



Saving Lives and Property Through Improved Interoperability

***Special Assignment Technical
Report—
2002 Fire and Rescue West
Conference***

Final

March 2002

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EXECUTIVE SUMMARY

On February 12–14, 2002, a conference, entitled “2002 Fire and Rescue West Conference,” was held at the San Jose Convention Center in San Jose, California. The 3-day conference consisted of a variety of sessions and exhibits of concern to fire service professionals. The key findings and recommendations resulting from the conference include—

- The Fire Department of New York’s (FDNY) land mobile radio (LMR) system may have contributed to FDNY fatalities at the World Trade Center (WTC) on September 11, 2001.
- Command, control, and communications between most public safety entities involved in the Pentagon response on September 11, 2001, were successful.
- A common incident management system (IMS) should be adopted by emergency management organizations to facilitate greater operational effectiveness and wireless communications interoperability.
- The response of the Baltimore City Fire Department (BCFD) to a major tunnel fire involved many public safety organizations during a period of several days, demonstrating effective mutual-aid operations, command and control, and interoperable communications.
- The Association of Public-Safety Communications Officials, Inc. (APCO) is moving quickly to resolve radio interference between public safety wireless systems and commercial service providers, and is recommending a solution that is very similar to a proposal from Nextel Communications, Inc. (Nextel).
- Fire service organizations are implementing applications using 802.11b wireless local area networks. These networks may become unreliable as the 2.4 gigahertz (GHz), unlicensed frequency band becomes more congested with other users.
- The Federal Emergency Management Agency’s (FEMA) Fire Act Grants can be used to purchase basic LMR equipment (i.e., mobile and portable radios).
- The death of a firefighter in Los Angeles exposed the fire department’s lack of radio discipline and poor radio operation procedures.

1. INTRODUCTION

The 2002 Fire and Rescue West Conference was held on February 12–14, 2002, in San Jose, California. This was the 25th annual conference and was endorsed by the California State Firefighters' Association, Fire and Emergency Manufacturers and Services Association, and Fire Apparatus Manufacturers' Association. The conference was sponsored by *Firehouse Magazine*, *Public Safety Product News*, and Firehouse.com. These supporting organizations regularly provide information and services to the firefighting service and local fire departments. Several hundred firefighting professionals attended the conference, which was a venue for training sessions, workshops, topical presentations, and an exhibition.

The 3-day conference provided multiple sessions simultaneously and Public Safety Wireless Network (PSWN) Program support staff attended the technical and operational events of greatest interest to the program. Unfortunately, three sessions originally advertised and of interest to the PSWN Program were cancelled: "Purchasing & Integrating New Fire Service Radios: Lessons Learned," and "Interoperability: Proven Tips & Equipment—Part I & II." Because of the lack of wireless interoperability information presented at the conference, the PSWN Program may be interested in presenting at the next event, Firehouse World Exhibition and Conference, February 18–20, 2003.

This report consists of concise summaries for each of the sessions attended by the PSWN Program support staff. Specifically, there are 16 session reports presented in 4 sections. Each section contains the session reports related to one of the four topic areas addressed at the conference—the events of September 11, emergency management, wireless technology, and fire service issues. Sessions are not described in chronological order, but in an order that provides a more concise presentation of the information.

2. SEPTEMBER 11 RELATED SESSIONS

The following sections provide detailed reports on the sessions related to the terrorist attacks of September 11, 2001—

- Initial Report on FDNY Response to the World Trade Center Attacks
- Pentagon Attack: A First Responder's Analysis
- Pentagon Attack: Lessons Learned during FEMA USAR Support to the Arlington County Fire Department
- World Trade Center Attack: Lessons Learned during Federal Support to the Fire Department of New York.

2.1 Initial Report on FDNY Response to the World Trade Center Attacks

Synopsis

This session provided an overview of the September 11, 2001, rescue and response operations performed by FDNY at the WTC. A combination of maps, aerial and satellite photography, artists' renderings, and video were used to provide a full description of the crisis. After the presentation, PSWN Program support staff discussed the role of wireless communications during the emergency operations with the presenter.

Presenter Information

John J. Salka, Jr., is a battalion chief and 20-plus year veteran of the FDNY. He has instructed at the department's probationary firefighters' school and in its professional development program, which he helped create. Chief Salka was on duty on September 11, 2001, and responded to the WTC attacks.

Presentation Overview

This session described the FDNY response to the September 11, 2001, terrorist attack on the WTC. Chief Salka reviewed the timeline of the attack and response, the scope of the destruction, and the method of firefighter response and recovery. The presentation did not address wireless communications directly, but PSWN Program support staff discussed that issue with Chief Salka after his presentation.

The FDNY response to the WTC attack began based upon a direct eyewitness account. At 8:45 in the morning, a team of firefighters was making a training video in lower Manhattan when they watched the first plane hit the north tower. By the time the south tower was hit by the second plane at 9:03 a.m., 200 firefighters had already responded to the scene. Many pieces of apparatus were stationed very close to the WTC towers, and therefore, when the south tower collapsed at 9:50 a.m., at least 50 pieces of apparatus were directly hit with debris. The north

tower fell at 10:28 a.m. As a result of the collapses, the FDNY lost its chief, many of its senior leaders, and its chaplain. In total, they lost 343 members. The FDNY also lost 112 pieces of fire apparatus and incurred more than \$147 million in damage to equipment.

To explain the scope of the destruction caused by the attacks, a great deal of information was provided. Before the 110-story towers collapsed, the fires caused by the planes consumed between 10 and 20 stories. The chief explained that the full effect of the heat (caused by burning jet fuel) on the steel structure was not understood; therefore they did not anticipate a collapse. Fire department personnel entered the buildings, and at the start of the response, the command center was actually located inside the north tower. When the south tower collapsed, all FDNY personnel were ordered out of the buildings, and the command post was moved away from the WTC complex. According to the chief, the collapse of the south tower “destroyed the whole operation.” The first collapse created more than 17 acres of debris and several periphery fires. Each periphery fire would normally be considered a major incident. Collateral damage to other buildings and vehicles extended up to 50 blocks away from the scene. With the loss of much of the command structure, including the FDNY Chief, and so many firefighters and pieces of apparatus, the fire department was overwhelmed.

After the collapse, the search-and-rescue and search-and-recovery operations encountered many obstacles. All FDNY personnel were called to muster. However, by that time, many off-duty personnel had already accompanied on-duty members to the original fire department staging area, which was buried in debris. Therefore, many off-duty members were already lost and the FDNY was unsure who was missing. Besides the personnel problems, the recovery was initially slowed due to the loss of public infrastructure. Because many fire mains were destroyed in the collapse, fireboats supplied some of the needed water from the Hudson River. Chief Salka noted that many steamfitters, pipefitters, steel workers, construction workers, and heavy equipment operators volunteered to help with the rescue and recovery and were extremely professional and effective.

Follow-Up Discussion

After Chief Salka spoke to the group, PSWN Program support staff discussed the performance of the FDNY wireless network and public safety wireless communications with the chief. The chief had some unique perspectives based on his work as a trainer and firefighter. As a trainer, Chief Salka said he regularly presented a session titled, “Where are the Radios?”, which focused on the need to provide a radio to every firefighter. He said fire departments typically did not have the funding to provide radios to all of their members. The philosophy of this approach was that each team of men supporting the firefighting operation should stay together, and therefore they only needed one radio. Chief Salka reported that the FDNY was able to provide a radio to almost every firefighter, but that was not the norm across the Nation. The chief indicated that he believed that this lack of communications cut down on mission effectiveness and could be costing lives.

During the WTC attack recovery, communications with some public safety organizations was not possible because the organizations used a variety of systems and frequencies. The impact of this lack of communications was noticeable during the recovery because FEMA had unique

resources that the FDNY often needed. However, the only way those resources could be requested was by literally speaking face-to-face to one of the FEMA directors. The FDNY would also like to have improved communications with the New York and New Jersey Port Authority. To improve interoperability, the chief recommended creating regional systems that could be activated during major emergencies.

