

Joint Legislative Committee on Emergency Management

Informational Hearing

Emergency Interoperability: What's Next for California?

Monday, August 6th

**Upon Adjournment of Assembly Floor Session
State Capitol, Room 444**

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- Karen Wong
 - California Technology Agency

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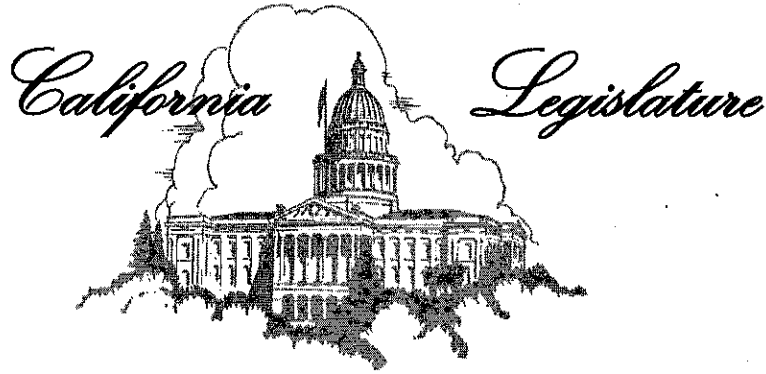
- Barry Fraser
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Joint Legislative Committee on Emergency Management

Briefing Paper on Emergency Interoperability

Abstract

For years, California has tried to unify its emergency radio systems, with the goal of keeping first responders in constant communication during a disaster. Even as this task nears completion, the federal government has begun deploying an even larger system designed to standardize disaster communication in a manner that may make these current efforts irrelevant.

I. Introduction

Perhaps most dramatically demonstrated during the communications snarl that hindered emergency crews on 9/11, the inability of police and firefighters to talk to each other in a crisis shocked and horrified the nation. A goal was identified, and a buzzword born: Interoperability.

II. Disaster Management in the State of California

A. State Emergency Management System

The Standardized Emergency Management System (SEMS), developed as a result of the 1991 East Bay Hills Fire, is California's system for managing emergencies. SEMS provides a consistent template to enable State, tribal and local governments, nongovernmental organizations, and the private sector to protect against, respond to, and recover from all emergencies and disasters regardless of scope, cause, location, or complexity. It is a core set of doctrines, concepts, principles, terminology, and organizational processes that enables effective, efficient, and collaborative incident management. This framework forms the substructure for interoperability and enables diverse agencies and organizations to conduct coordinated and efficient incident response operations.

All state government agencies must use SEMS when responding to multi-jurisdictional or multi-agency emergencies. All local government agencies must use SEMS in multi-jurisdictional or multi-agency emergency responses to be eligible for state reimbursement of response-related personnel costs.

Similarly, the National Incident Management System (NIMS) was established via Homeland Security Presidential Directive in 2004 to establish a systematic, proactive approach by which to guide governments and agencies (including the federal government) at all levels to work seamlessly during a disaster. Together, SEMS and NIMS provide the basis of California's Emergency Response System.

That said, incidents typically begin and end locally, and are managed on a daily basis at the lowest possible geographical, organizational, and jurisdictional level. For this reason, every county is responsible for the development of its own Emergency Operations Plan, utilizing SEMS and NIMS, which takes into account each local government's resources and unique hazards and terrain. Should an earthquake, fire, or other such disaster occur anywhere in California, it is expected that first responders will adhere to SEMS and NIMS and respond accordingly – thereby seeking regional, state and federal assistance as needed.

B. Communication During a Disaster

A critical component to SEMS and the successful management of a disaster in California is the ability of all first responders – regardless of specialty or region – to communicate with each other, officials, and the public at-large.

The 9/11 Commission Report found that:

“The inability to communicate was a critical element at the World Trade Center, Pentagon, and Somerset County, Pennsylvania, crash sites, where multiple agencies and multiple jurisdictions responded. The occurrence of this problem at three very different sites is strong evidence that compatible and adequate communications among public safety organizations at the local, state, and federal levels remains an important problem¹.”

Governments across the country are working to establish the infrastructure and networks to allow diverse emergency response jurisdictions to communicate with each other seamlessly during an event. It is crucial that first responders know both where additional assistance is needed, and also facilities/areas that they should avoid entering (i.e. fires deemed “out of control,” buildings in danger of collapse, areas with pipelines in danger of rupturing).

