 800MHz trunking network control their talk groups simply by plugging their dispatch consoles into the zone controllers. This means that all dispatch centers on the UCAN network have access to the same talk groups. The benefits of plugging in conventional dispatch centers quickly became apparent.

In preparation for a major exercise by the Utah National Guard, the Millard County dispatch center was one of the first conventional dispatch centers to be connected. Just as the exercise was beginning, the Sheriff's office was struck by lightning, disabling the dispatcher's ability to communicate with the National Guard exercise in their region. Thanks to the common interface, the State's Homeland Defense communications center was able to operate on the Sheriff's Office channels and the exercise continued without interruption.

During recent flooding in Washington County, with citizens being evacuated from their homes, the County Emergency Operations Center (EOC) decided to ask the Governor to activate the National Guard in order to get helicopter assistance. Because the State EOC, almost 300 miles away, was able to monitor all traffic channels in the region across the interoperability link, the National Guard was activated and Blackhawk helicopters were within minutes of arriving before the call for assistance was actually placed from Washington County.

The interoperability solution deployed is effective because it touches virtually all communication channels throughout the state and across all State, local government, and federal agencies. It is efficient because it is always on; it does not need to be activated. It is inexpensive because it does not attempt to replace

currently deployed communication technologies, but rather brings the technologies together. It is reliable because it is maintained to the same high public safety standards as the networks using it. And it is flexible because the majority of the ongoing costs deal with the data circuits that interconnect all of the centers. This means future technologies, such as Voice over IP (VoIP), can be implemented using the same circuit connections.

PUBLIC VALUE OF THE PROJECT

Stakeholder Participation

From the beginning of the project, input was sought from all federal, State, and local government agencies. Participation was widespread, and the project would have never been initiated without the full participation of all agencies. Dispatch centers had to agree to replace or upgrade their dispatch consoles to allow connectivity to the network. Though Homeland Defense funding provided much of the costs, local agencies had to provide matching funds. In some rural areas funds are precious, and their willingness to expend financial resources is a testament to the need, as well as to the effectiveness, of the project.

Public Policy Benefits

Each of the past three Utah governors have strongly supported the objectives achieved by this project. Utah's solution is a low cost, effective approach to achieving statewide interoperability, a goal promoted by the U.S. Department of Homeland Security as well as other public safety agencies at all levels of government. The following public policy objectives are supported:

- Overall interoperability of public safety voice systems
- Improved emergency response through better intergovernmental coordination
- More efficient use of government resources

REALIZED RETURN ON INVESTMENT

Adoption

Most public safety communication professionals agree that the opportunity to leverage Homeland Security grant funding was often lost as agencies used the funding to build separate proprietary systems. Rather than build on that legacy, the State is now centering on the underlying network infrastructure to provide a

vendor-neutral, economical solution that allows for maximum flexibility while ensuring that first responders can communicate when it is needed the most.

The success of the project was so resounding that in its last session, the Utah State Legislature overwhelmingly supported the ongoing block funding mechanism to keep the future of interoperability fueled. Too often projects funded by one-time grants begin with high intentions, but quickly end up as un-funded mandates to agencies that cannot afford to keep them moving.

Savings and Cost Avoidance

By listening to the needs of all constituencies, the State of Utah was able to implement a statewide interoperability solution at a fraction of the cost of various alternatives. It was estimated that it would cost an additional \$160 million to extend the 8-county footprint of UCAN, the state's 800 megahertz network to the rest of rural Utah. Instead, an expenditure of \$5.5 million was able to provide improved service within the metropolitan area while adding interoperability with the rest of the State.

Return on Investment

The success of Utah's Radio Interoperability initiative would never have been realized without the unified support of public officials, the first responder community, and the citizens of the state. Though the return on investment has certainly been financially realized, it is perhaps best measured by the lives saved, property protected, and relationships forged as dedicated professionals realize and act on the need to ensure that first-responders have the means to communicate.

Continuing Operational Benefits

The infrastructure that was put in place through this initiative provides a number of additional benefits.

1. All Public Safety Access Points (state and local) in Utah are now connected to Utah's high speed wide area network. This provides local users with improved access to the Utah Criminal Justice Information System with single-point access to dozens of integrated law enforcement services.
2. The network interoperability will provide a platform for integrated voice and data law enforcement services in the future.
3. The governance structure that was developed through the process of implementing this initiative has resulted in increased cooperation and communication between the hundreds of state and local agencies participating.