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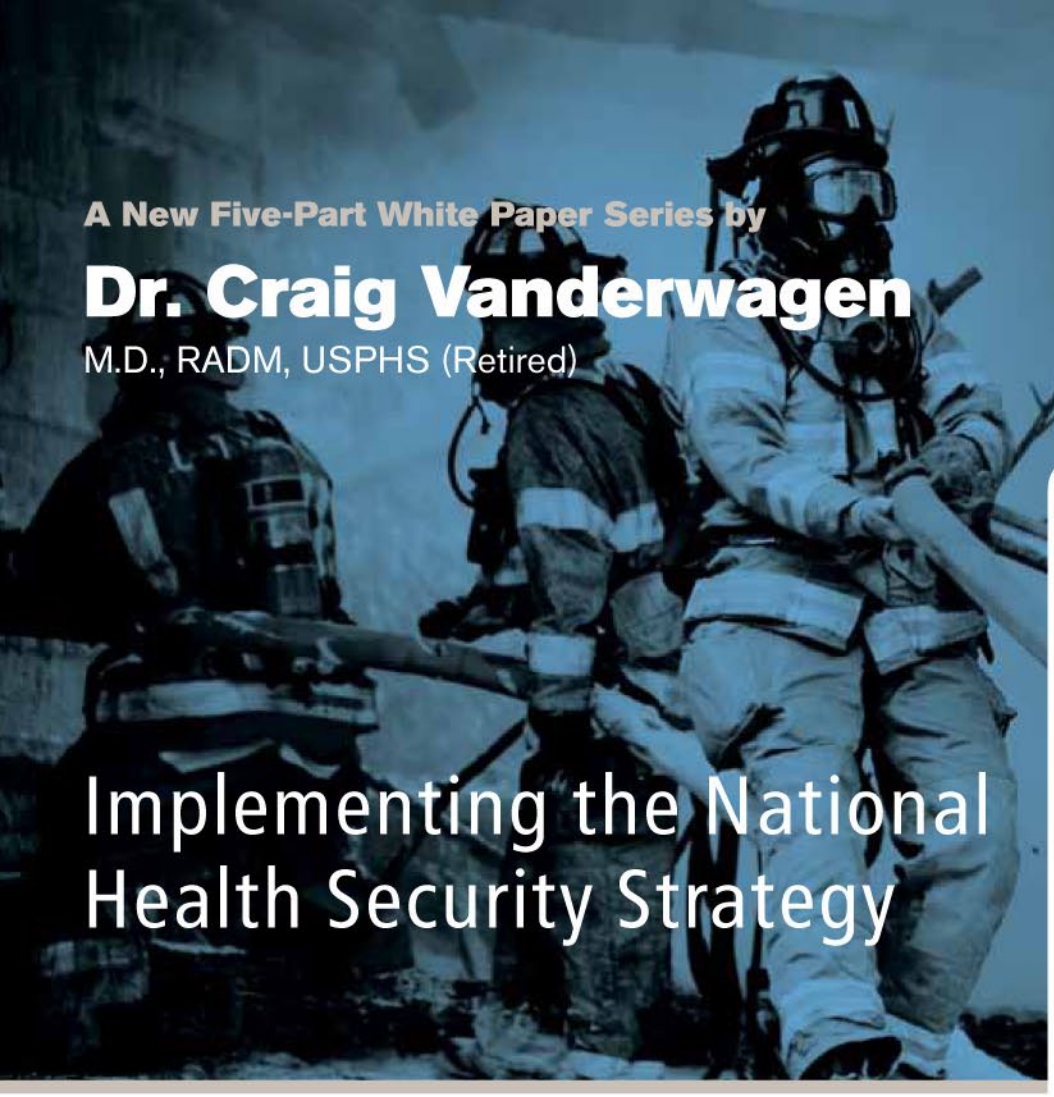

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From August 2006 until July 2009, **Dr. Vanderwagen** was the founding Assistant Secretary for Preparedness and Response (ASPR), U.S. Department of Health and Human Services.

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Editor's Notes

By James D. Hessman, Editor in Chief

From a cholera outbreak in London – in 1854 – to a 1995 fire at the Mary Pang Chinese Food Emporium in Seattle, to the tornado that ravaged Joplin, Missouri, earlier this year. Those are the chronological boundaries of the numerous topics covered in this month's roundup issue by eight distinguished writers, all of whom are career professionals in various specialized fields of emergency management, healthcare, and several related disciplines. The geographic boundaries are just as broad, ranging from Broward County, Florida, to Alberta, Canada, to Essex, England.

The topics covered are equally eclectic, starting with an overview by Bruce Clements of how recent technological advances have helped emergency responders and healthcare professionals – not only in the United States but in many other nations – save lives, reduce human pain and suffering, and protect and/or restore the infrastructure in many ways once impossible even to imagine. Among those advances are a few personal items such as wristbands – complemented and enhanced by a "breadcrumb" trail of firefighter-tracking devices, new campus-alert warning systems, and an additional two feet of sand (several miles of which the Army Corps of Engineers says are needed to ensure that the East Coast Protective Levee guarding three highly populated counties in Southern Florida is safe from another Katrina).

To begin with, though: The absolutely "must read" article in this monthly printable issue is Richard Schoeberl's insightful analysis of *United States v. Jones*, a major case now being considered by the U.S. Supreme Court, which in layman's terms boils down to what many Americans understandably believe is an impossible choice: the privacy of the individual citizen (as guaranteed by the Constitution); or greater security for the community, the city, the state, and the nation as a whole.

Also in this issue: Christina Spoons discusses the new PASS (Personal Alert Safety System) and other high-tech systems and devices now available to help firemen carry out their jobs and save the lives of innocent victims – including other firefighters. Ted Tully compares the huge number of lives lost and buildings toppled in the first few seconds after the killer tornado touched down in Joplin last summer, with the many lives saved and patients evacuated in New York City when the megalopolis was hammered soon thereafter by Hurricane Irene, an immensely more powerful weather "event." The difference, of course, was that Irene had been tracked for several days; the Joplin tornado struck without warning and concentrated its violence in a much smaller area of the earth's surface.

In addition: Joseph Cahill reports on recent advances in the early detection and treatment (specifically including vaccinations) of biological hazards; Omar Alkhalaf discusses the measurable improvement in patient transfers, evacuations, and post-transfer treatment made possible by the increased use of electronic medical records and other information; and Kay Goss digs into her encyclopedic store of knowledge to review numerous other technological and scientific advances made in recent years – and many more already discernible in the near future – that have made the world safer for all inhabitants.

As always, the ubiquitous Adam McLaughlin rounds out the issue with timely "States of Preparedness" reports on: California's latest statewide "ShakeOut" exercise (a healthy 9.4 million participants this year); the Florida Protective Levee plan mentioned earlier; a Robot Rodeo in Oklahoma to test and improve the skills of specialized bomb-disarmament teams; and the installation of an improved Campus Alert system at Virginia Western Community College – not too far, it should be noted, from the scene of the 2007 "Virginia Tech Massacre."