With respect to interoperability during the WTC response and recovery, the chief also discussed the effectiveness of the Incident Command System (ICS). He explained that ICS was the method used by most fire departments to establish and maintain command and control during major emergency incidents. Although this method was effective for daily events, and most major events, the chief said that it was not useful for events like the WTC attack. A significant number of agencies involved in the operations at the WTC site could not fit into the normal ICS framework because they did not have interoperable communications. Chief Salka pointed out that ICS only worked if communications were available. "Communication is everything," he added, "when attempting to manage command and control."

Chief Salka reported that from an operational perspective, the FDNY used two systems. Both systems were analog, low band very high frequency (VHF), and conventional. The system used for dispatch consisted of mobile radios, base stations, and repeaters. The mobile radios were mounted in the apparatus (i.e., pumper, ladder, etc.) and transmitted at a high power. Therefore, with the higher power and the repeaters, dispatch communications could be established over great distances and did not seem to have any problems. The second system, used for fireground operations, consisted of portables and mobiles. The channels used for fireground operations were not repeated, and the portables and mobiles that transmit on those channels transmitted on low power. The fireground system used low power and was not repeated because the channels used on that system were reused throughout the city by multiple fireground units. Although transmitting on low power was typically acceptable over short distances, it did not work when personnel at ground level attempted communications with personnel underground and in high-rise buildings. The chief said that when a firefighter went up 50 or more stories in a building or went underground, he was typically unable to communicate via the portable radio. The chief said he believed that it was possible that some firefighters in the north tower might not have received the order to evacuate after the south tower collapsed.

Chief Salka said that in contrast, the New York Police Department (NYPD) portable radios did not have this problem. The chief mentioned that FDNY recently attempted to purchase radios similar to the NYPD, but had significant problems precipitating a halting of the project. Also, he indicated that the FDNY had hired an independent consultant to perform an analysis to evaluate the entire FDNY operation during the WTC attack response and recovery.

Summary and Analysis

This session provided a thorough overview of the WTC attack and the response, rescue, and recovery operations performed by the FDNY. Chief Salka's long career as a firefighter and his first-hand experience during the WTC operations provided many useful insights about major emergency operations. His observations about the wireless systems used by the FDNY and other public safety agencies imply that major improvements in communications may have had some

impact on the WTC response and recovery. It appears certain that system design and spectrum management affected the FDNY's operations and may have contributed to FDNY fatalities.

2.2 Pentagon Attack: A First Responder's Analysis

Synopsis

This session reviewed the experiences of a local firefighter during the initial response to the terrorist attack at the Pentagon on September 11, 2001.

Presenter Information

Michael L. Smith is Deputy Chief, Director of Safety, in the District of Columbia Fire and Emergency Medical Department (DCFD). He is also a *Firehouse Magazine* contributing editor and adjunct instructor at the National Fire Academy. He was one of the field commanders that responded to the Pentagon on September 11, 2001.

Presentation Overview

This presentation provided information about the terrorist attack on the Pentagon, a timeline of events from the perspective of a first responder, lessons learned from the event, and some basic information about the DCFD's wireless communications. To explain the scope of the disaster, Chief Smith gave a detailed briefing on the Pentagon and the damage caused by the terrorist attack. He reported that the Pentagon was built in 1942 and covered 29 acres, was more than 5 stories tall, and was arranged in a series of 5 pentagonal rings. The innermost ring was the A-Ring, and the outermost ring was the E-Ring. The Pentagon was mainly built of reinforced concrete and contained 17 miles of corridors. Due to the building's reinforced concrete construction, most of the airliner's wings and therefore aviation fuel, did not penetrate past the outer ring, while the fuselage did penetrate through to the C-Ring. Therefore, although fire penetrated through to the C-Ring, i.e., halfway through the building, the most intense fire was left in the outer ring because that was the location of most of the jet fuel. The attack caused 189 fatalities and serious injuries to 98 people, including 65 firefighters.

From the perspective of Chief Smith, the DCFD was ill prepared for this emergency but did provide excellent support to the rescue and recovery operation. The DCFD began to respond to the terrorist attack when, after the attack at the WTC on September 11, 2001, the Federal Bureau of Investigation (FBI) alerted the DCFD to the possibility that similar attacks could be launched against targets in Washington DC. In response to the alert, the command staff of the DCFD began preparing for a possible attack in the city.

The DCFD response to the Pentagon attack had many obstacles. Unfortunately, the DCFD first responded to a false report that the White House had been attacked. This happened because after the Pentagon was attacked at 9:46 a.m., the White House staff was evacuated as a precautionary measure, and in the confusion a false report was made to the DCFD that the White House had been attacked. The DCFD responded with more than 4 engines, 2 ladder trucks, a heavy rescue squad, an ambulance, 4 of the 6 field battalion chiefs on duty, and 70 firefighters.

At 9:48 a.m., as the DCFD was beginning to respond to the White House alarm, Arlington County requested assistance to respond to the Pentagon attack. At this same time, the U.S. Capitol was evacuated, the local Metrorail system was closed, and many other businesses and government offices began closing for the day. Therefore, traffic gridlock was a severe problem as 1.7 million commuters attempted to leave the city. Because of the traffic problem, and the possibility of an attack at the White House, the DCFD sent units to the Pentagon but also kept some units at the White House as a precaution.

At 10:01 a.m., Arlington County requested more assistance and in response the DCFD sent its remaining on-duty personnel. At this point, all off-duty personnel were called to muster, and Chief Smith assembled with other command staff at an operations center at the division headquarters. It was clear to the chief that they were ill prepared for this emergency. The DCFD did not have adequate plans to address a terrorist attack of this nature, and they used broadcast television as their primary source of information. Off-duty firefighters returning to their stations were confused regarding what they should do when they found no apparatus available to staff. In fact, recall orders and plans were written in 1968 so the staff had to improvise, and some reserve pieces of apparatus were eventually made available. Also, to support the operation, the DCFD commandeered the DC Convention Center to establish a mass casualty response center and a firefighter rehabilitation facility. The DCFC also commandeered public transit buses to transport expected mass casualties.

At noon, Chief Smith took command of the DCFD response efforts. He first reported to the Unified Command Center, but due to overcrowding, he established his own command post nearby. By examining the Pentagon blueprints and speaking to witnesses, the chief learned that ammunition was stored in the C-Ring, close to the impact zone. Concerned that this ammunition had been exposed to high heat for 3 hours, Chief Smith immediately informed the Arlington County incident commander of the danger.

At 1:00 p.m., Arlington County requested a third alarm assignment from the DCFD. At this point, the DC fire stations were being staffed by mutual aid companies from Montgomery and Prince George's counties. Because other firefighters were not available, these mutual aid personnel from Maryland were sent to the Pentagon.

At 4:00 p.m., the buses commandeered for mass casualty transportation were used to relieve the DCFD personnel at the Pentagon. The rehabilitation center at the DC Convention Center was used to receive the firefighters and provide necessary medical aid.

At 7:00 p.m., Chief Smith recommended the suspension of firefighting and rescue work until the next morning because there was little hope of rescuing anyone, and it was more dangerous working at the scene at night. The Arlington incident commander concurred, and a minimal crew was assigned to monitor the fire and the unstaffed hose appliances being used to contain it.

At 7:00 a.m., September 12, firefighting operations resumed at the Pentagon and Urban Search and Rescue (USAR) Task Forces were assigned to the scene. By noon that day, the fire was well contained and body recovery work began. Military personnel managed security and

body recovery work. The operation became a recovery operation as the fire was extinguished and as the USAR Task Forces had little success.

Through the response, rescue, and recovery operations, Chief Smith realized that fire departments needed to prepare for emergency operations like the Pentagon attack. He provided several points to demonstrate the need for improved preparedness—

- The terrorist attacks were not over; other attacks were likely.
- The American fire service should learn from the practices and procedures used by its counterparts in Northern Ireland and Israel, where terrorist attacks were routine operational demands.
- Fire officials should be honest with themselves about their department's capabilities. All of the agency's existing disaster plans should receive a critical review. Fire officials should realistically assess their department's capabilities.
- Agencies should develop relationships with the state and federal agencies that would respond to similar attacks in their area. It would greatly aid each agency's ability to work together effectively when an attack occurred.

