Interoperability TECHNOLOGY Today

Homeland Security

A Resource For the Emergency Response Community

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CAP Keeps Nation Steps Ahead of Disaster

A glimpse at the devastating wake of recent disasters is a compelling reminder of how critical an effective emergency warning system is to a Nation's race against the clock. The rapid dissemination of timely emergency information to citizens is a tremendous tool in assuring the safety of the public.

In May 2007, emergency warnings saved countless lives in Greensburg, Kansas, where a tornado had devastated the town. National Oceanic and Atmospheric Administration (NOAA) forecasters used the Emergency Alert System (EAS) to issue a tornado warning a full 39 minutes before the 1.7 mile-wide tornado hit Greensburg. Ten to twelve minutes before the twister hit, NOAA issued a second warning—a tornado emergency message—urging Greensburg residents to find shelter immediately.

"The dissemination of vital information and interoperable communications are the backbone of our defense against natural disasters, attacks on our homeland, and even the possibility of a pandemic, health-related, or environmental attack," says Federal Communications Commission (FCC) Commissioner Deborah Taylor Tate.

National Alert System

Designed to ensure warning broadcasts in advance of disasters, the Nation's EAS is a national public warning system. The system requires broadcasters, cable television systems, wireless cable systems, providers of satellite digital audio radio service, and—effective in May 2007—direct broadcast satellite service providers to give the President the communications capability to address the American public during a national emergency. Local and state authorities can use the EAS to deliver important emergency information—such as AMBER and weather alerts—to a specific population. While the Federal EAS system has never been activated, there are hundreds of local and state warnings issued each year.

The FCC implements the EAS policies, procedures, and rules at the Federal level in conjunction with the Federal Emergency Management Agency (FEMA) and NOAA's National Weather Service (NWS). FEMA is responsible for implementing a national-level activation of the EAS, tests, and exercises. The NWS prepares emergency weather information to alert the public of imminent, dangerous weather conditions. The FCC's role includes prescribing rules that establish technical standards for EAS,

procedures for EAS participants to follow in the event that EAS is activated, and EAS testing protocols.

Next-Generation EAS

In May 2007, the FCC took significant steps toward improving the EAS by issuing a Second Report and Order (Order) aimed at bringing the alert system into the digital age.

"We need an Emergency Alert System that is more flexible, more robust, and more compatible with the technologies that Americans are adopting in their everyday lives," says FCC Commissioner Michael J. Copps. "In other words, EAS needs to move into the digital age."

The Order requires common carriers providing video service to participate in the EAS as broadcasters and cable and satellite providers already do. The Order also gives state governors the authority to activate the EAS statewide and for a geographically targeted area affected by a local emergency.

Finally, the Order requires that EAS participants accept messages using the Common Alerting Protocol (CAP) version 1.1 when CAP is approved by FEMA.

City of Angels Fields Tactical Information Pilot

Coordinating emergency response operations in the City of Angels is no stroll along Rodeo Drive. One of the Nation's fastest growing cities and the second largest in population—the city boasts nearly 4 million residents—Los Angeles sprawls more than 40 miles from mountains to sea. The size of Los Angeles City's land mass coupled with its large population presents local emergency responders with complex interoperability challenges.

Los Angeles emergency response agencies have long recognized partnerships as critical to interoperability progress. The region's large-scale planned events and devastating wild fires necessitate effective cross-jurisdiction collaboration. "With the wild fires of this region, you learn how to work collaboratively in planning and in response and in information sharing, or you get burned down," says Los Angeles Fire Department (LAFD) Battalion Chief Robert Cramer.

Common Operating Picture

Partnerships are the cornerstone of the LAFD's Tactical Information Pilot (TIP), launched in June 2007 using Urban Area Security Initiative funding. Designed to close interoperability gaps between

disparate information systems through a standards-based platform, the TIP is intended to strengthen interoperability among emergency response agencies by enabling them to share information across jurisdictions in real time.

"The TIP standards-based approach to interoperability acts as the universal bridge to timely, accurate, and relevant information," says LAFD Captain Xenophon Gikas. "Widespread exchange and dissemination of information ensures the most complete, common operational picture, greater situational awareness, and ultimately the saving of lives."

The TIP's platform integrates six components: an automated vehicle location system; a computer-aided dispatch system; a fire and police incident guidance application; an environmental monitoring and alerting system; an emergency management application; and optimized, automated, wireless Internet Protocol network management software.

To ensure open, standards-based exchange among emergency responders, commercial manufacturers provide a standards-based interface for each component. Interfaces are in the form of Disaster Management's (DM) Emergency Data Exchange Language (EDXL), the Distribution Element Standard, the Common Alerting Protocol (CAP), and the Open Platform for Emergency Networks (OPEN) interoperability backbone. The completed platform will enable the instantaneous exchange of critical emergency data—alerts and warnings, location, dispatch, chemical, and sensor information, and resource availability—across multiple jurisdictions.

"By integrating these data technology capabilities on a platform, we're making it viable to provide data interoperability among fire, law enforcement, EMS [emergency medical services], Hazmat, and

supporting agencies such as county health and transportation," says Cramer. "Creating a common operating picture across multiple agencies and jurisdictions can reduce response times."

User-Driven Approach

The TIP is installing and integrating the platform interface in several fixed facilities and in a cross-section of the emergency response vehicle fleet—from EMS vehicles to chiefs' command unit vehicles. "The purpose of the cross-section approach is to test the application across different levels of demand," says Cramer. "While every vehicle will have the same interface installed, what functions you use will correspond to the demands of your job."

LAFD is test-driving the platform in partnership with several Los Angeles agencies, including:

- Los Angeles City Police Department Hazmat Unit
- City and County Emergency Operations Centers
- Los Angeles City EMS
- Urban Area Search and Rescue Hazmat
- Los Angles County Sheriff Hazmat
- Los Angeles County Sheriff Department's Technology Exploration Unit
- Los Angeles Department of Transportation
- Joint Regional Intelligence Center
- Los Angeles County Department of Public Health

Collaboration is critical to the success of the TIP. "Before September 11, 2001, agencies might have thought, 'we can take this on by ourselves,'" says Cramer.