About the Cover: The barcode adorning the glabrous pate of the otherwise unidentified man on the cover may not be absolutely necessary to keep track of patients – and/or responders – in future times of crisis, thanks to a broad range of new "tracking and location" systems and devices now entering the resource inventories of emergency responders and incident commanders. (iStock photos; cover designed by Susan Collins)


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Emerging Technology Enables Mass Patient Evacuations

By Bruce Clements, Public Health

In August 2009, 55-year-old Wesley Stanko was admitted to Chinook Regional Hospital in Lethbridge, Alberta, Canada, after a fall. Stanko had suffered from a brain injury and struggled with declining health for some time, but prior to being admitted to the hospital was still able to live independently. At some point during his stay, he shuffled out of his room unnoticed, and a search was initiated soon after his disappearance. Some hospital staff did not believe he was in any immediate danger, and assumed that he had gone to visit friends. Almost three days later, he was found trapped – but alive – in a hospital mechanical room. He was subsequently moved to a long-term care facility where he could be monitored more closely in the future.

The following month in Essex, England, a similar but more tragic incident unfolded. An unnamed 53-year-old man suffering from breathing problems was admitted to Colchester General Hospital on the evening of 12 September. After he had been transferred to several departments throughout the night the hospital staff noticed, just before 4:00 a.m., that he was suddenly missing. The police were notified and a search was initiated. His body was discovered by a staff member the next morning in a locked section of the hospital's outpatient department.

These two stories underscore just a few of the challenges involved in tracking patients during nonemergency operations on a typical working day at almost any hospital. However, during times of emergencies or disasters, the challenges of patient tracking increase exponentially and require extensive internal and external coordination in the resulting chaotic environment. The degree of difficulty in patient tracking is largely determined, in most such situations, both by the unique challenges posed by each disaster and the acuity of each patient.

As illustrated in the examples cited above, patients are difficult to track without the right tools. In the past decade, disasters such as Hurricane Katrina have prompted the development, fortunately, of the more effective processes made possible by emerging technology. This improved tracking capability will undoubtedly not only provide substantial benefits to daily hospital operations, but also lead to more effective and more efficient mass evacuation operations.

Healthcare Facility Evacuations and Patient Tracking

There is a broad spectrum of emergencies that may force a healthcare facility to evacuate some or all of its patients. Internal hazards such as fire, smoke, and/or the release of hazardous materials can create an unsafe environment. In addition, the loss of environmental services – e.g., utilities, sterilization, communications, and IT support, the loss of medical gases, or threats to physical safety (e.g., a violent or armed visitor) – may well require evacuations, if only to sustain patient support and safety.

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The type of evacuation and immediacy of action required depend on many factors, including the location and severity of the threat or hazard. In spatial terms, an evacuation may be: (a) horizontal – moving from one area to another on the same floor; (b) vertical – moving patients from one floor to another; or (c) a partial or complete evacuation of the facility – which might well be required during major emergencies such as natural disasters, multi-casualty accidents, or acts of terrorism that threaten facility stability or access.

In timeline terms, the evacuation process may be: (a) immediate – for threats such as fires; or (b) delayed – for more prolonged hazards such as the loss of utilities. Regardless of the type of evacuation, the key to successful patient tracking during evacuation operations is to have a plan already in place, ahead of time, that is not only understood by all parties involved but also has been previously exercised – by the same staff members. The emergence of new tracking technology is expected to further enhance these processes.

Also now available are a number of rapidly evolving tracking systems and other technology-enabled support tools that have been developed by the federal government as well as by many states. The state systems, which are often quickly available to local responders and healthcare facilities, are used by local and state response agencies to initiate and manage evacuation operations. These systems include but are not limited to: the "At Risk Registry" in Louisiana; the Emergency Status System (ESS) in Florida; and the Texas Evacuee Tracking Network (TxETN).

In scenarios requiring larger evacuations and/or operations across greater distances, a federal patient tracking system known as the Joint Patient Assessment and Tracking System (JPATS) may also be used. JPATS was developed through an interagency agreement between the Department of Defense and the Department of Health and Human Services.

Texas Tracking

Hurricanes are a primary threat to the state of Texas, which has over 350 miles of general coastline and 3,300 miles of tidal shoreline. Largely for that reason, the threats posed by hurricanes are a central focus of the state's preparedness programs. Texas officials have taken many of the lessons learned from Hurricanes Katrina and Rita to establish new plans and concepts of operation. A new patient tracking system – the previously mentioned TxETN – was developed, for example, and was first used during Hurricanes Gustav and Ike. A flexible system that continues to evolve, it can be used for applications ranging from a hospital evacuation to general shelter-management operations.

Barcode scanning is an effective technique at lower volume processing sites. Each Texas band is unique and allows the four Texas Emergency Tracking Network systems to work in tandem without duplication of individuals.

Politically, the TxETN is a partnership overseen by the Texas Department of Emergency Management and the Texas Department of State Health Services. The primary hardware contractor, Radiant RFID, worked closely with the developers of the *EMTrack* and *Evac Center* software programs – and with the Southwest Texas Regional Advisory Council (STRAC), and the Sabine Neches Chiefs Association – to build the interoperable hardware and software components that support the patient tracking network. By leveraging these relationships and that technology, the established process is both fast and simple.

In a hurricane scenario, an Embarkation Hub can be established for anyone who is unable to self-evacuate – i.e., persons with medical, functional, or other needs that prevent them from evacuating. Upon arrival at the hub, those persons are triaged and their basic ID information – name, address, gender, date of birth, etc. – is entered into the tracking system. In some cases, the strip on the back of the Texas driver's license can be swiped to load the information automatically. That information is then electronically associated with the person's barcoded wristband, which is embedded with a radio frequency identification device (RFID); the wristband then becomes the person's "ticket" for evacuation and return.

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A triage algorithm is used to determine the most appropriate form of available transportation – e.g., buses, ambulances, and/or aircraft (fixed-wing or helicopter) – for those with medical or functional needs. The transportation assets usually are equipped with not only barcodes but also a Global Positioning System (GPS) device. As evacuees/patients are loaded into, or onto, whatever transportation is available, their wristbands are scanned by either a handheld scanner or an RFID Portal (which looks somewhat like a security portal at a supermarket). When a banded evacuee passes through the portal, it automatically reads his or her ID information through an antenna in the portal and forwards the information to an evacuee database, further reducing the processing time needed.

After the transportation vehicle is loaded with evacuees, the TxETN system automatically generates a manifest. Throughout the trip, there is real-time monitoring of the transportation vehicle through its GPS. When evacuees arrive at the debarkation point, they again pass through a portal – where the system is automatically updated to ensure, and to reflect the fact, that each evacuee has arrived. A separate tag is also available for each wristband, and can be used to tag durable medical equipment items that evacuees may require. The extra tag also can be used to keep track of a pet.

The tagging process not only enhances the accuracy of patient tracking during an evacuation but also offers valuable search capabilities. Using the wristband tags requires less manpower and provides remarkable situational awareness information to key response organizations. At any moment, the Incident Commander knows how many and what type of evacuees he or she is monitoring, as well as their current locations and planned destinations. Those managing both medical and general population shelters also know, exactly and automatically, what evacuees are on the way in, when they will arrive, and what types of support they may require.

Interfacing Management Tools for Patient Evacuations

WebEOC by ESi is an incident management tool generally employed throughout the state of Texas by emergency managers and their response partners to manage both incident and asset information in a systematic fashion. Today, though, there are more than 40 separate WebEOC servers across the state, an abundance of assets that on occasion, unfortunately, causes some serious interoperability and coordination challenges. However, those challenges have been efficiently addressed by the Southwest Texas Regional Advisory Council (STRAC) over the past several years through what is called the Texas WebEOC Interoperability Project (TWIRP). This project has increased interoperability and decreased system redundancy across the entire Texas WebEOC network.