Chief Smith noted that a large interoperable network existed in the greater Washington metropolitan area that seemed to work well for most users. However, the DCFD experienced communications problems that were only related to its own 800 megahertz (MHz) radio system. He said the DCFD was working with its vendor, Motorola, to research the problems and develop solutions.

Summary and Analysis

The September 11 terrorist attack at the Pentagon created an emergency that was very difficult for the DCFD to handle. However, Washington, DC, metropolitan area fire departments worked well together due to prior planning and training. To improve response to this type of major emergency, several improvements were identified (i.e., disaster plans). Despite the problems experienced by the DCFD due to their system's deficiencies, most public safety personnel were able to communicate via wireless networks or the Unified Command Center.

2.3 Pentagon Attack: Lessons Learned during FEMA USAR Support to the Arlington County Fire Department

Synopsis

This session described the search and rescue operations performed by the USAR Teams of FEMA.

Presenter Information

Larry Collins is one of the captains of the Los Angeles County Fire Department's USAR Task Force, and he was a member of FEMA's USAR Incident Support Team (IST) for the Pentagon and Oklahoma City attack sites.

Presentation Overview

This session reviewed the actions of the FEMA USAR teams at the Pentagon after the terrorist attack on September 11. The topics discussed included the composition and methods of a typical USAR team, the personnel assigned to the Pentagon, and highlights from the Pentagon operations. Capt. Collins reported that USAR teams each had 68 members and included doctors, engineers, firefighters, paramedics, technicians, and dog handlers. They typically carried enough supplies for 10 days of unsupported operations and required a 4,000 square foot area to establish their base of operations. The USAR approach typically involved five specific stages—

- **Size-Up and Reconnaissance**—Done immediately upon the arrival
- **Surface Rescues**—Victims self-rescue, or are rescued by bystanders or local rescuers immediately
- **Void Space Search**—Begins quickly, and may continue for days
- **Selected Debris Removal**—Peeling back layers of debris and conducting a search
- **General Debris Removal**—Begins at the end of Stage 4.

Five FEMA USAR teams were deployed to assist in search and rescue efforts—

- Virginia Task Force 1 (VA-TF1), based in Fairfax County
- Virginia Task Force 2 (VA-TF2), based in the City of Virginia Beach
- Tennessee Task Force 1 (TN-TF1)
- New Mexico Task Force 1 (NM-TF1)
- Maryland Task Force 1 (MD-TF1).

The deployment of these teams was staggered over a period of several days. Also, several local government USAR teams were deployed—

- Arlington County (VA) Fire Department Collapse Rescue Team
- City of Alexandria (VA) Fire Department Collapse Rescue Team
- Military District of Washington (Army Corps of Engineers group).

At the start of the operation, the USAR teams believed the chance of finding survivors was high because the Pentagon's floors and walls collapsed in a way that created many voids. In the past, USAR Teams had rescued people up to 16 days after a collapse. To search the voids however, the fire and smoke had to be cleared first.

Capt. Collins said the overall emergency operations at the Pentagon had since been deemed a "classic," with all levels of government and all agencies involved properly handling their responsibilities. But like all emergency personnel responding to the Pentagon, the USAR teams had to adapt their operations to a difficult environment. First, the arrival of the IST was delayed by 1 day due to the Federal Aviation Administration's air travel restrictions after the attack. Once the operation was under way, the USAR teams had to alter some of their activities because the entire area was a crime scene under investigation by the FBI. Also, the military decided that only military personnel would handle the bodies of the fatalities. Despite this unusual environment, the experienced teams that were assigned to the Pentagon correctly estimated that they would complete their work in 14 days.

Summary and Analysis

This session provided an overview of the USAR activities at the Pentagon attack site. From the information presented, it appears that the USAR teams performed well and did not experience problems due to poor communications. This assessment is consistent with the findings of the investigation performed by the PSWN Program.

2.4 World Trade Center Attack: Lessons Learned During Federal Support to the Fire Department of New York

Synopsis

This session reviewed the USAR operations conducted by FEMA at the WTC after the September 11, 2001, terrorist attacks.

Presenter Information

Harold Schapelhouman is a captain with the Menlo Park Fire Protection District and is a team leader with California Task Force 3 (CA-TF3). CA-TF3 is one of the 28 FEMA USAR teams.

Presentation Overview

The September 11, 2001, terrorist attack at the WTC and the resulting collapse of the two main towers required extensive USAR operations. This presentation provided a review of those

operations and the difficulties they encountered, and a comparison with the operations at the Oklahoma City disaster site.

During the collapse of the towers, the FDNY lost most of its USAR resources and capabilities because many trained personnel and equipment were lost in the collapse of the WTC towers. The need to address this loss was quickly identified, and FEMA established an USAR team off site from the WTC. CA-TF3 was split to provide the city with an USAR capability, provide a backup to USAR resources at the WTC, and to ensure that another team could quickly mobilize in case of more terrorist attacks.

After the WTC towers collapsed, thousands of qualified and unqualified personnel responded to the scene. The initial efforts of these personnel were unorganized and ineffective because they lacked a proper command structure and technical expertise. Often, after removing debris to search an area, the debris that had been touched by people was only moved to another area of the site, and not moved off site. This hampered the search by the canine teams because the dogs could not differentiate the scent of people working above the rubble from those trapped below.

In addition to the organizational problems, there was also a problem dealing with commercial vendors who went to the site and offered their equipment. Many vendors offered to provide their wares without cost, while others made that claim but later submitted bills for their expenses. Some vendors sent equipment that was difficult, dangerous, or inappropriate to use for those operations. Many commercial vendors even used the response effort as an opportunity to do marketing, i.e., providing the equipment so that they could claim their product was “used by professionals in the rescue efforts at the World Trade Center.”

Another problem discussed was the health effects of working at the site. Captain Schapelhouman reported that tests of the air at the site detected concrete, glass, silicon, iron, copper, zinc, and diesel fuel. The long-term effects of exposure to these materials was unknown. He said health impacts were beginning to manifest themselves in the form of pneumonia, bronchitis, and a persistent cough. Mental health impacts were beginning to manifest themselves in the form of nightmares, visions, and reliving the event through associating sights and smells encountered since the response.

Captain Schapelhouman noted that communications was a particular problem for rescue workers. The NYC communications infrastructure was lost in the collapse and fire. USAR Teams working below grade did so without any radio contact with teams working at the street level.

Captain Schapelhouman compared his team’s experiences during the Oklahoma City and WTC rescue and recovery operations. The WTC disaster site was much larger than the one at Oklahoma City, and the buildings at the WTC were reduced to very small pieces of steel, concrete, and glass. Similarly, human remains were also reduced such that relatively few were found. Finally, he said, the operation in Oklahoma City had a clear transition from rescue to recovery, but the WTC operation was still a non-stop rescue operation.

Synopsis and Analysis

This presentation reviewed the USAR operations performed by FEMA in response to the attack on the WTC on September 11, 2001. Several key problems were discussed and poor communications was identified as a significant problem. It is clear that the scope and magnitude of the attack destroyed some infrastructure and that contingency communications may not have been available.

3. EMERGENCY MANAGEMENT RELATED SESSIONS

The following sections provide detailed reports on the sessions related to public safety emergency management—

- Integrated ICS, IMS, and EOC for Effective Disaster Management
- Parade Command: Successful Management of High Capacity Events
- Tunnel Fires and Other Railroad Risks.

3.1 Integrated ICS, IMS, and EOC for Effective Disaster Management

Synopsis

Two sessions (combined to create this report) encouraged public safety agencies to merge the varying ideas and concepts of managing a disaster into a smooth, seamless, and coordinated effort. Disaster responses would be more effective when all participating agencies understand what to expect and how their roles would be managed.