CONTENTS

Homeland Security

Events & Conferences

International Wireless Communications Expo
February 25-29, 2008
Las Vegas, Nevada
www.iwceexpo.com

International Law Enforcement Educators and Trainers Association International Training Conference and Expo
April 1-5, 2008
Wheeling, Illinois
www.ileeta.org/Conference_2008.htm

DIRECTOR'S MESSAGE
By Dr. David Boyd

The Command, Control and Interoperability Division (CCI) is committed, as ever, to developing tools and leading initiatives that accelerate emergency response agencies' interoperability progress today. CCI recently worked with emergency responders, Federal partners, and industry to field two technology projects intended to improve interoperability on two important fronts: computer-aided dispatch (CAD) and the integration of existing and next-generation communications systems.

CAD Interoperability

Emergency response operations rely on CAD systems to ensure that personnel and resources are efficiently dispatched to the field. Jurisdictions often share personnel and resource information—ensuring that the closest units respond, even if they are across jurisdictional lines. This information sharing practice improves the utilization of units. Unfortunately, many of today's CAD systems are unable to communicate with dispatch systems in neighboring jurisdictions. Enabling CAD systems to exchange information across jurisdictions will improve the rate at which resources are dispatched to the field—reducing response times and saving lives.

CCI's CAD Interoperability Project (CADIP) coordinated with emergency response agencies in Silicon Valley, California to identify the challenges, best practices, benefits, and costs associated with linking CAD systems across jurisdictions. The project identified approaches to linking CAD systems in order to assist local and state agencies as they migrate toward multi-jurisdictional, interoperable CAD systems. CCI will also examine other jurisdictions that are pursuing different approaches to linking CAD systems.

In a parallel effort, CCI partnered with the National Capital Region to identify specific requirements for exchanging CAD information, and to develop data standards enabling CAD information exchange.

CCI is using the results of the CADIP to develop tools, templates, and guidance documents intended to assist agencies and jurisdictions in improving CAD system interoperability with neighboring regions. CCI is working with emergency responders nationwide to validate these requirements and CAD standards.

Communications System Integration

With the increasing availability of wireless broadband technologies, emergency responders nationwide are gaining access to advanced technology and application capabilities. As industry develops new technologies, it is critical that emergency response agencies are able to integrate them into current communications systems and operations. CCI's Radio Over Wireless Broadband (ROW-B) project field-tested the integration of new broadband applications with an existing Land Mobile Radio (LMR) system and standard operating procedures.

To demonstrate the integration of technologies over wireless broadband, CCI partnered with the District of Columbia's Office of the Chief Technology Officer and the private sector. ROW-B used a new standard called the Inter-RF Subsystem Interface (ISSI), which is part of the Association of Public-Safety Communications Officials Project 25—an effort to create standards that allow emergency response radios to communicate and interoperate. For the ROW-B project, ISSI provided a common connection point for the voice and data information between the disparate LMR and wireless broadband networks.

ROW-B results provided CCI and the emergency response community with an assessment of new products' functionality; the extensibility of ISSI for connecting different and incompatible systems; and valuable information about how to integrate new technologies with existing emergency response communications systems.

Our Road Ahead

The CADIP and ROW-B pilots represent important strides toward improving interoperability nationwide. While addressing interoperability challenges from different angles, technology project partners shared a common goal: to ensure that emergency responders nationwide can communicate with each other on demand. Our partnerships with the emergency response community, Federal agencies, and industry were fundamental to the success of these technology projects. As we face a new year of challenges, initiatives, and progress, collaboration will continue to be a critical common denominator across all of our efforts.

700 MHz Transition: The Countdown Begins

When the President signed the Digital Television Transition and Public Safety Act of 2005 into law on February 8, 2006, emergency responders nationwide gained access to valuable spectrum and application capabilities. The legislation requires television broadcasters to convert from analog to digital television by February 17, 2009—making 24 Megahertz (MHz) in the 700 MHz band available for emergency response use.

Next year's spectrum transition is a major milestone for emergency response operations—representing the second largest allocation of spectrum for emergency response use the Federal Communications Commission (FCC) has ever made.

Additional Spectrum in Demand

Agencies currently operate in assigned frequencies on 10 disparate bands scattered across the radio spectrum. "The soon-to-be vacated analog television spectrum will provide some necessary relief for emergency responders—alleviating serious congestion on emergency response airwaves," says Office for Interoperability and Compatibility Spectrum Manager Tom Chirhart. The spectrum allocation also will provide emergency responders with additional spectrum necessary to promote the use of advanced technologies such as data, streaming video, additional voice channels, and interoperability channels.

More than two decades have passed since the FCC allocated the 800 MHz band for emergency response use. Since then, emergency responders have experienced a significant shift in the scope of their missions and the requirements needed to successfully complete them. This shift includes the expansion of critical infrastructure protection since September 11, 2001—generating additional emergency preparedness responsibilities and the deployment of new, enhanced technologies.

To effectively support the rapid exchange of information across these new technologies, emergency responders require additional spectrum; many of these technologies did not exist when the Public Safety Wireless Advisory Committee identified emergency response spectrum needs in its 1996 final report. Next year's 700 MHz spectrum allocation brings with it a need to identify funding sources; to develop new communications systems leveraging the 700 MHz band; and to expand existing 800 MHz band systems into dual band 700/800 MHz systems.

The July 2007 FCC rulings regarding utilization of the 700 MHz band will have a long-term impact on its use. The FCC designated 12 MHz of the 24 MHz allocated for public safety as broadband spectrum, and stated that it would grant a single nationwide license for that spectrum to a national public safety broadband licensee. This national public safety broadband licensee would then negotiate with the licensee of an adjoining block of commercial spectrum to construct a single, shared public safety and commercial broadband network for the entire Nation. However, the remaining 12 MHz will continue to be licensed directly to state and local governments, primarily for narrowband voice communications subject to regional planning.

700 MHz Regional Plans Mandatory

With the exception of some channels already licensed directly to the states, the 700 MHz spectrum will be available to local and state emergency response agencies for licensing *only if* their region has an FCC-approved 700 MHz Regional Plan. In 1998, the FCC adopted a 700 MHz band plan and structure for 55 regional planning committees (RPCs) in order to coordinate new spectrum assignments to local, regional, and state users.