The TWIRP Project established fusion servers to serve as the hubs needed for sharing information between and among the statewide servers. The much improved connectivity was recently expanded, by using ESiWebFUSION, to all FEMA Region 6 states (Texas, Arkansas, Louisiana, Oklahoma, and New Mexico). Those states are now connected and are able to not only share critical information but also to maintain a common operating picture throughout the region. The TWIRP also facilitated an interface with EM Track, which is used by many local hospitals as a patient evacuee tracking system, and with the database servers for the Radiant RFID system. The interoperability thus achieved plays a critical role in the statewide sharing of information on patient evacuations.

In short, the future of patient tracking looks promising. Moreover, as key partners continue to leverage technology to develop even more effective tracking processes, and as those technologies further simplify and speed up the processes, mass patient evacuations will become considerably more manageable. The most essential step, probably, that now should be taken by areas without such systems in place is to cultivate the partnerships that will facilitate the standardization of evacuation processes. For emergency managers, it is comforting to know that, after a common set of patient evacuation priorities and objectives has been determined, the technology needed to make it happen will already be available.

Bruce Clements is the Public Health Preparedness Director for the Texas Department of State Health Services in Austin, Texas, and in that post is responsible for health and medical preparedness and response programs ranging from pandemic influenza to the health impact of hurricanes. A well known speaker and writer, Clements also serves as adjunct faculty at the Saint Louis University Institute for BioSecurity. His most recent book, Disasters and Public Health: Planning and Response, was released in 2009.

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Reasonable Search – Or Another "Big Brother" Situation?

By Richard Schoeberl, Law Enforcement

The Fourth Amendment to the U.S. Constitution was written to protect American citizens against unreasonable searches and seizures. In 1967, the U.S. Supreme Court ruled (in the case of *Katz v. United States*), that such protection includes situations where the person has a "reasonable expectation of privacy." Although Charles Katz was in fact placing illegal gambling wagers, it was nonetheless determined by the Court that it was a violation of his Fourth Amendment rights for the Federal Bureau of Investigation (FBI) to record his conversation while Katz was behind the closed door of a phone booth.

Today, the U.S. Supreme Court is once again faced with determining personal privacy rights as defined by the Fourth Amendment. At the heart of *United States v. Jones* is a dispute over global positioning system (GPS) technology, which is rapidly becoming a standard feature of smartphones and is often installed in cars, trucks, and other vehicles. The U.S. government – more specifically, the Department of Justice (DOJ) – argues that the FBI's use of a GPS tracking device to follow the vehicle of suspected drug dealer Antoine Jones did not constitute an unreasonable search. Because law enforcement investigations routinely use the GPS tracking of both cellphones and vehicles, the final decision in this case could lead to a major change in the future of law enforcement strategies.

In the decade that has passed since the terrorist attacks of 11 September 2001, the U.S. government has gained increasingly greater access to personal records – primarily, it is usually argued, to protect the nation against additional terrorist threats. Most U.S. courts have supported the additional powers that the 2001 Patriot Act granted to counterterrorism agents for accessing email accounts and telephones and/or even tracking Internet use – not only secretively but without warrants. One result of this greater latitude permitted for security reasons is that the government now has much greater search and seizure powers than it did in the years prior to the 9/11 attacks. However, the Court must now define, much more precisely, the line drawn between security and privacy as it pertains to and is enhanced by GPS technology.

The question looming is whether developments in technology amend an individual's "reasonable expectation of privacy." The Court's interpretation of what may or should be considered "private" has been brought into question not only by the continuing advances in GPS technology but also by the current generation's willingness to share – with total strangers on social networking sites – what was once deemed "private information." During the *Jones* hearings earlier this month, Justice Stephen Breyer expressed his concern when he told the plaintiff, "If you win this case, then there is nothing to prevent the police or the government from monitoring 24 hours a day the public movement of every citizen of the United States. ... You suddenly produce what sounds like *Nineteen Eighty Four* [the award-winning novel by George Orwell]."

Do Privacy Rights Trump National Security?

The concern expressed by Breyer highlights the importance of the Supreme Court's decision in determining whether continuous GPS surveillance conducted by law enforcement is or should be considered an unconstitutional intrusion on the privacy of an individual citizen. If the Court decides in Jones's favor, U.S. law enforcement agencies may soon be required to apply for a warrant before attaching a GPS device to a suspect's car. The Court is now considering a number of complicated factors in the case (which actually started in 2004 with the surveillance of Antoine Jones, a D.C. nightclub owner later arrested, in 2005, and charged with cocaine trafficking). The Court's decision may well include: (a) a definitive judgment on whether probable cause should be required before GPS technology can be used; or, perhaps (b) reaffirm the government's case that the use of GPS technology should be permitted to develop the "probable cause" needed by law enforcement for the use of additional high-tech surveillance tools.

For various reasons, whatever decision is made, the warrantless use of new GPS technology raises a serious concern for privacy in the 21st century, particularly if the Court sides with the Jones legal team – which is headed by Catherine Crump of the American Civil Liberties Union (ACLU) and supported by the Electronic Frontier Foundation and several other organizations. As Breyer suggested, the use of modern technology by law-enforcement agencies to combat crime and protect the American people from additional terrorist attacks raises the suspicion of a "Big Brother" government similar to that depicted in Orwell's 1949 novel. If the ruling is in favor of the government, anywhere and everywhere a person goes, both in the real world and

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in cyberspace, has the potential of being documented – and unprotected by the Fourth Amendment. The decision in this case therefore could have far-reaching implications for privacy rights in the information age.

On the other hand, GPS surveillance is, from the viewpoint of law-enforcement agencies throughout the nation, an unusually effective working tool that requires fewer personnel hours and is less costly to the government – i.e., to U.S. taxpayers – than would be incurred by having a team of agents physically follow a suspect. By using GPS, the physical man-hours dedicated to surveillance could be applied elsewhere and to other important tasks. In addition, the DOJ also argues, GPS surveillance could and should be considered nonintrusive because it provides information that could normally be observed in public, and for that reason is not much different from the closed-circuit television surveillance coverage legally permitted in the streets of New York, London, and many other cities throughout the world.

Just Another Investigative Tool? Or Not?

GPS tracking is also uniquely helpful in the normal progression of an investigation. A persuasive argument might even be made, in fact, that GPS tracking is simply "another investigative tool" that for practical purposes is no different than going through a suspect's trash (which has been done not only by law-enforcement agencies but also by many members of the U.S. media). Moreover, the DOJ team (headed by Solicitor General Donald B. Verrilli Jr. and Assistant Attorney General Lanny A. Breuer) argues that travel on public streets is not, and should not be considered, a private act. As law enforcement offices try to manage reduced budgets, GPS tracking offers a way to monitor suspect activity without having to assign one or more officers to follow each and every investigative case – all day and every day. GPS devices have been particularly useful in monitoring suspected drug dealers routinely moving into and/or out of the country to meet contacts.

Because law enforcement investigations routinely use the GPS tracking of both cellphones and vehicles, the final decision in [United States v. Jones] could lead to a major change in the future of law enforcement strategies

The DOJ's summary argument is that, if the Court rules in favor of the defendant, the decision "would seriously impede the government's ability to investigate leads and tips on drug trafficking, terrorism, and other crimes." There are, in fact, numerous examples in which law enforcement agencies have used GPS tracking to recover stolen vehicles and merchandise, track sex offenders, and monitor suspected terrorists and drug dealers – all at minimal cost, while reducing safety concerns for the officers involved and without jeopardizing the investigation.

The Leahy Bill & Justified Concern – But at What Cost?