Presenter Information

Michael Bryant is an assistant chief in the Los Angeles County Fire Department. Marcus Aurelius is the emergency management coordinator for Phoenix, Arizona. Decker Williams is a division chief in the Phoenix Fire Department and a FEMA USAR team member.

Presentation Overview

The session provided an explanation of why law enforcement agencies should consider operating more like firefighting organizations. The presenters also gave a thorough description of the Phoenix Fire Department's incident management system (IMS), a typical unified command, and an emergency operations center. They provided a clear description of how the fire service managed major emergency incidents.

Chief Bryant began the presentation by describing the differences between the emergency management approaches of law enforcement and fire service organizations. Historically, in incidents drawing both types of agencies together to respond, the fire service had been better organized. The fire service understood the value of breaking down incident management into smaller segments to be handled by ancillary officers who remained responsible to a central authority. With recent challenges, including the terrorist attacks of September 11, 2001, law enforcement had begun to consider adopting a command or management system to provide more effective operations. Mr. Aurelius noted that as law enforcement began to develop a system, the final design should mirror the fire service systems as much as possible. This would provide a clear picture of what each agency could expect of the others, thus reducing confusion, promoting teamwork, and improving communications.

Chief Williams provided an example of such a system, used to manage incidents and provide a reasonable span of control for the person in charge of the incident. He defined span of

control as the number of people or functions that an individual could effectively manage. In public safety, the effective span of control was considered to be 5–7 persons or functions. Derived from the system used in the Phoenix Fire Department, a central figure served as incident commander (IC), with other personnel managing the functions of operations, planning, administration, logistics, and safety. These positions were commonly referred to as “OPALS.” The acronym helped ICs recall the functions that should be delegated when appropriate. The positions and roles of the Phoenix Fire Department incident management system were defined as—

- **Incident Commander**—The IC should first assume, confirm, and position. This means that the person assumes the role of IC, announces it to all personnel assigned to the event, and makes his/her location known. The IC should evaluate the situation presented to determine—

- What do I have?
- What has been done?
- What needs to be done?

The IC should then assess resources to determine—

- What resources (equipment and personnel) are on the scene?
- What resources are still en route?
- What resources are still needed?

The IC should develop an incident action plan (IAP) to define the strategy and tactics necessary to implement the strategy. The IC should establish an incident organization that provides delegation of authority to execute the tactics necessary to support the strategy. The four primary functions that may be delegated would be OPALS. Finally, the IC should evaluate the progress of the event to make decisions as to whether to—

- Continue command and retain authority to execute the IAP
- Transfer command through an orderly transition to someone of higher authority
- Terminate command because the strategy has been achieved and no further management intervention is needed.

- **Operations Officer**—The Operations Officer executes the IAP, which is prepared by the IC to define the strategy and the tactics to be used to handle the event. The Operations Officer then defines the tasks that must be completed to accomplish the tactics and support the strategy.
- **Planning Officer**—The Planning Officer aids the IC in the development of the IAP and forecasts outcomes. The Planning Officer also identifies ongoing actions that may be needed to adjust the IAP by constantly assessing whether the situation is improving or worsening as time passes. The Planning Officer makes recommendations to the IC

for adjustments to the plan to meet that situation and then evaluates the impact of any adjustments made.

- **Administration Officer**—The Administration Officer tracks costs, controls expenditures; provides documentation of actions taken; and provides liaison with other agencies. The Administration Officer also works with legal authorities to protect the agencies involved in the response from incurring excessive liabilities for their lawful actions and accumulates information that can be incorporated into a critique of the operation later.
- **Logistics Officer**—The Logistics Officer provides supplies for the event response, locates resources that are requested, and works to meet the needs of the IC while cooperating with the Administration Officer to accomplish tactics and tasks. Logistics Officers in Phoenix are also responsible for rehabilitating personnel who need rest, which is a variation on the normal practice used elsewhere of placing this task under the Operations Officer.
- **Safety Officer** —The Safety Officer focuses on the impact of the IAP (strategy and tactics) on the safety of operating personnel. The Safety Officer should act to minimize risks to personnel and equipment by consciously examining the practices observed on the scene and making recommendations to the IC on changes that should be made. In the event that a serious and imminent risk is identified, the Safety Officer has the authority to stop the operation in order to prevent injury or death, then work with the IC to establish a safer approach before resuming work. Establishing safety as a function for leadership directly under the IC is a practice also unique to Phoenix; otherwise, Safety Officers are normally acting in an advisory capacity.

Chief Williams said that another method to improve emergency operations was to establish a unified command (UC). While the fire service enjoyed a long-standing practice of sharing resources, law enforcement did not. This lack of resource sharing was mainly due to the limits imposed by law on jurisdictions. To alleviate this problem and facilitate efficient use of resources during emergencies, UC should be used. Chief Williams discussed some of the benefits of UC, including—

- Providing coordination, organization, and control of resources toward a common goal
- Establishing a process for communications between agencies for better decision making
- Optimizing resources for emergency operations, especially when all agencies involved in the incident used the same type of incident management system.

Chief Williams added that while UC provided a process for better communications, it did not provide a means for communications. He said that this area had been and continued to be the weakest link in managing a disaster with a multiple agency response. Chief Bryant agreed, and said that on occasion, dividing an incident scene into small areas could make the scene more

manageable while aiding in communications (due to less distance between personnel working in those smaller areas). Chief Williams and Mr. Aurelius both noted that in Phoenix, communications interoperability was not a problem for the city or its immediate neighbors. Chief Bryant did not discuss interoperability in the greater Los Angeles region. Mr. Aurelius discussed the availability of crossband repeaters as a viable option for improving interoperability. Chief Bryant did add, however, that on large wildfires in the southern California area, interoperability was provided by distributing compatibly programmed radios to arriving police officers and firefighters at the staging area or the command post.

Building on the success of UC, an Emergency Operations Center (EOC) could be used to provide interagency coordination and executive decision making for managing disaster response and recovery. An EOC should be centrally located, allowing key government officials to easily participate. An EOC should handle policy direction, operations support, and situational assessment, specifically focusing on four main tasks—

- **Facility Preparation**—Keeping the facility stocked with supplies, ready for occupancy, and assuring that all telephones, radios, and other communications and support equipment were functional
- **Activation**—Opening the EOC and starting all equipment to prepare for use by responding officials and representatives
- **Reporting and Record Keeping**—Documenting the information received, the decisions made, and the notifications initiated; recording all expenditures; and ensuring adequate reporting information was retained to prepare historical and official documentation for legal actions, billing, and reimbursement
- **Facilitation and Consultation**—Assuring that the proper representatives and agencies were in attendance at the EOC; coordinating information flows, updates, and briefings; providing media management, and assisting officials in their decision-making efforts by providing information, gathering facts, challenging plans, and asking hard questions to provoke long-term thinking.

Summary and Analysis

The presenters promoted the use of a common IMS that would standardize the management of emergency operations performed by multiple public safety organizations from multiple disciplines. While the standard adopted by the United States Fire Administration (USFA) was discussed, the presenters did not specifically endorse it. Because individual localities develop unique systems, communications interoperability may be more difficult to achieve. They explained the basics of the IMS, and this information could help localities improve their operations and communications in many ways. However, it would be preferable if emergency management organizations adopted a common standard that could facilitate even greater operational effectiveness and wireless communications interoperability.

3.2 Parade Command: Successful Management of High Capacity Events

Synopsis

This session addressed planning for emergency service delivery at large public events and was based on the experiences of the presenting staff when they planned for the Fiesta Bowl parade, the 2001 World Series, and the Super Bowl.

Presenter Information

Marcus Aurelius is the emergency management coordinator for Phoenix, Arizona. Decker Williams is a division chief in the Phoenix Fire Department and a FEMA USAR team member.

Presentation Overview

The session reviewed the strategy and resources used by the City of Phoenix for dealing with large public events. Recent public events that required significant planning, equipment, and personnel were the Fiesta Bowl parade, the 2001 World Series, and the Super Bowl. The city's strategy for dealing with these events focused on three main goals—

- Caring for the ill and injured
- Confining and mitigating fire and criminal activity
- Protecting the providers of public safety services.