Each RPC is responsible for creating and managing a mandatory 700 MHz regional plan. While each regional plan must contain certain elements and must be coordinated with adjacent regions, RPCs are allowed flexibility in order to develop plans that effectively meet regional communications needs and accommodate emerging technologies.

When a region submits a Regional Plan to the FCC, the Commission reviews it to ensure that all of the required elements are included. Once the FCC establishes that the Plan addresses all mandatory criteria, the Plan is put on Public Notice for 30 days for public comment; a 15-day reply comment period follows. If these comments do not identify any issues, the FCC approves the Plan shortly after the comment period closes. Processing time for a 700 MHz Regional Plan from start to finish ranges between four and eight months.

With the February 17, 2009, deadline fast-approaching, RPCs are entrenched in the 700 MHz planning process. Currently, 10 regions have FCC-approved plans, three have plans under FCC review, and several regions are preparing to file finalized plans with the FCC for approval. For many regions, this planning process can seem overwhelmingly complex.

The FCC's July 2007 decision and the resulting shift in narrowband channels to accommodate the new broadband allotment require that all RPCs that have plans on file revisit them using the new band plan. The FCC ruling also requires RPCs to modify previously approved regional plans and to update some of the databases that these committees rely upon, e.g., the Computer Assisted Pre-Coordination Resource and Database system needs to be re-packed with the new band plan.

Regional Planning Criteria Checklist

The FCC has identified criteria that every 700 MHz Regional Plan must include. These requirements provide a starting point for regions that are in the early stages of the planning process:

- Identification of the document as the 700 MHz Regional Plan for the defined region
- Names, contact information, and affiliations of the RPC chairperson and members
- Summary of the major elements of the plan, and an explanation of how all eligible entities within the region were given an opportunity to participate and have their positions considered fairly
- Definition of the region, its boundaries, and the counties and cities within its boundaries
- Overview of the emergency response entities that have jurisdiction within or over any or all portions of the region
- Description of how the new spectrum will be allotted, and how the requirements of eligible entities within the region were considered and, if possible, met
- Explanation of how needs were assigned priorities in areas where not all eligible entities could receive licenses
- Explanation of how the region has coordinated its Regional Plan with adjacent regions
- Description of how the Regional Plan maximizes the new spectrum's use
- Description of future planning processes, including amendment process, database maintenance, and dispute resolution

Georgia Pilot a Mile Marker for PSAF

Last summer, the Command, Control and Interoperability Division's Office for Interoperability and Compatibility (OIC) partnered with practitioners from the Powder Springs (Georgia) Police Department and Georgia State Police to field the Public Safety Architecture Framework (PSAF) pilot project. Held in Atlanta, Georgia, on June 27-28, the pilot provided OIC with an understanding of the data needed for an emergency response agency to establish system to system compatibility, agency to agency interoperability, and system restoration.

Developed with practitioner input in 2006, the PSAF enables emergency response agencies to analyze current systems, and determine what is necessary to achieve interoperability with other systems and agencies. The PSAF also inventories and identifies capability gaps to help emergency response agencies target areas for improved interoperability.

"One of the challenges facing emergency responders is the ability to exchange communications when critical infrastructure is damaged or unreliable," says Cobb County (Georgia) Radio System Manager Tracy Roberts. "It's important in those circumstances to be able to plan for and assess interoperable communications in different scenarios and across agencies and jurisdictions. By capturing information about radio systems, the PSAF is helping us do just that."

OIC will use PSAF pilot results to develop an accurate radio system data model and to inform current volumes of the PSAF. An evolving framework, the PSAF will change as emergency responders provide OIC with additional input and lessons learned from PSAF applications in the field. OIC will work with practitioners to develop best practices for PSAF use, including interoperability analysis, gap analysis, systems planning, systems migration, business case development, and request for proposal development.

Volumes I and II of the PSAF are available at http://www.safecomprogram.gov/ SAFECOM/library/technology/.

Nebraska Pioneers Regional Interoperability Approach

In 2004, State Network Supervisor for Public Safety Mike Jeffres set out across Nebraska in a state car with a staff member, a stack of notebooks, and a vision: to gather the interoperability needs and challenges of regions through meetings with local decision makers. Three years, thousands of miles, dozens of meetings, and hundreds of phone calls and e-mails later, Jeffres returned to his desk with many pages of observations that would become the cornerstone of Nebraska's blueprint for progress in interoperability.

"The challenge in any statewide planning effort is understanding this gigantic picture of interoperability—understanding what the operational issues are," says Jeffres. "It's important to deal with individual local leaders and learn, from *their* standpoint, about their communications issues." Identifying areas of common need enabled Nebraska leaders to maximize limited Federal grant funding, and to lay the groundwork for a region-based approach to interoperable communications.

Nebraska's regional planning approach to interoperability organized the state's 93 counties into 17 regions, initially based on common interoperability needs, mutual aid operations, and geography. Nebraska eventually consolidated these 17 regions into 8 along exercise training boundaries. This network of interoperability regions is unique in that it recognizes state emergency response agencies as a peer region—no different than any other region in the state. "Including the state itself as a peer region is a new concept," says Jeffres. "This approach allows us to identify what is needed for state agencies to effectively interoperate with their local partners."

Nebraska's regional approach also has proven pivotal in local agencies' investment in the planning process. "At the initiation of our interoperability efforts, we recognized that if the state approached localities with a top-down solution and mandates, this was not going to work," says Nebraska Emergency Management Agency (NEMA) Assistant Director Al Berndt. "State entities are peers to local and regional entities. In our governing bodies, the local agencies and state agencies have an equal voice—we are equal partners."

Impetus for Change

This conceptual shift in Nebraska's approach to interoperability gained momentum in 2004 when the Governor's Homeland Security Policy Group made interoperable communications a statewide priority regardless of a locality's population or location. A champion of interoperability efforts, then-Lt. Governor Dave Heineman prioritized Department of Homeland Security (DHS) grant funding for interoperability. "Governor Heineman really helped interoperability top the agenda of the state," says Jeffres. "Nebraska leaders had understood the importance of interoperability for years—communications breakdowns during major law enforcement pursuits, grassland fires, and blizzards were reminders—but the state couldn't afford to make interoperability a top priority until the DHS funding became available."