There are currently no constitutional limits to the government's and law enforcement's ability to track the movements of people in public spaces and in plain view. Some civil-rights advocates could and do argue that there is justified concern about police using locational tracking technology that is completely unregulated by the Fourth Amendment. Many also will argue that there is a major and substantive difference between the information exposed by an investigative method, and the investigative method itself.

A proposed bill introduced by Senate Judiciary Committee Chairman Patrick Leahy (D-Vt.) would restrict the government from obtaining GPS data from companies without first obtaining a proper warrant. The Leahy bill argues, among other things, that, without a warrant, the government should not "access or use an electronic communications device to acquire geographical location information." It also would: (1) provide some much needed clarity related to the legal procedures and protections that should apply to electronic devices being used to track the movements of individuals; (2) require the government in most cases to show probable cause and/or to obtain warrants before acquiring the location information of persons under surveillance; (3) create criminal penalties for the surreptitious use of an electronic device to track a person's movements; and (4) prohibit commercial service providers from sharing with outside entities, and without

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customers' consent, the geographical location information of those customers.

Continuing advances in cellular technology and increasing privacy laws have the potential for being a deadly combination – no matter what the Court's decision. The principal practical argument for GPS tracking, of course, is that it provides more information than usually would be available for most police departments to obtain by simple visual observation. The decision by the Supreme Court in the *Jones* case, it is hoped, will set forth the reasonable guidelines needed to monitor a technique that is already widely used by law enforcement agencies. Police officers are already faced with a difficult uphill battle of protecting the public – and the continued use of GPS tracking will help them work even more efficiently to safely protect themselves and the citizens within their jurisdictions.

The decision before the Court comes down to determining what is considered "reasonable" and what, or how much, "privacy" should be protected in order to keeping law enforcement officers, and the American people, "safe" – however that sometimes nebulous word is defined. In the more than 60 years that have passed since the publication of *Nineteen Eighty Four*, there have been astounding leaps in technology. Some and perhaps most of the great leaps forward already made have been widely accepted; other "advances," though, are not quite as obviously beneficial, and some may in fact be unconstitutional – despite the fact that they may have assisted law enforcement agencies. Today, the legal authority for GPS tracking remains vague, but that may soon change – if and when a comprehensive ruling is made in the case of *United States v. Jones*.

Richard Schoeberl has over 15 years of counterintelligence, terrorism, and security management experience, most of it developed during his career with the Federal Bureau of Investigation (FBI), where his duties ranged from service as a field agent to leadership responsibilities in executive positions both at FBI Headquarters and at the National Counterterrorism Center. During most of his FBI career he served in the Bureau's Counterterrorism Division, providing oversight to the FBI's international counterterrorism effort. Schoeberl also was assigned a number of collateral duties – serving, for example, as an FBI Certified Instructor and as a member of the FBI SWAT program. He also has extensive lecture experience worldwide and is currently a terrorism and law-enforcement media contributor to Fox News, Sky News, al-Jazeera Television, and al-Arabiya.

Tracking and Locating Fire and Emergency Personnel

By Christina Spoons, Fire/HazMat

There are numerous reasons to keep track of personnel at the scene of an emergency. Knowing what crews are on the scene, and which personnel are assigned to each crew, makes it easier for the incident commander to allocate resources to specific areas of the scene. In addition to assigning resources, knowing the locations of all responders is also important in situations where they themselves need emergency assistance.

Large-scale disasters obviously, and deservedly, receive considerable publicity and attention, but most operational firefighter fatalities do not take place at major incidents. Regardless of the size of the event, though, history has shown that, when emergency responders are lost or disoriented, a tracking and location system can be extremely useful in finding them before they become the next fatalities. The case of a firefighter working in an unfamiliar smoke-filled environment is probably the most obvious example, but the need for tracking and location systems has broader implications for all emergency services – e.g., law enforcement, corrections, and military applications.

The Mary Pang Chinese Food Company Incident

Four firefighters lost their lives in a fire at the Mary Pang Chinese Food Company in Seattle, Washington, on 5 January 1995. The company, which made frozen food dishes for grocery stores in the Seattle area, had been in the same building for more than 20 years. On the lower level of the building, a bakery occupied part of the warehouse; a band also rented space for its practices in an otherwise unused area.

According to the 1995 USFA (United States Fire Administration) report on the incident – *Four Firefighters Die in Seattle Warehouse Fire* – the original structure was built in 1909 and had been both expanded and modified several times over the more than 80 years since. Initially, the building was a 60 x 60 foot single-story brick structure.

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Two additional 60 x 60 foot sections were added – one to the north and one to the west – to create an L-shaped building, with two of the original walls becoming interior fire walls. A series of owners also had modified the connections between various sections of the building several times, and some of the old doorways and windows had been bricked over.

During the 1920s, the local ground level of the building, which was in a swampy part of Seattle, was raised by 10 to 20 feet. One result of that project was that the ground floor of the building ended up below street level. A second story later was added to what was the original 60 x 60 foot area of the building; the new addition was at sidewalk level on one side of the building. The owners later added a second story to the north wing of the building, but the west wing remained a single-story structure that was still partially below street level.

The 1995 fire, which investigators eventually determined to be arson, started in a storage room in the basement of the original section of the building. One of the band members was the first caller to report signs of smoke. The first fire crews responding thought that the fire appeared to be coming from the roof of the west wing. Some of those crews went there to ventilate the roof; other crews entered the street level of the original area of the building – and found themselves facing heavy smoke conditions with virtually zero visibility.

The interior crews were not aware at that time that there was a level below the one where they were working. Eventually, though, the floor collapsed. Flames then spread to the ground floor, out the doors, and through the hole in the roof. Four firefighters fell through the floor into the lower level; seven other firefighters escaped, but all of them had suffered varying degrees of burn injuries.

The fire crews on the scene were able to determine the last known locations and identities of the four missing firefighters. In addition, some crew members making the rescue attempts thought that they had heard personal-alert safety system (PASS) alarms sounding, but they were not able to find the four firefighters. Fire Department personnel recovered two bodies the day after the fire, and one the second day after the fire; the fourth body was not found until 72 hours after the fire was first reported.

The 2010 Kansas Residential Structure Fire

A career firefighter died in a residential structure fire on 22 May 2010 after becoming separated from his captain in heavy smoke. According to the 2011 NIOSH (National Institute for Occupational Safety and Health) report on the incident, *Career Fire Fighter Dies While Conducting a Search in a Residential House Fire*, the firefighter and his captain had entered a 6,000-square-foot two-story home to conduct a search and rescue operation for an unaccounted for resident and a dog. The captain and firefighter found the dog first, and took it to the front door, then continued to search for the still missing resident under steadily worsening conditions – it was not determined until later that that resident was in fact not in the building at the time of the fire.

During their fruitless search, the firefighter stopped to clear his mask after becoming ill and vomiting, and found himself separated from the captain. As soon as the captain noticed he was alone, he called a Mayday and began searching for the missing firefighter. Two rapid-intervention teams were quickly dispatched to look for the firefighter, who was found, in an unresponsive state, approximately 11 minutes later – and only about 24 feet from where he was last known to be seen.

An effective tracking and location system obviously could have provided much needed assistance to the rescue crews

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by significantly reducing the time needed to locate the missing firefighter – and/or other trapped or disoriented personnel. The use of such a system – which might have prevented a fatality – would let the incident commander know the present location, at all times, of each responder at the scene of the incident.