An IAP lists the tactics to be used to accomplish these goals.

The presenters stated that to implement the IAP, the Phoenix Fire Department (PFD) deployed a variety of resources, including—

- Paramedic engines
- Ambulances
- Bicycle-based emergency medical services (EMS) teams
- Cart-based EMS teams
- Mobile command posts
- Rollerblade-based EMS personnel.

These resources were assigned to specific posts or given specific areas to cover. A dispatcher in the communications center was assigned to monitor all event radio traffic and to track the activities of the mobile command post to prevent duplication of efforts. This also assured that the 911 center and the mobile command post were coordinating their activities. The City of Phoenix also integrated an IMS into the IAP.

Summary and Analysis

The presentation reviewed the methods used by the City of Phoenix to prepare for and support large public events. The city's approach includes a comprehensive strategy that has been successful during several major events.

3.3 Tunnel Fires and Other Railroad Risks

Synopsis

This presentation reviewed the firefighting operations during a major tunnel fire in Baltimore, Maryland, on July 18, 2001.

Presenter Information

Donald Heinbuch is acting chief of operations for BCFD.

Presentation Overview

This session reviewed the BCFD response to the tunnel fire on July 18, 2001. Specific issues addressed were wireless interoperability, command and control, the response timeline, firefighting highlights, and lessons learned. The session included slides, video, and group discussion. From the information provided, it was clear that this was a major event for the BCFD and they performed very well.

The fire started as a result of a train derailment at 3:00 p.m., in the heart of downtown Baltimore. Chief Heinbuch indicated that the cause of the derailment was still unknown and was under investigation by the National Transportation Safety Board. The train contained several hazardous chemicals and derailed in a 1.7-mile long underground tunnel. Due to the location and source of the fire, the BCFD had a very difficult time extinguishing it and the city's downtown area was seriously impacted. It took 6 days to remove all the train cars and extinguish the fires.

According to all reports from the incident, the radio system worked very well. Chief Heinbuch described the BCFD system as an 800 MHz, Motorola, digital, trunked system. It was purchased using city bonds in 1997 and cost the city \$60 million. This major event was considered the first full test of the system. Dynamic regrouping and talk-around features were used during the response. Despite the heavy traffic loading, no busies were reported and 24 talk groups were used to communicate with a variety of police, public works, EMS, and neighboring fire departments. Interoperability with neighboring departments was accomplished via system patches.

Summary and Analysis

This session provided a thorough review of a major tunnel fire in downtown Baltimore, Maryland. The incident was successfully managed by the City of Baltimore and the public safety community. The wireless communications were specifically mentioned as an effective resource

during the operations and communications between the numerous public safety organizations was not a problem. Multiple talk groups and patches were used to conduct communications, and command and control. The response of the public safety community in Baltimore and their use of their technologically advanced wireless network may demonstrate best practices that the PSWN Program may want to further document.

4. WIRELESS TECHNOLOGY RELATED SESSIONS

The following sections provide detailed reports on the sessions related to wireless technology—

- Fire/EMS Communications: Stop Getting Stepped On
- Review of the Exposition
- Technology Showcase.

4.1 Fire/EMS Communications: Stop Getting Stepped On

Synopsis

This session reviewed the efforts of the APCO and Nextel to eliminate interference between public safety wireless communications and commercial wireless service providers.

Presenter Information

RoxAnn L. Brown is a consultant for the Washington County Consolidated Communications Agency (WCCCA) and is also the director of APCO Project 39. Sandy Baer is a public relations representative for Nextel.

Presentation Overview

This session was very short and very little information was provided. The agenda described this session as an opportunity to learn about the “cooperative solutions being found” to address the “growing national issue of wireless devices obscuring vital public safety radio traffic.” Rather than a discussion of interference and methods to reduce it, it was primarily a presentation for garnering support for Nextel’s recent white paper submitted to the Federal Communications Commission (FCC). The first speaker, Ms. Baer, gave a very general overview of the white paper. She said the white paper recommended reallocation of large parts of the radio frequency spectrum. The reallocation would greatly benefit Nextel and also might be very beneficial to the public safety community. Specifically, if the FCC were to reallocate the spectrum as recommended by Nextel—

- The public safety community would have more spectrum in the 800 MHz band.
- The new public safety spectrum would be contiguous, eliminating the interference related to interleaved channels between public safety systems and commercial systems.
- Nextel would give the public safety community up to \$500 million to defray the cost of moving its systems to the new frequencies.

Following Ms. Baer, Ms. Brown provided a review of APCO Project 39 and how APCO viewed the Nextel white paper. She described APCO Project 39 as the group created by APCO

that was attempting to address the interference problem. Under her leadership, Ms. Brown indicated that the group had established a very aggressive 2-year timeline focused on eliminating interference between public safety and commercial wireless systems. To date, APCO Project 39 had made a comprehensive list of interference issues across the Nation. The primary cause of the problem was intermodulation interference. The solution, according to APCO Project 39 was to provide greater separation between public safety and commercial systems. According to Ms. Brown, APCO had a “cautious, yet optimistic” view of the Nextel white paper. From APCO’s perspective, it was the first recommendation that could fully address the problem, and Ms. Brown recommended that those present should contact their elected officials to encourage them to support the process of finding a solution. According to Ms. Brown, the primary issue to be resolved from APCO’s point of view was whether \$500 million was enough to pay for the transition. Ms. Brown mentioned that APCO was seeking additional funding support from other commercial service providers.

Summary and Analysis

This session reviewed the activities of APCO Project 39 and highlights from a Nextel white paper related to interference between commercial systems and public safety wireless communications. APCO has made progress in fully evaluating the interference problem and has determined that the best solution for public safety communications is to move all public safety systems to one contiguous spectrum band. However, APCO is only evaluating the possibility of moving to contiguous spectrum in the 800 MHz band. Therefore, the APCO solution is different but very closely aligned with the Nextel white paper. The PSWN Program may provide input to this process by estimating the actual funding necessary to move public safety wireless systems to the new recommended spectrum band and determining whether the identified spectrum band is the most optimal one for the public safety community.

4.2 Review of the Exposition

Synopsis

The conference included an exhibition that provided a marketing venue for hundreds of vendors. This part of the report reviews the products related to public safety communications.

Exhibition Highlights

JPS Communications, Inc., displayed several products with which the PSWN Program is already very familiar. These products included—

- ACU-1000, a switch that can be used to interconnect a maximum of 24 channels and talk groups (24 is possible with 2 ACU-1000s)
- TRP-1000, a mobile switch, that packages the ACU-1000 and 10 different radios together to provide a transportable interoperability solution

- NXU-2, an interconnect device that can be used to connect computers and audio consoles to the ACU-1000 over a standard wide area network (WAN) or local area network (LAN).

Northrop Grumman Electronic Systems displayed their MobileVu Trunk Mount Computer and Display. The display and computer are rugged and can support most applications needed by law enforcement. Also, the computer has the capability to support a wireless LAN interface. Setcom Corporation and Sigtronics Corporation presented headset communications products that provide intercom and radio connectivity for all members on an apparatus.

Epic Marketing Company sells products from several manufacturers. They displayed a high band VHF, analog radio from Kenwood that Epic has sold to the California State Forest Service. The primary benefit of the Kenwood unit is its low cost and durability.

Day Wireless Systems provides a full suite of consulting and system design and implementation services. Their marketing at the conference focused on building interoperable metropolitan systems but the company seemed capable of building regional or statewide systems. They were quite conversant in the topics of interoperability and methods to link disparate systems.

Summary and Analysis

Representatives from several wireless communications companies presented their products and services. Most of the needs of the public safety community could be met by their products, and the vendor representatives were well prepared to discuss interoperability issues as they related to their products.

4.3 Technology Showcase

Synopsis

Two sessions (combined to create this report) reviewed some of the leading wireless communications technologies and management software tools.