In 2005, the Nebraska Legislature created the Regional Interoperability Advisory Board (RIAB) to assist the Office of the Chief Information Officer (OCIO) with interoperability efforts. The RIAB and OCIO partnered with NEMA and the Governor's Homeland Security Policy Group, chaired by Lt. Governor Rick Sheehy, to develop the Nebraska Homeland Security Communications Strategy.

This strategy comprises three major components: The regional communications networks; the state communications system plan; and the statewide mutual aid frequency plan—all of which are necessary to support multi-agency joint operation emergency response.

Regional Planning Approach

"As a state, we recognized that funding a single, statewide communications system was not feasible," says Jeffres. "Our initial focus, then, has been on upgrading local and regional systems to ensure that they have the operability and interoperability levels needed to coordinate with their neighboring jurisdictions."

For an effective regional planning approach, Nebraska didn't need to look further than its own Central Nebraska Regions for Interoperability (CNRI). CNRI was formed in 2004 when 10 counties and municipalities partnered to develop a vision and strategy for improving interoperability in central Nebraska. "CNRI was one of the first to define a region by an interoperable communications concept," says Buffalo County Emergency Manager and CNRI Chair Darrin Lewis. "The concept and region grew from there." Today, CNRI includes more than 20 counties, which coordinate emergency response operations using interlocal agreements and a regional communications system that enables voice and data exchanges across varied radio systems. *See sidebar.*

Grouping Nebraska's 93 counties into 8 regions has enabled Nebraska to set manageable benchmarks for achieving interoperability across larger geographic areas of the state. Mutual aid dispatch operations and shared radio resources will link local, state, and Federal emergency response communications.

Communications Toolbox

A communications system, developed and implemented by an Arizona-based communications interoperability company, interconnects the CNRI network of county systems. This system uses a systems engineering approach to provide incident commanders with important resources for coordinating joint-operation responses. The software assists agencies to:

- Build an incident model that identifies relevant entities and their relationships to a specific incident.

- Determine which agencies need to communicate, what radios and frequencies these agencies will use to communicate, and what resources the agencies will need to contain and mitigate incidents within and across jurisdictions.

- Create a plan that identifies which agencies respond to an incident, how these agencies are organized, and how these agencies will communicate at the scene of the incident.

- Acquire communication assets and create an infrastructure that will aid the implementation of a plan with these acquired assets.

- Provide interagency agreements and standard operating procedures to assist communications as needed.

"These resources are critical in a post-September 11th era," says Jeffres.

Originally intended to strengthen interoperability across CNRI, the database software has become a significant piece of Nebraska's statewide interoperability strategy. An incident-specific communications planning tool, the software has proven valuable in effectively implementing local and regional interoperability decisions statewide.

"You should never lose sight of the fact that without local and regional interoperability, there is no state interoperability," Jeffres emphasized. In support of this comprehensive approach, the software requires that interoperability plans entered into the database originate at the local, regional, and state levels. This function provides agencies with the ability to control communications assets through networked radio interfaces, and helps coordinate local and regional activities statewide.

"We very intentionally managed this project through the local emergency management directors at the local and state levels so that their communications plans were included into the planning process," says Berndt. "The database software tool enabled us to cohesively integrate local emergency management plans and the tactical interoperable communications plans. By rolling these plans into the technology tool, local and regional processes become integral to long-term statewide planning."

The database software is one of several resources in Nebraska's interoperable communications toolbox. To advance progress, Nebraska has worked with the Interoperable Communications Technical Assistance Program (ICTAP) to improve mutual aid coverage planning. Additionally, to document regional and state Tactical Interoperable Communications Plans in a common analysis tool, Nebraska is providing a group of regional and state communications planners with training on ICTAP's Communications Assets Survey and Mapping (CASM) tool. The state intends to use the operational definitions captured in these database tools to develop interoperability methodologies that support regional responses.

Achieving interoperability for Nebraska, says Berndt, reaches beyond new equipment and technologies. "We identified early on that interoperable communications is not as much a technology problem as it is the desire to communicate." Berndt says. "Before pursuing a technology solution, we first identified *why* we needed communicate. Then, we identified *how* we were going to communicate," says Berndt.

Best Practices from Interoperability Progress in Nebraska

- Achieve a common understanding of the state's communications needs and challenges *before* diving into the technical details of how to solve interoperability.

- Divide the big picture of interoperability into manageable areas and goals.

- Drive interoperability efforts with a focus on local, practitioner needs *and* with an eye toward the state's overall vision.

- Identify political leadership to champion the state's interoperability initiatives.

- Upgrade capabilities with a view towards sustainability.

- Ensure that local and state agencies coordinate on the technical *and* non-technical elements of interoperability.

- Provide localities with technical assistance as they implement communications upgrades.

- Establish an approach to interoperability that supports *ongoing* improvements and progress.

"Anything can be connected to anything else," agrees Jeffres. "Interoperability is really a people challenge—people agreeing to use their resources under defined conditions. Once administrative decisions are established, technical and operational support can be committed to enact those decisions. This will be revised again and again through exercises and governance."

Nebraska took a significant step toward aligning on-the-ground efforts with this comprehensive definition of interoperability when it integrated state agencies as a peer region in the regional communication network.

Bridging State Gaps

Historically, Nebraska's local agencies have been equipped with more sophisticated communications capabilities than state emergency response agencies, e.g., State Patrol, Game and Parks Commission, State Fire Marshal's Office. Disparate systems and technologies compromised interoperability during response operations, necessitating local-to-state communications. Many times, local jurisdictions resorted to loaning local radios to state emergency responders so that they could operate on local systems.

Identifying state emergency response agencies as a peer region within the regional network has enabled Nebraska leadership to examine what is needed to ensure that state agencies can interoperate with their local counterparts. Today, Nebraska's local and state emergency response agencies coordinate planning efforts, capabilities assessments, and exercises. A state communications system will connect to local systems through regional frequency compatibility; local dispatch connections; and Nebraska's mutual aid frequency plan, which ties together local and state systems.