Recent Advances in Tracking and Location Technology

There are several types of tracking and location systems currently available. The PASS device previously mentioned is a primary location technology that many fire departments now use. It is designed to set off an alarm if the individual user remains motionless for 30 seconds. The alarm can also be manually activated should the user need immediate assistance, with the sound assisting other personnel in locating the person needing help. However, as happened in the 1995 Mary Pang Seattle case, it is not always possible to determine the precise location of the sound. Responders at the Seattle fire thought, in fact, that they had heard a PASS alarm, but they were still unable to locate the downed firefighters.

Most operational firefighter fatalities do not take place at major incidents; regardless of the size of the event, though, history has shown that when emergency responders are lost or disoriented a tracking and location system can be extremely useful in finding them before they become the next fatalities

Some technology uses a "breadcrumb" approach in which firefighters place small transponders at relatively close intervals as they travel through a burning building. Those devices then act as beacons to allow the system to communicate with other personnel and/or with other beacons. Other systems now available require the retrofitting of a building with radio-frequency identification (RFID) tags. Each tag is programmed with such information as the exact location of that tag. With this system, an RFID reader is needed to transmit a radio signal that can read the information on the tag.

Yet other systems use dead reckoning or inertial technology, or some combination thereof, to calculate the user's position. Dead reckoning systems calculate a person's travel from a known starting point and use speed and direction estimates, combined with elapsed time, to determine his or her current location. Inertial systems use gyroscopes and accelerometers to estimate the distance and direction traveled. However, accuracy decreases over time and distance with both dead-reckoning and inertial-technology systems.

Research and development continues in the area of tracking and location in order to create even more precise systems that can pinpoint the location of personnel both in real time and as accurately as possible. Researchers and manufacturers have been meeting annually over the past several years to present their work at conferences sponsored by the U.S. Department of Homeland Security on indoor personnel location and tracking for emergency responders. In addition, many programs now under development are incorporating multiple location and tracking technologies in the hope that the use of overlapping technologies will compensate for the weaknesses of each individual technology.

To briefly summarize: Although many types of location and tracking technologies are currently available, each has its own strengths and weaknesses. An accurate system is necessary to let the incident commander know the location of each individual on the scene, not only for allocating personnel, but also, and of greater importance, to assist in locating trapped or disoriented personnel much more quickly and efficiently in order to save lives.

Christina Spoons holds a Masters in Public Administration with a concentration in Homeland Security and is currently completing her Ph.D. in the same discipline with a concentration in Terrorism, Mediation, and Peace both from the Walden University. Her emergency services experience includes several years as a Firefighter/EMT and instructor with the American Red Cross. She has been active in the development of firefighter curricula at both the state and national levels and also is involved with several National Fire Protection Association committees, including those focused on Firefighter professional qualifications and electronic safety equipment. She teaches homeland security and public policy and administration courses at Ashford University, and fire science courses at Columbia Southern University.

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From Patient Tracking to MOUs

Joplin & Irene Force Changes in Hospital Evac Plans

By Theodore (Ted) Tully, Health Systems

Significant changes in hospital emergency planning have taken place since and largely because of Hurricane Katrina in 2005. Hospitals, along with nursing homes, have had their safety and security requirements strengthened by regulatory and/or accreditation agencies to ensure that their emergency plans take into account how they will carry out full or partial evacuations. However, many of these requirements post goals that hospitals have tried to meet only to find out, usually in an emergency, that the changes instituted are still not enough. This year, though, the healthcare community experienced many new emergency situations that challenged not only hospital officials but also community leaders responsible for supporting healthcare institutions during an emergency situation.

Two very different types of emergencies – Hurricane Irene and the Joplin Tornado – that hospitals experienced earlier his year were weather events: one was a sudden and extremely violent emergency lasting only a few seconds that left a major healthcare institution devastated by its effects; the other was a much slower moving event that allowed a planned evacuation for an impending hurricane that would cause major disruptions in several hospitals within the same major metropolitan area.

Both events revealed, once again: (a) how important preparedness planning is for hospitals and other healthcare facilities; and (b) that the planning that had occurred was well worth the efforts made by the communities involved to protect their infrastructures. Both emergency events also revealed a number of flaws and weaknesses in the planning process for hospital evacuations. Following are some of the particulars, including the major lessons learned, about each of those two events.

The Joplin Tornado: Deaths, Destruction & Preventable Delays

Within seconds after touching down in Joplin, Missouri, an EF-5 tornado cut a path of destruction through it that included a hospital – the St. John's Regional Medical Center – that took a direct hit to its west facade. It took the tornado only 45 seconds to turn the hospital into an unsafe structure. Within minutes it was clear to staff that the hospital was no longer viable for patient care and that a full evacuation would be necessary. In the overall Joplin area, officials later determined, there were an estimated 160 deaths, 8,000 houses, office buildings, and other structures heavily damaged (many of them beyond repair), as well as 18,000 vehicles destroyed. The staff at St. John's evacuated 183 patients – including 24 patients from the emergency department (which was completely destroyed), 28 critical-care patients, one OR (operating room) patient, and one PACU (post-anesthesia care unit) patient.

Initial Impact: The immediate disaster response was hampered because the hospital's command centers was inoperable, the hospital's emergency equipment trailers were blown blocks away and destroyed, the hospital's MedEvac helicopter – and the landing pad at the hospital – also were destroyed, and only a very few of the hospital's emergency plans could be accessed during the evacuation. In addition, the hospital's emergency generators failed to start – but that problem proved to be a blessing, because the hospital also had experienced a gas leak that might otherwise have caused an explosion.

Evacuations: Evacuation sleds were available to the rescuers (hospital staff mostly), but there were not nearly enough sleds to evacuate patients down nine floors of unlighted stairs littered with debris. For that reason, doors, wheel chairs, and mattresses were used to evacuate patients to pre-planned evacuation points. Most of the patients were transported – to the closest area hospitals still functioning – in POVs (privately owned vehicles, including pickup trucks), some of which were carrying hospital beds, with hospital staff riding in back holding IV tubes.

The healthcare after-action report described the evacuation as "impossible"; nonetheless, all patients were eventually evacuated to the staging areas that had been set up outside the St. John's area (senior officials later credited drills and training for the effectiveness of the overall evacuation process). The patients evacuated were then taken from the staging area to other hospitals by POVs, ambulances, and MedEvac, with the last patients arriving by the following morning. Meanwhile, a number of tents served as temporary-care areas to treat the injured as the days went by.

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Patient Tracking: Because of the emergent nature of the tornado – combined with the almost total devastation not only of the hospital infrastructure but also numerous caches of emergency supplies – the tracking of patients was a true "nightmare," according to the on-scene responders. The same officials later estimated that it took them over four days to completely account for all patients; they also pointed out, though, that the availability of electronic medical records represented a major improvement in the evacuation progress, because up to two years of medical records of all of the patients evacuated could be accessed online.

The Fictitious "96 Hour Supply": Hospital officials identified the theoretical "96-hour supply" (of medicines and medical equipment) as a significant weakness in planning because most if not quite all of those supplies were used up in about four hours. The same officials confirmed, in their after-action report, the need for much larger caches for the same length of time (96 hours). They also suggested that those much larger caches should be stored in safer positions – bunkers, perhaps, that are much better protected from danger – so that they could be accessed much more quickly after a major emergency.

MOUs and other suggestions: The hospital and emergency managers also suggested that such equipment items as "go-bags" on patient units and staff identification tags be carried in wallets, because many of the standard hospital ID tags were lost during the hurricane. Memorandums of Understanding (MOUs) for equipment suppliers and ambulance services were found to be another positive, despite the fact that they were not much help in the immediate aftermath of the tornado. There also is a compelling need, the same officials said, to practice – better and more frequently – what the hospital staff must do if the supply system is overwhelmed.