¹ The National Commission on Terrorist Attacks Upon the United States, “9/11 Commission Report,” 2004, pg. 397.

III. Delays to Statewide and National Interoperability

In the wake of 9/11, former U.S. Homeland Security Secretary Michael Chertoff remarked in 2006 that "...the critical foundation for an effective response is the ability to talk to one another." He explained that:

"It is a task that is very formidable, and requires not only a technological element, but also an element of governance, an element of how we deal with each other in terms of very different organizations and very different chains of command²."

A. Technology

Communications technology is constantly evolving, which makes selecting the use of an appropriate mechanism for true interoperability a moving target. Currently, the merging of voice and data communications combined with widespread use of proprietary and incompatible communications gear are issues that present unique challenges to the creation of a public safety interoperability network. For example, the focus immediately after 9/11 was on the use of radio (Land Mobile Radio, or LMR) technology. But while agencies across the country scrambled to improve radio interoperability, first responders began recognizing the importance of data communications and technology. At the same time, vendors began combining voice and data capabilities into converged communications networks – commonly called "voice over IP" (voice over internet protocol). Thus, in many instances, agencies and governments have spent years researching and procuring equipment, only to learn very quickly that is out of date.

B. Proprietary Equipment

To complicate the question of technology further, vendors' products often do not or cannot communicate with each other. While this is often a business decision on the part of vendors, many have begun to recognize the importance of adapting that model for the benefit of public safety interoperability. The solution has been the development of open standards like the National Information Exchange Model (NIEM) – an end-user driven, federally supported, government-wide initiative to "connect communities of people who share a common need to exchange information in order to advance their missions." NIEM offers a common vocabulary so that when two or more people talk to each other they can exchange information based on common words that they both understand.

² Remarks by Homeland Security Secretary Michael Chertoff at the Tactical Interoperable Communications Conference, Washington, D.C. May 8, 2006.

It provides a data model, governance, methodologies, training, technical assistance, and an active community to assist users (in this case, vendors) in adopting a standards-based approach to exchanging information. As such, NIEM provides a forum for accelerating collaboration and identifying common approaches to challenges for companies and users³.

In the case of public safety interoperability, those NIEM-proliferated standards are attempting to be replicated and incorporated into “off-the-shelf” equipment that is accessible to small and medium-sized jurisdictions. It is incumbent upon technology vendors to incorporate these standards, however, and that is a work in a progress.

C. Spectrum Availability

A key recommendation included in the 9/11 Commission Report was that “Congress should support pending legislation which provides for the expedited and increased assignment of radio spectrum for public safety purposes⁴.” Public safety radio systems typically operate in portions of the 800MHz band. But that band is also used by commercial wireless carriers and private radio systems. This creates a problem of harmful interference to 800 MHz public safety communication systems caused by higher-density commercial wireless systems.

In January, the Federal Communications Commission (FCC) took unprecedented action by designating Long Term Evolution (LTE) as the communications standard infrastructure for the network. LTE is a wireless broadband technology designed to support roaming Internet access via cell phones and handheld devices. Because LTE offers significant improvements over older cellular communication standards, it is often referred to it as “4G” (fourth generation) technology. The following month, Congress enacted a landmark measure to transform the public safety broadband spectrum using largely LTE technologies (see “FirstNet” below).

D. The Importance of Unified Communication

When discussing the importance of interoperability and communication for effectively managing emergencies, the discussion typically involves both unified technology and a culture of coordinated communication – across jurisdictions, geographies, and leadership mentalities. Interoperability involves the acknowledgement that emergencies and disasters are best managed cooperatively, and not in a “siloed” manner.

³ National Information Exchange Model, “What is NIEM?” <https://www.niem.gov/about/what-is-niem/Pages/what-is-niem.aspx>, Accessed July 31, 2012.

⁴The National Commission on Terrorist Attacks Upon the United States, “9/11 Commission Report,” 2004, pg. 397.

This is not just about technology. The technology is, yes, a major component. But this is also absolutely about how so many agencies and jurisdictions *use* that technology. The changes to organizational structure, leadership mentality and "rank and file" personnel training that will need to occur to ensure total emergency communications interoperability is mammoth, in scope. For just a few examples:

- There are more than five different terms in use nationally for a "stand-by fire crew."
- What one fire department calls a "Halligan" another may call a "Hooligan Tool" and another may refer to as a "Pro Tool."
- Many police and fire agencies use "10-codes" as an abbreviated communication system. But even between them, different codes mean different things. For example, some use "10-4" to indicate that a message has been received. Yet others use "10-26" or "10-39."