Mutual Aid Frequency

Part of Nebraska's regional approach to communications, the state's mutual aid frequency plan, creates an interoperability overlay to developing regional communications systems. Dispatch centers tie into mutual aid radio sites, which then connect county and regional communications to shared mutual aid assets. The mutual aid frequencies add a shared resource to support regional dispatch and tactical operations. The system provides:

- Overlapping coverage beyond county-owned communications assets
- Level of integration between regional communications systems
- Level of interoperability for statewide roaming

Coverage areas and channel assignments in the 150 MHz, 450 MHz, and 800 MHz bands complement regional communications systems.

Significant Strides

Interoperable communications in Nebraska is gaining strides beyond the patchwork of systems and piecemeal planning that once supported the state's emergency response operations.

"We've seen our approach work," says Berndt. "During the fire season, local, state, and Federal emergency responders were able to integrate through incident command. Additionally, during the ice storm of 2007, we lost considerable infrastructure, but were able to maintain communications and interoperability across our regions."

Regions' commitments to this progress have generated: sustainable communications upgrades, the establishment of interoperability governance structures, and regular interoperability planning among local and state emergency response agencies. "Much of this activity has been voluntary," says Jeffres, "People recognize that we have this rare opportunity to accomplish significant progress across the entire state, regardless of population."

These milestones do not represent a finish line for Nebraska's interoperability efforts. "This is an ongoing endeavor, not a one-time investment," says Jeffres. "This is not a project with a definitive end. Our work is never really over."

Great Things Come in Small Packages

They say that great things come in small packages. Four central Nebraskan counties—together comprising just four percent of the state's land area—lent truth to this adage in 2004 when they partnered to propose a regional shared channels plan. This early collaboration among the counties of Adams, Buffalo, Dawson, and Hall represented a decisive step toward achieving interoperability progress for more than 20 counties in central Nebraska.

Emergency responders in central Nebraska are no strangers to the challenges of interoperable communications. Many times, in order to communicate during mutual aid operations, responders physically swapped radios or relied on runners. It wasn't uncommon for incident commanders to wear multiple radios on their belts. "More times than not, we just didn't talk," says Buffalo County Emergency Manager and Central Nebraska Regions for Interoperability (CNRI) Chair Darrin Lewis. "There's nothing worse than seeing a Deputy Sheriff standing on one side of the Interstate unable to talk to a State Patrol Officer just 100 yards away on the other side of the Interstate."

In 2004, when the Nebraska Unicameral did not approve legislation to fund a statewide trunked system, Nebraska prioritized grant funds for interoperability projects—motivating counties like those of central Nebraska to submit proposals. It didn't take long for word to spread about 4 counties with a mission to improve interoperability among neighboring jurisdictions, and what began as a 4-county proposal soon became a 10-county collaborative effort.

Representatives from the 10 counties—Adams, Buffalo, Dawson, Frontier, Gosper, Hall, Hamilton, Harlan, Kearney, and Phelps—and each county's largest municipality convened as CNRI, Nebraska's first multi-county interoperability region. CNRI members first identified and agreed upon five goals constituting CNRI's vision for regional interoperability:

- Capability to directly communicate with member county, city, and state units assisting local jurisdiction and directly communicate with local units when they are assisting another member county
- Capability to maintain radio contact with officers during pursuits and prisoner transports
- Capability to monitor pursuits that are approaching a local jurisdiction
- Capability to maintain radio contact with police, fire, ambulance, and emergency management personnel while outside local jurisdiction
- Capability to broadcast area-wide messages and alerts

Next, CNRI members signed interlocal agreements and a Memorandum of Understanding.

"We agreed upon a vision and member county obligations before pursuing any technology solutions," says Lewis. "This was important to our approach and the project's sustainability." The CNRI approach supports a comprehensive definition of interoperability—with 40 percent of efforts committed to planning, 30 percent to technology, and 30 percent to exercises.

In 2006, Nebraska approved $1.2 million for CNRI's proposed 10-county communications system. Today, the CNRI interoperable communications system enables responders to exchange voice and data communications across varied radio systems. Each CNRI county communications center includes computers that are connected over a business-class network service and configured for compatibility with existing communications systems.

Each county maintains control of its local communications assets and ties together communications resources from participating counties under defined interoperability conditions. Initially, CNRI member counties envisioned using the communications system primarily for large-scale emergencies. Today, however, it is used from planned events to multijurisdictional response operations.

CNRI ensures that the communications system continues to meet end user needs through two committees: the Policy Group and the User Working Group. Comprised of emergency responders, the User Working Group provides input to the Policy Group on needed operational improvements. The Policy Group creates policies based on these recommendations.

This stakeholder input and expertise, says Lewis, has been invaluable to the system's success. "Trust is essential in planning a system," says Lewis. "We've got people in these groups that have been working together for more than 25 years. We bring different perspectives to the table but we all have one common goal: To be able to talk to each other when the time comes."

"Today, everyone recognizes that we can't solve interoperability unless we collaborate with our partners." To ensure that the project meets the needs of responders in the field, LAFD regularly coordinates meetings with emergency response partners.

"The collaborative efforts extend even beyond our emergency response partners," says Gikas. "Success would not be achievable without the cooperation, personal dedication, and financial commitment of our commercial product developers and system integrators. Truly, we are all in this together."

LAFD is also working closely with product vendors to complete the platform's installation, integration, operation, and training. Emergency responders and vendors meet regularly to set performance goals and to track progress. Audit forms provide system users an opportunity to document positive and negative system performance characteristics.

"The utilization of standards-based technology is allowing us to provide our work force with new tools that have tremendous power," says Gikas. "It can't be overemphasized that through quality training our people will realize the full potential of the system."

Cramer hopes that the field tests give the pilot project enduring momentum, and make a case for standards-based systems. "Ultimately, I hope that this pilot project delivers technical capabilities to our responders that are so compelling that responders voice their support for the project's expansion. Secondly, I want to be able to demonstrate the benefits of choosing to go with a standards-based technology solution. Standards guarantee interoperability."