Presenter Information

Richard Price is a suppression battalion chief in San Mateo County Fire Department, and the wireless data program he implemented was awarded the 2002 Mobile Master Award for Enterprise Deployments from *Mbusiness Magazine*.

In addition, numerous marketing representatives presented information about their individual products.

Presentation Overview

The two technology showcase sessions primarily served as a forum for information technology and communications vendors to market their newest products. Chief Price began the

session by explaining how his department was using handheld and wireless devices, and a variety of software applications to more effectively manage fire department operations and administration. San Mateo County Fire Department had pioneered many “bleeding edge” hardware and software products, and the chief said that a noticeable improvement had been made in command and control, and record keeping for training and maintenance. After explaining the benefits of implementing new technology, he discussed how each fire department had different needs and funding allowances. He recommended listening to the vendors to learn about the overall improvements in the industry. Then, after considering which capabilities would be most beneficial to their departments, he recommended department representatives should meet with a variety of vendors to find the one that provided the best service or product at the best price.

Representatives from four vendors, Palm, Inc., Compaq, Handspring, and Panasonic discussed their handheld computers. Although each product seemed very similar, there were standout features of each. The first vendor representatives to speak were from Palm, Inc. They discussed the history of Palm and of the handheld computer market, and Palm’s current product line. They described Palm’s most recent product offering, the i705, as a wireless handheld computer that connects to palm.net., a wireless, data only network that has coverage over 92 percent of the United States. With its computing power and wireless connectivity, the i705 could be used for many firefighting applications, such as—

- Remote reporting to incident command
- Remote tracking of the event from multiple locations
- Personnel Accountability Reports
- Scheduling maintenance and training.

Overall, the Palm seemed to act as an extension of the typical computer aided dispatch (CAD) system, with the advantage of being more mobile. Handspring presented a Palm-like product, the Treo, which had mobile phone capability. Therefore, the Treo could support the previously mentioned Palm applications with the advantage of mobile voice communications.

Compaq and Panasonic presented pocket personal computers (PC) that were similar to Palm devices with the primary exception that they operated on the Microsoft Pocket PC operating system. Therefore, many of the applications available for each were different. Unlike the Palm devices, the Pocket PCs could be connected to a variety of wireless networks. Panasonic’s products included a variety of rugged computers. They displayed three types of computers: a laptop, a “brick,” and a handheld. The brick was a computer designed to be mounted in an out-of-the-way place, separate from the monitor. The software applications available for the Panasonic computers were standard CAD and other public safety applications that could be used in the Windows operating system. The computers were specifically designed for industrial, public safety, and transportation users. The liquid crystal displays (LCD) were designed for use in the sun, provided touch screen functionality, and had programmable buttons around the display.

Two wireless services providers discussed how they could support public safety operations. The Sierra Wireless representative provided an overview of trends in commercial wireless data technologies. Five primary advantages to using commercial wireless data services were listed—

- Messaging could be accomplished more efficiently
- CAD information could be more effectively routed
- Database information could be accessed in the field
- Automatic vehicle location systems could be implemented
- Separate data system would remove traffic from the voice network.

The Sierra Wireless representative noted that many public safety agencies attempted to implement data networks on top of their voice systems or build separate systems. It was his opinion that this approach was far more costly and less efficient than leasing from commercial service providers.

AT&T Wireless provided a presentation similar to Sierra Wireless', but focused more on the specific applications that were available to the public safety community. AT&T Wireless also discussed how their service was provided over a network that was completely separate from the network used by public subscribers. The AT&T wireless representative listed several agencies that were already using their system and recommended a three-step process for any fire department considering the service—

- Form a pilot team within the department that will test the service and applications
- Meet with other departments that have used the service
- Make provisions in the budget for a phased implementation.

The final vendor presentation was from RadioTrac Inc. RadioTrac offered a product that could be used to locate a person in distress. If the person in distress depressed the emergency button, the device would signal for help over the existing radio system. The device was compatible with any LMR system. In addition, the device used a Global Positioning System (GPS) input to provide accurate location information.

In addition to introducing the vendors and providing context to the various presentations, Chief Price also discussed the specific achievements of his department. He said the department had outfitted a command vehicle, which was on display, and was quite advanced for the firefighting service. The vehicle contained—

- A Panasonic Toughbook (up front) with connectivity through the AT&T Wireless network (therefore it could be removed from the vehicle and would remain connected)
- A Panasonic monitor in the rear of the vehicle that was a slave to the front seat Toughbook
- Wireless LAN (802.11b) network connectivity which could link the command vehicle with other vehicles at the scene, providing broadband connectivity needed for remote video monitoring
- Printer/Fax
- GPS navigation system

- Four 800 MHz, Motorola radios
- A separate power system for the electronics.

In addition to the command vehicle, Chief Price also discussed his department's use of application service providers (ASP). He said an ASP provided hosted applications that could be accessed through the World Wide Web. He said San Mateo County Fire Department used ASPs to record and track training and maintenance.

Summary and Analysis

This session provided information about many newer technologies being used by fire departments. It is clear that manufacturers of cutting-edge technology highly value the public safety marketplace. San Mateo County's use of 802.11b wireless LAN technology is particularly interesting because it transmits on the unlicensed, 2.4 GHz frequency band. Although it appears that their operations are not dependent on those networks, the use of unlicensed frequencies for critical public safety functions could be a major problem because as more wireless LANs are activated, interference and reliability will become issues. The PSWN Program should investigate this potential issue further.

5. FIRE SERVICE RELATED SESSIONS

The following sections provide detailed reports on the sessions mainly focused on fire service related issues—

- FEMA's Assistance to Firefighters Grant Program Workshop
- Fire-Based EMS: Critical Issues, Critical Answers
- Los Angeles City LODD: 28 Life-Saving Changes
- Close Call Reporting
- Heartbreak Hotel: Life and Death at the Palomar
- Managing Change in a Traditional Fire Department.

5.1 FEMA's Assistance to Firefighters Grant Program Workshop

Synopsis

This session provided an overview of the FIRE Act grant program and the application process.

Presenter Information

Josh Batkin is a program analyst in the USFA Grants Program Office in Washington, DC. Tom Harrington is a program specialist in the USFA Grants Program Office in Washington, DC. John Cook is a consultant for the USFA Grants Program Office in Washington, DC.

Presentation Overview

This workshop provided a complete overview of the grant program's history, the program's current structure, the application process, and best practices for winning FIRE Act grants. It was reported that FEMA, through its USFA, would provide \$360 million in grants to local fire departments in 2002. This money would be provided through the Assistance to Firefighters Grant Program, commonly known as the FIRE Act grants program. During 2001, the program's first year, it provided \$96 million in grants. However, the program received requests for more than \$3 billion. Due to the demonstrated need of the firefighting community, the Congress has increased funding for the program to \$360 million.

Many lessons were learned last year about how to most effectively administer the program and distribute the funds to the appropriate fire departments. To improve the program, many changes were made to the program that would make it easier for local fire departments to apply and be approved for FIRE Act grants. Those changes included—

- The application process would be completely Web based.
- FEMA would provide training in a variety of methods (i.e., Web based, conferences, training seminars)

- Four functional categories of grants would be used (i.e., Fire Operations and Firefighter Safety, Fire Prevention, Emergency Medical Services, and Vehicles).

Some specifics about the program's financial management were reviewed. It was stated that every grant had a 10 percent matching requirement on the part of the receiving fire department. However, the matching funding was not needed until the fire department actually wanted to spend the grant money. Also, the 10 percent matching funds could come from any source, including local government, the state, or possibly a private partner of the fire department. It was reported that the \$360 million in grants this year would be distributed as follows—

- At least 5 percent would be allocated to Fire Prevention Programs.
- No more than 25 percent would be allocated for the purchase of vehicles.
- There would be no cap on funding in the Emergency Medical Services or Fire Operations and Firefighter Safety categories.

The application process was also reviewed. It was reported that applications for 2002 were due on April 1, 2002. The applications would go through two main reviews. The first review would check the application to ensure that it fit one of the four categories. The second review would be a more thorough panel review where the applications would be ranked. The highest ranked applications would receive funding. The description of the specific scoring system was not provided. The panel members were professionals nominated by one of the nine major firefighting associations recognized by FEMA.