Hurricane Irene: Major Problems Cited, Major Changes Underway

Hurricane Irene struck the New York Metropolitan area with a near-knockout punch in the late evening of 27 August, and

continued the assault for quite a few hours thereafter. Although it did not hit with the force originally predicted, it caused flooding in many areas of the city as well as wind damage and other storm effects that disrupted everyday life in the nation's most populated city for over a week. The planning for the hurricane started several days earlier and – thanks in large part to the fact that many U.S. cities have dealt with major hurricanes in the past – the plans for hospital and nursing home evacuations had been put in place early by various political jurisdictions along the Atlantic coast, and specifically in many areas of New York City itself.

SLOSH Zones & Training Drills: Since the hurricanes of 2005, New York City's hurricane planning has involved hospitals and nursing homes in the city's "SLOSH" coastal and low lying shore or river areas – SLOSH stands for Sea-Land-and Overland-Surges-from Hurricane Zones – that probably would be affected either by flooding or by the winds generated by a large coastal storm. Storm models, hospital preparedness plans, and training drills – carried out by both city and state preparedness agencies – have been enhanced and significantly improved over the past five years. The hospitals and/or nursing homes potentially affected knew that they had to have the plans ready and at hand, ahead of time, on how they would evacuate or shelter in place to deal with the most severe effects of a storm such as Irene.

Hospital Evacuations: For what was probably the first time in the city's history a declared emergency was called prior to the storm's arrival; the emergency plans required the mandatory evacuation of numerous hospitals and nursing homes throughout a significant area of the city. Most hospitals started their evacuations days before Irene's arrival – and continued, in reverse, when they later had to relocate the same patients back to the same hospitals several days later (after the worst of the storm effects had ended).

MOUs and EMS Support: Many of the city's hospitals rely on the same limited number of MOUs (memoranda of understanding) for patient transport. The city's emergency management system (EMS) is operated by the city's fire department – FDNY (Fire Department of New York) – which usually carries out only "911-emergency" types of transports – and was made available for patient transfers to other hospitals within the city. The private ambulances that hospitals had available to them, thanks to the MOUs, also were used – but, as would be and was expected, most of the hospitals directly affected had to reach out, through the same or other mutual-aid agreements, for additional units.

Patient Transfers and Tracking: The city's plan did address the support of ambulances to the many institutions directly affected, but the patient-by-patient transfers were left, for the most part, to the individual hospitals to arrange. In short, this extraordinarily large institutional evacuation was not only extremely complicated but also required hospital-to-hospital communications that went well beyond the previous day-to-day transfer experience of most of the hospitals participating. It also was not a routine movement of patients that the city's OEM (Office of Emergency Management) was fully prepared to carry out. The overall number of transfers was extremely large and impressively coordinated (as were the return transports after the storm had passed). Despite that hugely successful effort, though, many hospitals experienced being "on their own" in many ways that they had not expected, or previously experienced.

The Major Lessons Learned: Although the Joplin tornado and Hurricane Irene occurred several months ago, many of the lessons learned are still being reviewed, and it probably will take at least several months more before those hard-earned lessons are incorporated into actual changes in emergency procedures and preparedness planning. Additional after-action reports, corrective action plans, and future emergency drills will still be needed, and must be heeded, to truly improve hospital emergency responses throughout the two metropolitan areas hardest hit – and in other jurisdictions throughout the United States and U.S. territories. The fact that hospitals can clearly see the value of needing plans that make it possible to respond, quickly and effectively, to weather events that might require partial and/or total evacuations – in time frames lasting anywhere from a few minutes up to several days – is perhaps the most important lesson learned this year by hospitals and municipalities throughout the country.

Theodore "Ted" Tully is the Administrative Director for Emergency Preparedness at Mount Sinai Medical Center in New York City. He previously served as Vice President for Emergency Services at the Westchester Medical Center (WMC), as Westchester County EMS (emergency medical services) Coordinator, and as a police paramedic/detective in Greenburgh, N.Y. He also helped create the WMC Regional Resource Center, which is responsible for coordinating the emergency plans of 32 hospitals in lower New York State.

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Mapping: An Increasingly Valuable Emergency Management Tool

By Kay C. Goss, Emergency Management

In 1854, when a cholera outbreak that eventually took the lives of more than 600 people struck London, the mechanism for transmitting the disease was yet unknown. However, an English physician named John Snow noticed that the outbreak seemed to cluster in the area around a public water pump. By mapping cases of the outbreak and using statistical data to link those cases with the source of contagion, he was not only advancing the science of epidemiology, but also integrating geography into the analysis process. Today, a system of data that brings together cartography, statistical analysis, and database technology is known as a Geographic Information System (GIS).

As GIS has evolved, it continues to enhance emergency management in many exciting ways, several of them unimaginable until just a few years ago. Organizing data by jurisdiction, purpose, and/or orientation enhances both the quantity and quality of the relevant information available in a way that provides new insights for, among other goals and objectives: risk assessments; predictions; prescriptions; and organizational, situational, and operational relationships. For that reason alone, GIS is helpful in all phases of emergency management – preparedness, mitigation, response, and recovery.

Originally, emergency management used GIS primarily in areas of mitigation such as the FEMA (Federal Emergency Management Agency) Hazards U.S. (HAZUS) program and flood plain management and mapping. It began to be used, in many more ways, in preparedness – especially in the modeling and simulation of drills and exercises – as well as in response and recovery. One result is that the important damage-assessment process has been enhanced significantly by mapping, as have debris removal, search-and-rescue operations, and all four phases of emergency management.

Tasks & Responsibilities: "There's an App for That"

GIS integrates, stores, edits, analyzes, shares, and displays geographic information for the communication of valuable decision-making data in each of these crucial areas. Additional applications for mapping that also directly or indirectly enhance emergency-management capabilities include, but are not necessarily limited to, such tasks and responsibilities as: resource management; asset management and location planning; and the development of environmental impact assessments.

GIS integrates, stores, edits, analyzes, shares, and displays geographic information for the communication of valuable decision-making data in crucial areas; additional applications for mapping also directly or indirectly enhance emergency-management capabilities

Also: infrastructure assessment and planning; urban and regional planning; logistics; population and demographic studies; statistical analyses; environmental contamination analyses; disease surveillance activities; and, last but not least, military planning.

The still growing number of potential applications ensures that a broad spectrum of disciplines, many of them overlapping and/or complementary, can and do benefit from GIS mapping. Multiple disciplines and jurisdictions are able to interface regularly with emergency managers in an even broader spectrum of tasks and responsibilities, including sustainable development, public health, landscape architecture, community planning, transportation, logistics, crime mapping, national defense, and many other fields.

As GIS diverged into location-based services, geospatial positioning systems (GPSs) enabled mobile devices to provide this information in relation to fixed assets. That important step forward leads to total situational awareness and further enhances GIS usage for and by emergency services personnel in cases such as: (a) a fire service needing help in locating fire hydrants, fire trucks, and ambulances; (b) evacuees looking for the nearest gasoline

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stations, restaurants, and hotel facilities; and (c) a law enforcement agency in determining the current location of police cars.

VIPER, Virtual Alabama & Other Programs

The Virginia Information Program for Emergency Response (VIPER) brings all of the fixed and mobile information assets together to provide almost total situational awareness for the state's emergency responders and managers. Virtual Alabama, a somewhat similar system in a sister state, has also inspired considerable activity among other states and local communities in similar endeavors. The same types of programs and systems are developing rapidly in many other cities and states across the country.