A standardized alert messaging format, CAP enables a digitally based emergency warning to be distributed simultaneously across multiple platforms. "CAP dramatically increases the possible avenues for alerts to reach the public," says Commissioner Copps. The Order comes less than a year after the President's Executive Order 13407, calling for standard protocols for alert and warning.

Data Messaging Milestone

The FCC's Order is a milestone for CAP v1.1, which was adopted in October 2005 as a standard of the Organization for the Advancement of Structured Information Standards (OASIS).

The standardized message of CAP in Extensible Markup Language (XML) enables emergency responders to exchange communications across a variety of systems—including computers, wireless communications, alarms, television, and radio.

"The FCC mandate is significant in that it acknowledges the versatility of the CAP message format not only for currently deployed systems but also for those not yet envisioned," says OASIS Emergency Management Technical Committee Chair Elysa Jones. "It provides the stepping stone to a fully digital EAS for the future."

In November 2000, the National Science and Technology Council released its *Effective Disaster Warnings* report, which recommended that, "A standard method should be developed to collect and relay instantaneously and automatically all types of hazard warnings and reports locally, regionally, and nationally for input into a wide variety of dissemination systems." An impetus for CAP's development, the report's recommendations were adopted by a working group comprised of more than 130 emergency managers and information technology experts known as the Partnership for Public Warning. Initial concepts for CAP came from this working group.

Today, CAP is a critical tool for emergency responders. All CAP messages include:

- Purpose, source, and status of the emergency
- Information related to the urgency, severity, and certainty of the emergency
- Geographic information related to the emergency
- Option to include reference information about the emergency

"CAP's simple and standard format improves emergency responders' ability to communicate warnings and public alerts with effectiveness and efficiency," says Command, Control and Interoperability's Disaster Management Program Manager Denis Gusty. CAP reduces the workload associated with using multiple warning systems by providing a single input to activate diverse alerting and public warning systems. CAP's single input also helps ensure consistency in the information transmitted over multiple delivery systems—key to a warning's effectiveness.

By eliminating the need for multiple custom software interfaces to warning systems and dissemination systems, CAP reduces the costs and operational complexity of transmitting messages over multiple systems.

"The FCC's Order is a positive step," says Gusty. "The continued implementation of CAP will improve interoperability across agencies and jurisdictions—helping to ensure that our Nation is prepared to respond to whatever disasters tomorrow may bring."

For more information about CAP, visit the OASIS Web site at http://www.oasis-open.org/home/index.php. For more information about the FCC's Order on CAP, visit the FCC Web site http://www.fcc.gov/headlines.html. For more information about the EAS, visit the FCC's Public Safety & Homeland Security Bureau EAS Web site at http://www.fcc.gov/pshs/eas/. For more information about Executive Order 13407, visit http://www.fas.org/irp/offdocs/eo/eo-13407.htm.

IN YOUR OWN WORDS •

By Fire Chief Jeff Johnson, Tualatin Valley (Oregon) Fire & Rescue, and Deputy Chief Dennis Cobb, Las Vegas (Nevada) Metropolitan Police Department

The Time for a Nationwide Interoperability Plan is Now

Last June, for the first time, emergency response practitioners from across the Nation joined to draft a nationwide set of principles to guide the emergency response community's efforts towards interoperable communications. This proposal represents a turning point in the Nation's struggle with interoperability challenges—offering a shared vision of interoperability and describing fundamental supporting principles and actions. The intersection of several factors—additional spectrum, cumulative interoperability progress, congressional support, availability of interoperability grants, Federal resources, and recent natural disasters—make today fertile ground for positive change.

This enormous effort began at the December 2006 meeting of the Emergency Response Council (ERC), a practitioner body comprised of emergency response representatives from across the Nation. At that meeting, the ERC charged us to lead two practitioner teams in developing a set of guiding principles and actions that would serve any nationwide interoperability planning effort. Six months later, at its June 2007 meeting, the ERC debated our teams' proposed principles and actions—and ultimately reaffirmed the ERC's shared vision for a system of systems, and validated 12 guiding principles and 22 key actions. We returned to our agencies and communities with a Plan that represented not only a proposal to the Federal Government but also a blueprint for practitioners nationwide to effect change.

To achieve a system of systems, the ERC proposed a set of guiding principles that governments and agencies can use to drive partnerships, design systems, forge agreements, and allocate resources supporting interoperable communications. The ERC also agreed that there are key actions in four initiative areas that practitioners nationwide should implement *today*:

- **Leadership & Coordination:** Independent communication systems are designed and managed at all levels of government, and within a system of systems, no single entity is completely in charge of the combined communications network. Clear leadership structures linking all levels of government to coordinate resources must be in place, or emergency responders will suffer reduced understanding of resources and inefficient use of those resources.
- **System Design & Interconnects:** Communication technology changes continually as new technologies emerge and as aging systems are retired or upgraded. An emergency response communications system of systems can never be truly "finished"; however, we must continue to define a robust and reliable one based on capabilities needed to serve our communities effectively. To do this, each system today must be designed to interoperate with other systems in some workable way when needed and authorized, while planning and building a capability to adapt to new technologies as they become available.
- **Standards & Certification:** Different types of equipment and products support various means of interoperable communications. For systems to interoperate, technical standards or planned connections must be in place. Connectivity and standards should be independently certified and tested to ensure that equipment works as described by manufacturers and as anticipated by users.
- **Standardization & Accreditation:** Some communities have highly trained communications personnel and comprehensive, documented interoperable communications processes. Other communities have few or no trained personnel or documented processes. Nationally standardized protocols, procedures, and accreditation must be in place to establish consistency of operations and common skill sets across the Nation.