Codes and terminology are drilled into young police officers and firefighters in training academies as a manner of survival. Yet in terms of interoperability, the lack of a unified language presents a serious challenge to managing a large-scale incident involving numerous jurisdictions. Overcoming this challenge of communication barriers will require changes to the command and control structures of *all* emergency response agencies (of which there are nearly 100 in Los Angeles County alone).

It should be noted that headway has been made. Regional communications have been greatly enhanced, technology has evolved, and government and industry are working together on standards. Solutions have been developed and implemented in major urban areas to facilitate voice communications between agencies. Bridging devices have helped to make this possible. Data sharing hasn't come as far, but projects have been implemented to help fill the void – including waivers granted by the FCC to jurisdictions such as Los Angeles, Mississippi, and the San Francisco Bay Area – to build their own public safety broadband networks. Once rolled out, these networks *could* provide the backbone for a national broadband network.

IV. The Los Angeles Regional Interoperable Communications System (LA-RICS)

The need for emergency communications interoperability is especially great in the Los Angeles region with over 50 law enforcement agencies and 31 fire departments serving a 4,084 square mile region and 10 million County residents. Interoperability in this region involves 88 independent cities and agencies, both the City and County of Los Angeles (and their respective law enforcement departments), several port authorities, a national forest and others.

A. Organization

In 2009, the Los Angeles Regional Interoperable Communications System Authority (LA-RICS) was established as a joint powers authority specifically to create the Los Angeles Regional Tactical Communications Subsystem – a network that would unite the region’s 34,000 first responders through voice and data communications.

The LA-RICS Authority received one of several waivers from the FCC to proceed with a regional interoperability network project. In as such, LA-RICS proposes to deploy a 700MHz public safety mobile broadband network across all of Los Angeles County, featuring almost 300 wireless 700MHz public safety broadband sites (using 176 new and 114 existing infrastructure sites), and 100-miles of high-capacity fiber backbone. The network would enable computer-aided dispatch, rapid law-enforcement queries, real-time video streaming, medical telemetry and patient tracking, geographic information systems (GIS) services for first responders, and other applications.

LA-RICS applied for the largest federal grant ever given for this purpose. The Authority received more than 11 federal grants with a combined value of nearly \$270 million, including a \$154.6 million U.S. Department of Commerce Broadband Technology Opportunities Program (BTOP) grant, the largest of its kind in the nation. This grant is expected to cover the infrastructure costs in deploying a broadband public safety network for the project which, alone, is estimated to generate 2,181 jobs, including jobs produced indirectly from the project. The balance of this large-scale project -- approximately \$500 million -- is expected to be borne by the County of Los Angeles, in one form or another. If it is built, the LA-RICS network would be one of the largest and most complex of its kind in the country.

B. Contract Award

After several years of work with two major possible vendors – Raytheon and Motorola, Inc. -- a contract for development of the LA-RICS system was awarded to Raytheon and its partners. Unfortunately, in March 2011, the County Counsel’s office recognized a flaw preventing the award from proceeding. The County of Los Angeles and LA-RICS started over in July 2011.

Because a large portion of the federal grant monies awarded to LA-RICS came with specific timeframes, a measure was introduced in the state legislature in late 2011 to assist the authority with awarding a second contract in a timely fashion. Assembly Bill 946 (2011, Lowenthal), signed into law by Governor Jerry Brown, allows the County of Los Angeles or LA-RICS the option to use a solicitation process to award a contract for design, construction, and delivery of a regionally interoperable communications system and all related infrastructure. This authority will help decrease the overall project risk, time required for implementation, and overarching costs. It also ensured that the County was

able to maintain its \$270 million in federal grant funds. A new award is expected to be announced very soon.

V. Bay Area Regional Interoperable Communications System (BayRICS)

The San Francisco-Bay Area is a dynamic and diverse region demanding a unique solution for public safety interoperability. The area includes almost 50,000 public safety users and over 500 public safety facilities spanning approximately 2.5 million households and 186,000 businesses.

A. Organization

The Bay Area Regional Interoperable Communications System (BayRICS) Authority is a joint powers authority formed to manage the San Francisco Bay Area Wireless Enhanced Broadband Project (BayWEB) -- a public-private partnership led by Motorola, Inc. The Authority is composed of the counties of Alameda, Contra Costa, Marin, San Francisco, Santa Clara, San Mateo, and Sonoma, the core cities of Oakland, San Francisco, and San Jose. The counties of Napa, Santa Cruz, Solano, and Sacramento are also exploring possible membership and inclusion.