Charles Werner, the Fire Chief of Charlottesville, Virginia – who also serves as Technology Chair for the International Association of Fire Chiefs – is considered by many of his colleagues to be not only the "thought leader" in this area of technology development but also a leading advocate for the interoperability needed to integrate all of the valuable information now becoming available. He also chaired the Department of Homeland Security's SAFECOM Program, and led Virginia's own interoperability and situational awareness initiatives. Werner helps drive the development of technology by working closely and nationally not only with the scientific and technological communities but also with emergency-management and homeland-security specialists in emergency communications and GIS mapping.

Endless Capabilities And Monumental Achievements

In addition to GPS devices, there is also an explosion of exciting web mapping activities, such as Google Maps and Bing Maps, which offer public access to enormous amounts of geographic data and other information that can be quickly accessed, annotated, and shared. The Google and Bing toolkits usually contain such informational tools as street maps, aerial and satellite imagery, geo-coding and search systems, and routing information and instructions. For emergency management planners, GIS mapping services provide a valuable resource for all levels of emergency planning, ranging from local to international applications.

Local examples of GIS mapping include the ongoing analysis – in Washington, D.C. – of earthquake damage at both the National Cathedral and the Washington Monument. Regionally, emergency management efforts rely on such mapping to monitor commuting patterns, the analysis of which enhances evacuation planning. In addition, animated changes in vegetation before and during a growing season are monitored and can be used to determine when and where a drought was most extensive in a particular region – that highly relevant data might be and often is used for requesting a presidential disaster declaration.

On the national level, remote sensing serves as a key homeland security tool in many counterterrorism initiatives. Internationally, Arctic ice-melting studies would not be possible or as accurate as they are today without GIS mapping. In short, the growing application of earth-surface analysis is limited only by the number of sensors required to provide the necessary data.

Since Snow's mapping of London's epidemic in 1854, GIS systems have migrated and evolved into much more tightly integrated "enterprise" approaches that use a service-oriented architecture easily capable of sharing the resources, data, and applications needed by a growing number of agencies, departments, and even private-sector businesses. Modern systems allow application developers to create flexible GIS systems, moreover, that can quickly respond to changing needs, such as emergency situations in the short term and emergency management planning in the long term. The examples of practical applications mentioned here are in fact limited only by the space available, because they are, for all practical purposes, almost endless, increasing with each passing day, and – most important of all – vital to the continued building of the emergency management profession in general.

For more information, visit: http://www.firehouse.com

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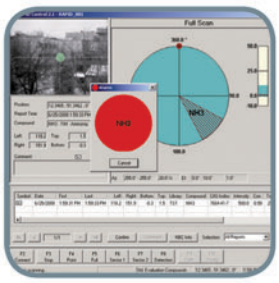

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Identifying Biological Hazards as They Happen

By Joseph Cahill, EMS

Simply put, biological hazards are a combination of disease-causing microbes and the body fluids that carry them. Unlike some chemical agents, biological agents are not detectable by human senses. For that reason alone, responders usually must rely on technological means of detection.

There are two main strategies for detection: surveillance; and direct testing. Surveillance analyzes multiple data streams – from hospital emergency rooms, pharmacies, laboratories, and EMS (Emergency Medical Services) units – in an effort to spot disease outbreaks by observing those who are treating the illness. Direct testing fits a number of locations nationally through the use of air sampling gear that collects what is "written on the wind," so to speak, in an effort to recognize an attack while it is still ongoing. These fixed listening posts almost always have the on-site power and communications channels needed to enable the prompt dissemination of incident information and various related data.

In the ten years since the 9/11 2001 terrorist attacks, the capability to carry out on-scene air testing for biological hazards has both evolved and improved. The new systems and devices now available are small enough and portable enough to be carried by a single responder. Being able to easily transport a system or device into the field – untethered to communications and power supply connections – is an important step forward that allows entry teams to monitor their own risk levels.

The on-scene information now available, or easily obtainable, also allows the medical support staff for these teams to make treatment decisions based on actual exposure data rather than on speculation. Responders and victims also are spared the sometimes harsh side effects of receiving unnecessary medications. In addition, resources that tend to be scarce during a large-scale attack can be preserved for higher-priority applications.

Alarming Facts & Basic Phases

When an agency is considering the purchase of a biological monitor – or any other type of monitor, for that matter – the agency's pre-incident plan should include the response that should be expected if the alarm is triggered. This is not as simple as it sounds, and this important operational consideration is often overlooked both during the purchasing process and in the deployment stages of a response. There are, nonetheless, three basic phases of response to a detector alarm: (a) threat removal; (b) immediate treatment; and (c) long-term treatment and monitoring. Following are a few words about each:

Threat Removal – Stopping the Spread: Having a plan in place for cleaning off and/or otherwise neutralizing any contamination is essential to keep responders and victims from spreading the hazard as they leave the incident site – which is in large part how the harmful effects of biological agent attacks are magnified beyond the scene.

Immediate Treatment – One Among Many: Antibiotics help the body fight off infection. However, there are many antibiotics on the market – and, for that reason, knowing the specific biological contaminant at the incident site will help responder teams decide which antibiotic to use. In short, knowing as much specific information as possible about the hazardous agent present may significantly improve the effectiveness of the treatment, not only by providing better results but also by inflicting fewer side effects.

Long-Term Treatment and Monitoring – Tricks of the Trade: A significant countermeasure against biological attack is knowing and using an effective vaccine. Vaccinations expose responders to a weakened strain of

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the disease-causing agent, or to the non-lethal cousins of the agent, in order to trick the body's immune system into building resistance to the disease. The main limitation to using vaccinations effectively is that the agent must be known in advance. For that reason, this strategy is primarily targeted at responders who arrive on the scene after the alarm has sounded and the agent has been confirmed.

The ABCs of Logistics Planning

In either case, the logistics involved should be planned out, well in advance, and should include, as a minimum, the following steps: (a) obtain the medications/vaccines; (b) transport the countermeasure resources to those who need them; and (c) dispense the medications/vaccines. Using a "tool-box" approach enables responders to make a general plan for the distribution of countermeasures that can later be adapted to meet the specific needs of each specific incident.

There are two additional benefits provided by this course of action: First, the long-term monitoring of those who have been exposed allows proper continuing care to be provided against the exposure. Second, such monitoring allows the medical community in general to learn from the incident or event and thereby improve the response preparations for future events.

Advances in detection equipment enable responders to detect biological hazards at an early stage, ideally before the contamination has a chance to spread. Using such data – in conjunction with a planned procedure for removing the threat, treating those contaminated, and monitoring the after effects – can help significantly both in reducing the risk of exposure and in stopping additional spread of the agent. Advances in detection technology mean that responding teams no longer need to "blindly" enter the scene of a biological attack.

Joseph Cahill, a medicolegal investigator for the Massachusetts Office of the Chief Medical Examiner, previously served as exercise and training coordinator for the Massachusetts Department of Public Health, and prior to that was an emergency planner in the Westchester County (N.Y.) Office of Emergency Management. He also served for five years as the citywide advanced life support (ALS) coordinator for the FDNY - Bureau of EMS, and prior to that was the department's Division 6 ALS coordinator, covering the South Bronx and Harlem. Much in demand as a speaker – he has addressed venues as diverse as the national EMS Today conferences and local volunteer EMS agencies – Cahill also served on the faculty of the Westchester County Community College's Paramedic Program and has been a frequent guest lecturer for the U.S. Secret Service, the FDNY EMS Academy, and Montfiore Hospital.