This proposed Nationwide Plan for Interoperable Communications, until acted upon, is merely a collection of words. The principles and proposed actions represent agreements we believe must be implemented to build and strengthen interoperability across the Nation. All levels of government and emergency response can play an important role in driving this Plan forward:

- Congress should determine if new legislation is required.
- The Department of Homeland Security should continue to partner with emergency response practitioners and interoperability experts to build agreements on a Nationwide Plan.
- Federal response and recovery agencies should work together, and seek input from states and localities to align Federal resources with their needs.
- States should implement these agreements by seeking input from local organizations to meet their needs in statewide solutions.
- States should work with end users to ensure state resources reach localities, regions, and tribes.
- Localities should implement these agreements with neighboring localities to ensure their ability to plan and work together before buying equipment.
- Associations should enroll members into these agreements, and champion them as a practical way to approach nationwide interoperability efforts.
- Individual emergency response officials should work to "own" these agreements, commit to them, and act on them daily.
- Each of us should educate the public that enacting these guiding principles improves their emergency responders' ability to protect their way of life, property, and safety.

Today, ERC members are energetically mobilizing support for this Plan with these partners. Additionally, the ERC's Plan needs support from each of us—whether by penning an article, posting the principles to an association's Web site, or presenting the Plan to a regional meeting. Through our steady and strong commitment, we can drive this Nationwide Plan for Interoperable Communications forward to generate broad understanding and support for its implementation. By working together to build this system of systems, real progress towards interoperability will become a reality nationwide.

From the Field to the Hill

Congressman Reichert Champions Interoperability
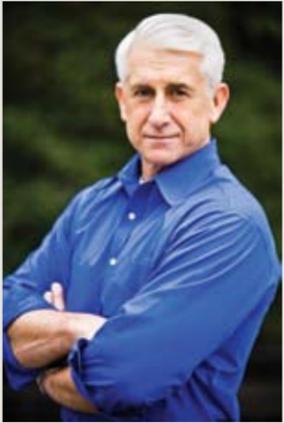
It isn't every day that you meet a Congressman who can speak with the voice of both a policymaker and a 33-year law enforcement veteran. A former detective and sheriff, Congressman Dave Reichert (R-Washington State) knows firsthand how critical interoperability is to emergency response operations.

In pursuit of a public service career, Reichert joined the King County (Washington) Sheriff's Office in 1972. "I've always wanted to help people but wasn't sure where that would take me, when I was young," says Reichert. "I thought about being a cop, and joined the King County Sheriff's Office. Right away, it was exciting and I felt like I was being helpful."

The police work was a turning point for Reichert, and the beginning of a law enforcement career chronicled by a remarkable trail of headlines and awards. In 1997, Reichert became the first elected King County Sheriff in more than 30 years. He brought national recognition to the Office as head of the Green River Task Force—solving the largest serial murder case in the Nation's history. The recipient of numerous honors, Reichert was the National Sheriffs' Association's "Sheriff on the Year" in 2004, and has twice received the Medal of Valor Award from the King County Sheriff's Office.

Reichert's commitment to improving interoperability began in the field—more than three decades ago. "I first noticed the problem [lack of interoperable communications] right from the beginning," says Reichert. "It was a common complaint, but we didn't think anything could be done about it. The technology just didn't exist in the early 1970s. There were so many instances when I needed to communicate to others on the situation on-scene, just couldn't get through, and often had to make risky decisions."

"In 1997, we went from a VHF [very high frequency] system to the 800 Megahertz (MHz), and it was a battle to just communicate. You often lost reception and had intermittent coverage," Reichert explains. "I began working with both the Washington State Sheriffs' Association and the National Sheriffs' Association to gain 700 MHz, and we are only now seeing progress on that front."

Today, Reichert champions interoperability efforts from a different vantage point. Serving his second term as the Representative from the Eighth Congressional District of Washington, Reichert also serves on three congressional committees: Homeland Security, Transportation and Infrastructure, and Science and Technology. During his first term in Congress, Reichert chaired the Homeland Security Committee's Subcommittee on Emergency Preparedness, Science and Technology—leading the development of the 21st Century Emergency Communications Act, aimed at improving emergency response communications nationwide.

Q&A with Congressman Dave Reichert

Q. In your view, what are the major interoperability challenges of today?

A. The largest problem facing our public safety will be to ensure the gap is bridged between different communications systems. As new communication systems become available, such as a new broadband network, it is imperative that these systems are developed in a way that they can link with traditional radio systems.

In Washington State, as in many places across the Nation, we have a wide variety of terrain which can make communication extremely difficult. This is particularly amplified with the upcoming 2010 Olympic Games in Vancouver, Canada. In addition to a difficult terrain, the close proximity to the Northern Border presents problems with interference between U.S. public safety and Canada.

Q. What is your vision for interoperability?

A. With the upcoming auction of 700 MHz dedicated for public safety use in January 2008, we have a tremendous opportunity to expand the communication ability of our Nation's first responders with the use of broadband communication. I also believe traditional communication equipment will continue to play an important role. Last Congress, the President signed into law the 21st Century Emergency Communications Act, which among other things accelerated the development of standards for emergency communication equipment and required states to have in place Statewide Interoperable Communication Plans.

Since September 11, 2001, billions of dollars have been allocated by the Department of Homeland Security for interoperability. Between fiscal year 2003 and fiscal year 2005, more than $2 billion was spent on interoperability. In addition, Congress recently passed legislation authorizing $1.6 billion in grants for emergency communications equipment and that is combined with the new Public Safety Interoperable Communication (PSIC) grants of $1 billion. I believe there needs to be a consistent funding source and it is essential these funds are spent consistent with the reforms of the 21st Century Emergency Communications Act.

Q. When did interoperability issues first top your agenda, i.e., was there a specific event that highlighted its importance for you?

A. There wasn't really a specific event—it's been an issue and a priority during my whole career. When I arrived in Congress, and became Chairman of the Emergency Preparedness Subcommittee, it was the first thing I wanted to fix.

I have the unique benefit of bringing 33 years of law enforcement experience to Congress, and have the knowledge of how critical the issue is to law enforcement and first responders.

Q. Has your approach to or perspective on interoperability issues evolved over the course of your careers?

A. After spending 33 years in law enforcement, many of those years as a detective, I brought to Congress a background in investigation and getting to the root of any problem. As Chairman of the Emergency Preparedness Subcommittee last Congress, I took that same approach to solving the problem of interoperability. Shortly after Hurricane Katrina, I was named Chairman of the Subcommittee that oversees FEMA [Federal Emergency Management Agency] and emergency response. I made solving interoperability my number one priority. I know from my past experience, without the ability to communicate, it is not possible to have command and control. This was unfortunately witnessed during the response to Hurricane Katrina.