The BayRICS Authority also received a waiver from the FCC to proceed with its own regional interoperability network project – BayWEB. BayWEB will be a mechanism by which to deploy a 700MHz interoperable wireless public safety broadband network and a public access wireless broadband network in the greater San Francisco Bay Area. Examples of applications to be enabled include real-time mobile video for field officers, geolocation information about damage, dangers, hazardous materials, road conditions, and personnel and vehicle location; immediate Amber Alert file transfers, and virtual command centers to support emergency evacuations. The network will involve the use of 200 existing public safety sites. The build-out and deployment of the BayWEB network is estimated to create more than 1,300 jobs.

The BayRICS Authority will manage quality-of-service, access, interoperability, policy, and system management issues for the public safety network. BayRICS was also awarded several federal grants including a \$50,593,551 BTOP grant.

An added component of BayWEB is the offering of wireless capacity on the system's open network to local Internet service providers in the Bay Area. Seven small business wireless Internet service providers have already signed on to utilize this system to provide service to community anchor institutions, businesses, and end users.

B. Contract Award

Unique to BayRICS is the fact that the system's \$50.6 million BTOP grant was awarded to Motorola, Inc. – the authority's lead partner. Motorola has also been the lead partner in managing similar deployments of public safety wireless access networks, including the Palmetto public safety network in South Carolina and the Starcom public safety network in Illinois.

VI. The First Responder Network Authority (FirstNet)

Despite progress establishing the joint powers authorities in Los Angeles, the Bay Area and other regions across the country, the President and Congress have decided in the past several years to move away from the long-standing "network of networks" approach to communications and towards the concept of one entity holding broad powers as the sole licensee of a nationwide interoperability network. Assistant Commerce Secretary Anna Gomez recently remarked that this centralized approach was necessary to ensure operability. "We did not want to repeat the same circumstances of the past in which voice networks were built on individual bases and therefore were not interoperable so that police and fire couldn't communicate during an emergency or EMS couldn't communicate with the National Guard, or whoever the responders are in the particular incidents⁵."

A. The Middle Class Tax Relief and Job Creation Act of 2012

In February 2012, Congress enacted, and President Barack Obama signed into law, the Middle Class Tax Relief and Job Creation Act of 2012 (Act, H.R. 3630), which directed the creation of a nationwide interoperable public safety broadband network⁶. According to the *Federal Register*, the Act "meets a long-standing priority of the Obama Administration to create a single, nationwide interoperable public safety broadband network that will, for the first time, allow police officers, fire fighters, emergency medical service professionals, and other public safety officials to communicate with each other across agencies and jurisdictions⁷."

The Act tasks the Department of Commerce's National Telecommunications and Information Administration (NTIA) with launching a new independent authority, the First Responder Network Authority (FirstNet), by August 20th of this year (2012). FirstNet will be responsible for designing, building and operating a single nationwide network in collaboration with a private sector operator that will be chosen through a competitive bidding process⁸.

⁵ Maynard, Melissa, "States, Feds Posed to Write New Chapter in Public Safety Communications." Pew Center on the States. May 30, 2012.

⁶ Middle Class Tax Relief and Job Creation Act of 2012, Public Law 112-96, 126 Stat. 156 (2012).

⁷ *Federal Register*, "Notices," Vol. 77, No. 95, Wednesday, May 16, 2012, pp 28857-28858.

⁸ Middle Class Tax Relief and Job Creation Act of 2012, Public Law 112-96, 126 Stat. 156 (2012), §6206(b)(1).