Some specific best practices were discussed for winning applications:

- Check to ensure that the request is for a basic need and fully complies with the rule that will be published in the Federal Register and on the Web site. "Basic need" means the program does not intend to fund major construction or create programs that are not firefighting related. Specifically, FIRE Act grants will not be used for counterterrorism or weapons of mass destruction response programs. According to the presenters, counterterrorism programs should be funded by the Department of Justice.
- Check to ensure that there is a direct link between the request and the fire department's ability to save lives. The application should clearly explain a specific deficiency at the fire department, how that deficiency is degrading performance, and how the requested assistance will solve the problem.

The presenters also recommended that the applicants should perform a community risk assessment and evaluate how well the fire department could meet the community's needs. The community risk assessment should include issues such as growth, population, type of development, special hazards (e.g., factories and airports), and information about long-term trends or at least 5-year trends. Along with the description of the community, some discussion of the community's finances should be provided. The presenters said that the review panel would be

interested to know why the needs of the fire department were not being met with community taxes, private/public partnerships, or state grants.

In addition, use of a grant writer was not viewed as a good thing by reviewing panels. The presenters said the program wanted as much money as possible to go directly to the specific needs of the fire departments. Therefore, the program did not want any of the money to go to pay for a grant writer. In general, the presenters said that all that was necessary was for the grant applicant to have the application edited to ensure that the narrative was clear, concise, and persuasive. As long as the published rules were understood and followed, and the narrative was easy to understand, the application would stand on its merits in comparison with the other applications. Therefore, a grant writer was an unnecessary cost.

Some information was provided that related directly to the funding of public safety communications. Because the program's objectives were to meet the basic needs of local fire departments, the program would not provide grants for building communications towers or purchasing base stations or repeaters. That type of equipment was not considered a basic need. However, the program would consider funding portable and mobile radios, and pagers. Also, there was some benefit if the applicant showed greater impact of the assistance. For instance, if several fire departments were building a shared system, or linking multiple system together, the program might be more likely to fund the mobile and portable radios of each department on the shared system.

Summary and Analysis

This session provided a thorough review of FEMA's Fire Act Grants and how local fire departments should apply for them. The presentation was very thorough and should provide the information necessary for many local fire departments to win funding for new equipment. The PSWN Program can use this information to help local fire departments meet some of their wireless communications needs because Fire Act Grants can be used to purchase some types of LMR equipment.

5.2 Fire-Based EMS: Critical Issues, Critical Answers

Synopsis

This session discussed the evolution of EMS in the United States during the last two decades. The presenter focused on the increasing role that fire departments were taking in delivering EMS and projected the next challenges the fire service would face in this area.

Presenter Information

Mr. James O. Page, Esquire, has been affiliated with the fire service since 1957, when he joined the Los Angeles County Fire Department. He has been a nationally known leader in the EMS field since the 1970s. Mr. Page has also been a licensed attorney since 1971.

Presentation Overview

Mr. Page discussed the humble beginnings of EMS in the United States and reviewed the most significant developments in the last 20 years. Some of the highlights included—

- In 1983, the American Ambulance Association (AAA) adopted a Commission for Accreditation of Ambulance Services. This was the first step in raising performance standards in the industry since the introduction of emergency medical care training for field providers.
- In 1985, Automatic External Defibrillators (AED) were developed, providing people with and without medical training a better ability to save lives.
- In 1989, local fire departments began to provide emergency medical care as a part of their daily routine.
- In 1990, violence against EMS providers, including murders, became a major problem. This development resulted in changes to the way that calls known to involve violence were answered.
- In 1996, hospitals began using “re-routes” as a means of shuffling away excessive numbers of patients from facilities without available bed space.
- In 1997, technology improved communications for the EMS industry. Cellular telephones and personal digital assistants (PDA) began to see use in EMS for contacting hospitals, relaying patient information, and documenting assessments and care.

Mr. Page advocated that fire departments prepare to take on more responsibility for providing EMS because private ambulance services were in decline. As examples of the continuing problems in the private ambulance industry, he cited the experiences of a college EMS education program in California. This program, in existence since 1975, identified specific problems that continue to plague the industry—

- Wal-Mart pays new employees more money than trained paramedics receive when they start in the private sector.
- Paramedics are treated as a disposable commodity in the private ambulance industry.
- Enrollment in the college EMS education program has been decreasing. From average class enrollments of 50, the number has dwindled to 13.

To further illustrate the crisis facing EMS, Mr. Page noted that in the hospital industry, health care reforms had caused some significant problems that had impacted EMS:

- There were 1,300 fewer hospital emergency departments in the United States in 2001 than there were in 1990.
- There were 30 million more patients in need of bed space in hospitals annually during the same period of time.

Mr. Page concluded by noting that it was not clear what could be done nationally to address these problems, but there were two factors that would continue to make the situation worse. First, the U.S. population was continuing to age, which would have a direct impact on the demand for EMS. Second, financial troubles continued to adversely affect the private sector.

Summary and Analysis

This session reviewed the significant changes experienced by the EMS during the last 20 years. While great advancements have been made in the level of care that patients receive, the same level of attention has not been given to problems that service providers encounter. If the private sector cannot improve the providers' status, public agencies need to be ready to take over providing EMS to their communities.

5.3 Los Angeles City LODD: 28 Life-Saving Changes

Synopsis

This session reviewed the changes that were made to the Los Angeles City Fire Department after the line of duty death (LODD) of Captain Joseph C. Dupee in 1998.

Presenter Information

John Nowell is a battalion chief and a 24-year veteran of the Los Angeles City Fire Department. Stephen Ruda is a 22-year veteran and captain in the Los Angeles City Fire Department. He received the California State Firefighters Association Medal of Valor, and he holds two commendations for bravery, the department's second-highest award for valor.

Presentation Overview

This session focused on the causes of, lessons learned from, and changes made at the Los Angeles City Fire Department in reaction to the LODD of Joseph Dupee. Dupee was among the firefighters called to a fire at 2:00 a.m. on March 8, 1998. The fire was at a dog food manufacturing facility, a single-story 60-foot by 120-foot building. At some point during the firefighting effort, Dupee ordered his men to evacuate the building. During the evacuation, Dupee became separated from his men and died in the fire. The Dupee LODD was the first at the department in 14 years, and both the LODD and the department were investigated. This session presented the major findings from that investigation.

The investigation identified many direct and indirect causes for Dupee's death. Some of the major issues identified were that there was no reason for the firefighters to enter the building.

There were no lives threatened by the fire and therefore no firefighter's life should have been risked during the firefighting effort. After entering the building, Dupee became separated from his team, and a roof collapse prevented him from exiting. Finally, ineffective radio communications seemed to hinder the response to his disappearance. There was a general lack of radio discipline and no set method for declaring a personnel emergency. However, according to the investigation, at no time did Dupee request assistance. Therefore, even with better radio communications, this incident might have occurred exactly as it did. There were other indirect and contributing factors identified as well that were used to develop lessons learned. Tragically, a recent fire department fatality in Phoenix, Arizona, was found to have many of the same causes as Dupee's death. Eighteen lessons learned were specifically identified and should apply to all fire fighting efforts—

- Ensure that crew members maintain actual physical contact in severe conditions
- Use proper entry equipment during a rescue attempt
- Use entry equipment properly to expedite the rescue
- Only attempt fire suppression if adequate suppressant is available
- Use a commonly understood phrase to call for help in the case of an emergency
- Raise the humidity in the fire space to reduce the possibility of flashover
- Do not use excessive hose that will cause tangling and prevent evacuation
- Illuminate doorways that should be used for entering and exiting a structure
- Create as many escape routes as possible with ground and aerial ladders
- Establish an effective and centralized command structure
- Provide the necessary personnel and equipment to the command post
- Assign staging areas and use them
- Provide procedures and training for dealing with emergency situations
- Assign a separate radio channel or talk group for rescue teams
- Conduct Personnel Accountability Reports (PAR)
- Create effective Rapid Intervention Teams (RIT) for every alarm
- Follow the mission priorities of protecting life, property, and records
- If no life is at risk, no firefighter should risk his life
- Train as if your life depends on it, because it does.