We held four hearings in Congress in 2006 to discuss all aspects of this problem, from Federal, state, local, and private sector witnesses. From these hearings it became clear that a lack of technology is not the problem. However, the challenge is being able to utilize the existing technology we have at our disposal.

Q. What lessons have you learned since becoming involved in interoperability issues in law enforcement and in Congress?

A. Interoperability saves lives of both citizens and first responders—that's the bottom line. You don't have to stop on a mountain top to call for backup. You can be prepared and communicate to others when you drive up to a firefight. As a Sheriff and then a Congressman, I have the fortunate opportunity to have a unique and thoughtful perspective on this issue. I remain convinced that any solution must be a bottom-up strategy with local buy-in. As a result of all the disparate systems operating throughout the Nation, it is essential that any solution be one that has local support and input. Our first responders, the boots on the ground, should be in full support and have a voice in our strategy. Our solution with the 21st Century Emergency Communications Act was to ensure Federal standards are in place, but also to give local jurisdictions input in developing their Statewide Interoperable Communication Plans.
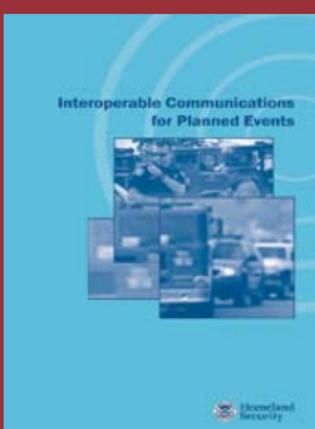
DHS Releases Interoperable Communications for Planned Events Guide

The Department of Homeland Security (DHS) has released an *Interoperable Communications for Planned Events* guide. This guide is intended to assist emergency response officials responsible for designing and executing interoperable communications plans for planned events, e.g., festivals, concerts, and sporting events. Developed with practitioner input, the tool includes lessons learned and best practices. The *Interoperable Communications for Planned Events* guide is available at: www.safecomprogram.gov

- Certification from the RPC chairperson that all meetings were open to the public

RPCs can use a Regional Plan checklist, the *National Regional Plan Template* published by the FCC's Public Safety National Coordination Committee (NCC) Implementation Subcommittee, to ensure that their plans are complete. The NCC Implementation Committee's *Guidelines for 700 MHz Regional Planning Committees* provides detailed explanations for each of a Regional Plan's required elements. These resources are available at the NCC Subcommittee Documents page on the National Public Safety Telecommunications Council's (NPSTC) Web site (http://www.npstc.org/nccsubcom.jsp).

"NPSTC strongly supports regional planning efforts," says Marilyn Ward, NPSTC's Executive Director. "We have been providing 700 MHz planning training at our quarterly meetings. We invite interested RPCs to join us for training on narrowband, wideband, and broadband technologies, and how they will need to be coordinated to simultaneously coexist between and within RPC regions." For a schedule of NPSTC's meeting dates and locations, visit www.npstc.org.

Common Denominators for Success

Navigating the multiple dimensions of 700 MHz regional planning requires an engaged and motivated RPC. The NCC Implementation Subcommittee and NPSTC have provided suggested templates for maintaining momentum across a RPC's membership:

Develop a regional planning process that is user-driven and inclusive.

For a 700 MHz Regional Plan to effectively meet the communications needs of a region, it is critical that key stakeholders—local, tribal, and state emergency responders, mutual aid organizations, operations decision-makers—actively participate in the planning process. "Regional planning requires extensive coordination and a high level of collaboration by all agencies involved," says Chirhart. RPC meetings should be open to all members of the emergency response community. In addition, RPCs should encourage the participation of non-government organizations since they may be licensed in the 700 MHz band with sponsorship by a governmental agency. An inclusive planning process is important to strengthening regional partnerships, which, for many localities, will prove critical in addressing long-term challenges. "Public safety may have to rely on partnerships since the cost of agency-owned networks may be cost-prohibitive," adds Chirhart.

Maintain open communication channels.

To maximize participation in RPC meetings, RPC members can use a broad range of communications methods. Resources to advertise an RPC's first meeting include FCC Public Notices, *FCC Daily Digest*, advertisements in emergency response-related publications, notices in emergency response organization publications, trade magazines, local newspapers, mass postal mailings, and mass electronic mailings.

Open communication channels are important *throughout* the 700 MHz regional planning process. Regular communications between meetings will keep participants informed of progress, provide an opportunity to incorporate everyone's input real-time, and maintain users' investment in the process.

Establish RPC subcommittees.

Subcommittees encourage participation, assist the RPC in addressing 700 MHz planning comprehensively, and tap into the broad expertise represented across a RPC. A Technical Subcommittee, for example, can review adjacent regions' plans and applications. An Outreach Subcommittee can maintain RPC members' contact information, and can identify opportunities to notify and maximize participation across a region's emergency response community.

Build a regional planning process with elasticity and endurance.

Spectrum planning is an ongoing process—not a one-time, one-size-fits-all investment. A robust 700 MHz Regional Plan requires built-in elasticity to adapt to new communications needs and factors, such as emerging technologies and equipment. Also important is strong leadership, which is key to keeping planning efforts on track.

February 17, 2009, represents a mile marker—not a finish line—for 700 MHz regional planning. "Based on technologies in use today, and those under development, regional planners today must fast-forward to identify what the mission requirements will be in 5, 10, and 20 years, and determine how public and commercial networks will meet those requirements," says Chirhart.

For more information about the 700 MHz allocation, visit the FCC's Public Safety and Homeland Security Bureau Web site at http://www.fcc.gov/pshs/spectrum/700mhz/. For additional 700 MHz regional planning templates and documents, visit the NCC Subcommittee Documents portion of the NPSTC Web site at http://www.npstc.org/nccsubcom.jsp.

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- Interoperability progress in Los Angeles and Nebraska
- Countdown for the 700 MHz transition
- National Emergency Alert System advances

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