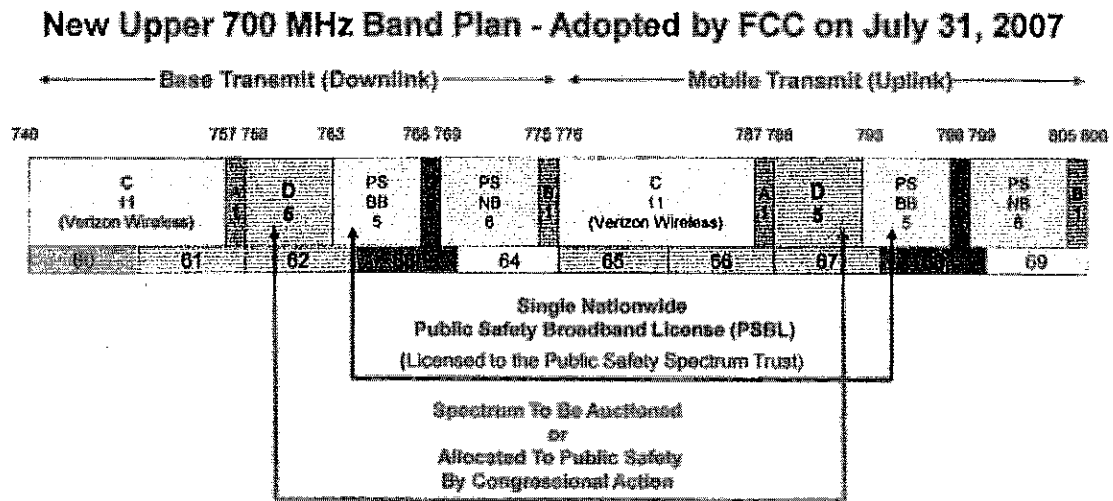
According to the legislation, after the private operator is chosen, FirstNet will develop a blueprint and determine funding levels necessary to complete the segment of the national network to be housed within each state. The Act also stipulates that the network must eventually operate on a break-even basis by charging public safety agencies enough money to cover ongoing expenses⁹.

Additionally, the Act charges NTIA with establishing a grant program to assist State, regional, tribal, and local jurisdictions with identifying, planning, and implementing the most efficient and effective means to use and integrate the infrastructure, equipment and other architecture associated with the network¹⁰. Up to \$135 million will be available to NTIA for this State and Local Implementation grant program. Furthermore, NTIA has until August 22, 2012 to establish requirements for the grant program to include, at a minimum, a determination of the scope of eligible activities that will be funded, a definition of eligible costs, and a method to prioritize grants for activities that ensure coverage in rural as well as urban areas¹¹.

Congress has approved \$7B to tackle this issue nationally.

B. The 700 Megahertz Public Safety Band and D Block

HR 3630 also carved out a new spectrum for public safety users and provided initial funding for the build-out of the national network (\$7 billion nationally): Specifically, the Act called upon the FCC to reallocate space in the 700MHz band of the spectrum -- known as D Block -- for dedicated public safety use, allowing more users to be on the network as well as providing bandwidth for additional applications.



Source: Seybold, Andrew, "The Value of the D Block" 10/11/2011

⁹ Maynard, Melissa, "States, Feds Posed to Write New Chapter in Public Safety Communications." Pew Center on the States, May 30, 2012.

¹⁰ Middle Class Tax Relief and Job Creation Act of 2012, Public Law 112-96, 126 Stat. 156 (2012), §6302(a).

¹¹ Middle Class Tax Relief and Job Creation Act of 2012, Public Law 112-96, 126 Stat. 156 (2012), §6302(c).

The FCC is hoping to auction the D Block to commercial interests with the stipulation that the winning bidder form a public-private partnership under the direction of the Public Safety Spectrum Trust Corp., a nonprofit consisting of public safety groups. This has never been done before, and it is unclear what interest exists within the private sector for participation in this spectrum auction. Speculation suggests that this auction likely would not occur until 2016 as much work needs to be done to lay the groundwork for success beforehand.

C. Status

The National Governors Association held a meeting in late June in an attempt to help states understand the federal legislation and options it lays out for them, including whether to build their own portion of the network or allow FirstNet to do so on their behalf. That said, it is important to mention that as an entity, FirstNet still does not technically exist. The 15-member governing board for this Authority is in the process of being appointed, with an expectation that all members will have been chosen by the end of August, 2012.

For some perspective on timing, it should be noted that the private cellular carriers (i.e. Verizon, Metro PCS, AT&T, Metro Cellular and Sprint) all took approximately two years to build the infrastructure that was crucial to supporting their broadband networks. At the time, these companies had also been operating for many years, with structured business plans and operations models in place. By contrast, FirstNet has not yet even been officially established. The FCC has estimated that the FirstNet system will require up to \$6.5 billion in capital expenditures over 10 years¹².