Summary and Analysis

This session provided information about the LODD of a firefighter in Los Angeles. His death was caused by many factors that the department has used to develop improved operational procedures. Although the wireless communications system used by fire department was technically sound, several improvements were made to the way the department uses its system.

5.4 Close Call Reporting

Synopsis

This session focused on the benefits of sharing firefighter mishap information, commonly known as close calls, in a non-punitive setting.

Presenter Information

Gordon Graham is a 27-year veteran of California law enforcement and public safety. He was a practicing attorney and regularly speaks about civil liability, job-based harassment, professionalism, ethical decision making, and risk management.

Presentation Overview

This session served as an introduction to the topic of risk management and how it can be used to save the lives of firefighters. Mr. Graham provided a basic example, the Smith System, of how risk management was based on systems theory. He said the Smith System was a set of basic rules for driving a car and was used to conduct automobile training. If learned and followed, the Smith System prevented almost all auto accidents. The Smith System was a simple example that illustrated how risk management was based on systems theory. Mr. Graham encouraged the attendees to think about their operations from a systems perspective and then develop rules and procedures that would prevent mishaps.

Much of Mr. Graham's presentation focused on how to create rules and procedures that would prevent firefighter fatalities. One way to understand the operational system and develop procedures for avoiding mishaps was to identify and catalog mishaps and mistakes. For every death, there were many more mishaps and mistakes. The goal of risk management was to identify and learn from mistakes and mishaps before one of them caused a fatality. Unfortunately, most organizations only learned from deaths because the personnel were afraid of discussing their mistakes in front of their peers and supervisors. Mr. Graham's suggestion for eliminating this problem was to create a non-punitive mishap reporting process. The process should record mistakes and mishaps from personnel anonymously. He said that one successful attempt to use this approach on a very large scale was www.firefighterclosecall.com.

Summary and Analysis

This session provided a high-level review of operational risk management and related systems theory issues. Firefighters are using these ideas to implement better procedures and prevent fatalities.

5.5 Heartbreak Hotel: Life and Death at the Palomar

Synopsis

This session provided an overview of the response operations of the Los Angeles City Fire Department to a major fire at the Palomar Hotel.

Presenter Information

Steven Ruda is a 22-year veteran and captain of the Los Angeles City Fire Department. He was the Public Information Officer for the Los Angeles City Fire Department at the time of the Palomar fire.

Presentation Overview

This session provided an overview of the rescue and firefighting operations at the Palomar Hotel during the early morning hours of August 16, 2001. Captain Ruda said the Palomar Hotel, a 4-story building in Los Angeles, California, was used for subsidized housing. The building had a number of fire protection features, including—

- Smoke detectors
- Sprinkler-fitted hallways
- Exterior dry standpipes
- Fire escapes
- Fire doors protecting the stairwells.

At 3:42 a.m., the Los Angeles City Fire Department responded to the report of a fire at the Palomar Hotel with six engines, two ladder trucks, an ambulance, and a battalion chief. The first units to arrive at the scene performed rescue operations because the fire was very advanced and many residents were at the windows calling for help. The residents were trapped by the heavy smoke and intense heat of the fire. The fire was started by at least 1 arsonist who used 40 gallons of gasoline to set the fourth floor hallway and stairs on fire. Despite the rescue operations, six occupants were injured, and two were killed. There were also two firefighters injured who required hospitalization. One of the two fatalities occurred because a mother lost her balance and fell four stories while passing one of her children to a firefighter on a ladder. The other fatality was believed to be one of the arsonists.

The Los Angeles City Fire Department identified several close calls that occurred during this event—

- The sprinklers were overwhelmed by the volume of fire.
- The fire attack was delayed because multiple rescues were needed immediately.
- The selected hose lines were too small for the intensity of the fire, especially since the attack had been delayed and the fire continued to build.

- The delayed fire attack contributed to the collapse of a floor, dropping a firefighter from the fourth floor into the second floor, and requiring a rescue effort to be mounted.
- Each firefighter had an individual radio, which proved invaluable because three separate collapses trapped firefighters.
- Incoming units were transmitting unnecessarily, blocking the emergency communications of injured firefighters who were trying to call for help.

Summary and Analysis

This session reviewed the main activities of and lessons learned by the Los Angeles City Fire Department during the Palomar Hotel fire. LMR communications played a key role in the rescue and firefighting operations. From the close calls listed, it is clear that it is important that radio discipline is followed by all radio users and that all firefighters directly involved in the rescue or firefighting operations are provide a radio. These steps are necessary to ensure that a firefighter involved in a close call can call for help when necessary.

5.6 Managing Change in a Traditional Fire Department

Synopsis

Chief Mario Trevino provided an overview of his experience during his first months in a new department and his future priorities, as well as his thoughts on managing change in the San Francisco Fire Department.

Presenter Information

Mario H. Trevino, San Francisco Fire Department, was sworn in as chief in August 2001. He had been the chief of Las Vegas Fire and Rescue since 1996. He has 29 years of experience in the fire service, having previously served with the Seattle Fire Department, where he rose through the ranks to the level of deputy chief.

Presentation Overview

During this session, Chief Trevino explained the need for fire departments to accept change and discussed some of his personal experiences encouraging change during his career as a firefighter. As examples of how quickly our world was changing, he mentioned that high officials were now subjected to humiliating searches as they boarded airliners and U.S. Air Force fighter jets were scrambled “every time a plane flies near the Golden Gate Bridge.” In essence, he said, after the September 11 terrorist attacks, everything had changed, and everything would continue to change.

Contrary to this new environment, fire departments, especially old fire departments, were very tradition oriented. East-coast fire departments and some west-coast fire departments (i.e., San Francisco’s), drew much of their strength from their traditions. The need for change, and the

natural tendency of fire departments to stick to their traditions caused conflicts. Despite the adherence to traditions, Mr. Trevino effected many changes as chief of the Las Vegas Fire Department, such as—

- Uniform changes
- Equipment modernization
- Logo changes
- Disciplinary policy revision.

Chief Trevino said that he would need to make even greater changes at the San Francisco Fire Department.

To demonstrate the existing state of affairs in San Francisco, he showed “The Bravest,” a film about the San Francisco Fire Department. It was a documentary that showed several main operations—

- Apartment fire response
- Brush fire response
- Fire investigation
- Urban rescue
- Vehicular rescue.

The operations depicted were successful, but Chief Trevino said that there were many problems beneath the surface that needed to be solved.

Some of the major problems that Chief Trevino mentioned had a direct, negative impact on his ability to have a stable budget and were politically charged. He mentioned that in addition to the five unions, there were several race-based and other employee advocacy organizations. Therefore, it was very difficult to solve problems without disturbing at least some of the department’s employees or their advocacy organizations. Despite these difficulties, some of the changes that would be instituted at the San Francisco Fire Department were—

- Create a long-term plan that accounted for equipment and personnel
- Stop sick leave abuse
- Reduce the need for overtime
- Change the light-duty policy
- Improve the safety program
- Improve the integration of EMS into the fire department
- Improve the implementation of affirmative action and improve morale
- Expand training and purchase new equipment in response to domestic terrorism threats
- Provide more time for junior personnel to meet directly with senior officials
- Bring in a physical agility test that will improve personal fitness and performance.

Chief Trevino said these changes would be very difficult to enact because they had far-reaching impact on the fire department personnel and their traditions.

Summary and Analysis

This session was very informative regarding the difficulties of making improvements in tradition-oriented public safety organizations. The problems experienced by the local fire department in San Francisco may be similar to many other public safety organizations. Clearly, much of the chief's efforts to implement changes are focused on educating, dispelling myths, and building consensus. The difficulties the chief discussed may also be relevant to attempts to improve wireless communications.