VII. FirstNet's Implications for California

A. Opt In or Opt Out?

States like California who have made some progress in the development of regional interoperability systems will face difficult, time-sensitive questions in the months ahead about whether to allow FirstNet to build and operate the network on their behalf, or instead, to use a provision that allows them to opt out and build and operate their own portion of the national network while adhering to the federal standards set by FirstNet.

Under the legislation passed by Congress, states that opt out will have to demonstrate their ability to comply with a host of technical requirements and will receive less funding for construction of the network – and no funding for operating or maintaining it.

¹² Pittman, Elaine, "Little Progress on National Public Safety Network 10 Years After 9/11," *Forbes*. August 31, 2011.

They will also have to demonstrate technical and operational know-how and adequate funding capacity in order to secure a lease of the allocated spectrum.

A third, not-yet-truly-explored possibility could be the option for California to proceed with “building out” our systems as planned, and then later transferring the network and its corresponding assets to FirstNet.

B. Status of Existing LTE Projects

Because NTIA wants to be “prudent” with any investments that are made before FirstNet develops its blueprint for the nationwide network’s architecture, it has recently suspended a large portion of grant funds issued under the Broadband Technology Opportunities Program – including hundreds of millions of dollars previously allocated to both LA-RICS and BayRICS. NTIA has issued a list of “low risk” activities that these joint powers authorities may continue to proceed with (including backhaul, site upgrades, and the purchase of “ancillary” equipment), but has remained firm in its commitment to await further direction from FirstNet in regards to many of the LTE projects that these (and other jurisdictions) had proposed – many of which were in the initial rounds of project exploration and development¹³.

C. T-Band Give Back

While much attention has been paid to the fact that the Middle Class Tax Relief and Job Creation Act of 2012 provides for the addition of D Block to public safety users, one controversial aspect of the legislation is the mandated “give-back” of T-Band spectrum. “T-Band” refers to the 470 - 512 MHz frequency band, which is shared between public safety agencies and the television broadcasters (hence the “T-Band” designation) and was made available on a shared use basis by the FCC for Land Mobile Radio systems such as those used by public safety agencies in 13 major metropolitan areas of the country, including Los Angeles.

Section 6103 of the legislation requires giveback of the T-Band spectrum by public safety licensees and specifies that it must be reallocated no later than nine years after enactment of the law. It is expected that relocation of those users will be completed two years after the spectrum is competitively bid. The expectation is that this spectrum will be reallocated and auctioned to commercial use (likely used for television broadcast). Proceeds from this future auction are to be used to cover the costs to relocate affected public safety licensees, with the remainder going to the U.S. Treasury.

¹³ National Telecommunications and Information Administration, BroadbandUSA “Fact Sheet.”

The County of Los Angeles has spent a large amount of time and money upgrading equipment and technologies throughout the past decade for use within the T-Band spectrum. The County is concerned with the waste of money that would be involved with now abandoning these technologies so soon after adoption.

D. Next Steps

The Middle Class Tax Relief and Job Creation Act of 2012 directs FirstNet to consult with regional, state, tribal, and local jurisdictions about a number of subjects including, among other things, the integration of existing public safety governance and planning authorities, additional parameters of the grant program, the manner by which existing infrastructure may be leveraged, acceptable state and local grant activities, and possible state funding and performance requirements¹⁴. It is expected that, once the FirstNet Board and Authority are officially established, comments will be received and appropriately considered as a means of driving future actions.

VIII. Conclusion

Prior to 9/11, the concept of interoperability was highlighted within the public safety community by incidents like Columbine – those where multiple jurisdictions responded to high-stress events and found themselves unable to communicate with each other. 9/11 forced the idea of interoperability into the minds of the public.

While that public awareness has lent itself to the creation of FirstNet, there is still much work to be done in this arena. The infrastructure needs required to support a nationwide public safety broadband network are extensive. The operational, leadership, and organizational changes that will need to be made in a cooperative fashion across the public safety spectrum are also numerous.

As a state, California has faced its share of wildfires throughout the past decade. But we have managed to avoid the type of large-scale disasters that highlighted deficiencies in Louisiana, New York, and Washington, D.C. All emergency managers will tell you that it is not a matter of being prepared “if” disaster strikes – but “when.” For this reason, it is imperative that we, as a state, continue to strive for improvement in the arenas of emergency communications and interoperability with a keen eye towards enhanced public safety and emergency management when disasters occur.

¹⁴Middle Class Tax Relief and Job Creation Act of 2012, Public Law 112-96, 126 Stat. 156 (2012), §6206(c)(2).