Electronic Medical Records (EMRs) Report & Webinar

Coming December 2011

All who work in emergency preparedness, regardless of specialty, are charged with the priority of saving lives. Delays in transport and incomplete records or medical history can reduce a victim's chance of survival. Responders work as quickly as possible, but local medical resources may be overwhelmed in mass casualty incidents. Optimum management of people in such incidents demands detailed situational awareness for all who support the response.

DomPrep recently conducted a survey based on the role of EMRs. The survey was taken by a panel of experts (DomPrep40 Advisors) along with readers of the *DomPrep Journal*. The results will be compared to discover gaps as well as synergies. Key findings will be published in a report for distribution and in an online webinar.

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The Impact of Tracking on Response Efforts

By Omar Alkhalaf, Emergency Management

The efficient and effective tracking of personnel, information, and supplies during a dangerous incident can have a significant impact on the outcome of the response. Moreover, the ability to track those persons with access to the incident site helps ensure that only authorized personnel are permitted to be present at the site. For that reason alone, assigning specific individuals to track such information, and various related data, will help ensure: (a) that the information available is transmitted properly; and (b) that the supplies needed are tracked and allocated efficiently.

In the spring of 2009, flooding in North Dakota and Minnesota reached record levels, compelling the governor of North Dakota not only to issue a statewide emergency flood declaration but also to activate the state's National Guard. In addition, the governments of North Dakota's Cass County and the city of Fargo, the county seat, activated both their emergency operations center (EOC) and their tactical operations center (TOC). Unfortunately, the TOC personnel encountered several issues with tracking information related to rescue missions, and in some cases management personnel did not receive certain information about those missions until after the operation had been completed.

The TOC ultimately assigned personnel to each marine rescue unit involved to oversee the collection and dissemination of the critical information needed for tracking the various rescue missions. Having those personnel accompany the marine rescue units helped emergency managers not only track their teams but also keep up to date on the status of the operations taking place.

While the 2009 spring floods focused on the use of personnel for tracking, an incident in California resulted in the use of advanced technology to improve both communications and tracking. In January 2005, a Metrolink train crashed with another vehicle in Glendale, California, causing two additional trains to derail. Dealing with that incident, which killed 11 people and injured 180 others, required a major rescue and triage operation that involved hundreds of firefighters from Los Angeles County, with additional help (provided under mutual-aid agreements) from various local police departments, sheriff departments, and highway patrol units.

Moving Forward: From Post-It Notes To Interoperable Communications

The Los Angeles County response agencies followed the National Incident Management System (NIMS) guidelines and established a unified command to respond to the incident. However, they had to use pencils, paper, and Post-It notes to track resources and deployed personnel. As a result, the response agencies encountered difficulties sharing information with one another. Later, though – after the Los Angeles Regional Common Operational Picture Program (LARCOPP) Committee was created – the members of that committee recommended the development of an emergency management system that could be deployed in the field during such incidents to transmit information in real time. This solution helps track information and personnel in the field, which means that such information can be gathered even while emergency teams are responding to an incident.

Exercises are equally important in developing new tracking techniques. In August 2006, the Philadelphia Urban Area conducted a full-scale Interoperable Communications exercise at the Strafford Train Station in Wayne, Pennsylvania. Among those participating in the exercise were 49 representatives from nine emergency management agencies and two private-sector organizations. The purpose of the exercise was to test the participants' ability to maintain interoperable communications after an explosion causes a derailment on the train tracks. The Wayne exercise demonstrated, among other things, the need to designate a communications unit leader during the initial stages of an incident response to assist with maintaining communications and the tracking of information, supplies, and personnel.

The spring floods in North Dakota and Minnesota, the train crash in California, and the communications exercise in Pennsylvania had one thing in common: All of them confirmed the literally life-or-death importance of effective and efficient resource tracking in emergency management and response operations. The lesson learned is this: The tracking of information, supplies, and personnel will have a significant impact on the success of the response effort itself. Through the use of interoperable communication systems, emergency managers can track responders, ensure that only authorized personnel have access to the incident site, properly share the information available, and allocate the supplies needed.

For additional information on similar incidents and detailed after-action reports, please visit the Lessons Learned Information Sharing website at http://www.llis.dhs.gov.

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Oklahoma, California, Virginia, and Florida

By Adam McLaughlin, State Homeland News

Improving Bomb Response At Oklahoma's Robot Rodeo

Although most rodeos involve cowboys and bull riding, Oklahoma City was the location for a different kind of rodeo – one in which robots were the star non-human participants.

In late October, law enforcement officials from Oklahoma City, Edmond, Oklahoma County, and Norman – as well as some military personnel and representatives from both the Oklahoma Highway Patrol and the Federal Bureau of Investigation (FBI) – were in attendance for an annual "robot rodeo" held at the State Fair Park in Oklahoma City.

Oklahoma has seven FBI-certified bomb squads, according to the state government's website. The seven squads are stationed in different locations, and each squad has received a standardized robot for use during bomb-response incidents. During the rodeo, the bomb technicians' proficiency and skills at operating the robots were put to the test at six different stations that challenged them to complete specific tasks.

Oklahoma City Police Department Capt. Dexter Nelson said the bomb techs come from local, state, and federal government agencies, the military, and the FBI. During the rodeo, the bomb squads networked with one another and with the robot manufacturer, and shared their various "best practices" for responding to the emergencies.

"The key benefit of this event is the networking aspect of having the various bomb squads discussing and sharing ideas on different scenarios at the same time," Nelson said. "As … [the participants] rotate from station to station completing the different obstacles, they communicate with each other, and then they see the problems that come up with the robots that they are using in that particular scenario."

Nelson said that the presence of representatives from Tennessee-based Remotec – the manufacturer of the robot used by the Oklahoma City Police Department – provided an opportunity to explain some of the problems the robots were encountering in the field so that the company's own research and development team could take that feedback into account when making improvements to the robots in the future.

Millions of Californians Participate in Latest ShakeOut Exercise

One-fifth of California's population took time out of their day last month to practice "earthquake preparedness" as part of this year's Great California ShakeOut – which since 2008: (a) has grown almost literally by leaps and bounds and this year included an estimated 9.4 million participants in California itself; and (b) has inspired a number of other states, and several foreign countries, to prepare for earthquakes through similar drills and exercises.

The annual ShakeOuts are designed primarily as a way to encourage greater participation in earthquake preparedness exercises by the public at large through various closely coordinated drills, and now includes participants – in addition to the millions of Californians who "sign on" each year – from many states and U.S. territories, as well as a number of foreign countries. "Sociologists tell us that seeing other people prepare is the most … [important] factor in motivating people to prepare," Gregory Renick, public information officer for the California Emergency Management Agency, recently wrote. "Research also shows that talking about preparedness with family and friends also motivates people to prepare."

Numerous schools, businesses, and community centers around the state practiced what to do during an earthquake, while several fire departments practiced their SAR (search-and-rescue) operations and learned other actions to take following an earthquake. The organizers of this year's Shakeout noted that more than six million students, faculty, and staff participated in the 20 October drill. "Significant increases" were also seen among businesses, medical personnel, federal employees, and nonprofit organizations, officials said. Participation in Northern California and the Central Valley saw a 50 percent jump in the number of citizens active in one way or another in the 2011 Shakeout.

From Bushnell Way to S.F. to New Madrid

A typical event – at Bushnell Way Elementary School in Los Angeles – included an earthquake drill in which students and teachers acted as victims while local CERT (community emergency response team) members of the Los Angeles Fire Department, and FEMA (Federal Emergency Management Agency) personnel honed their SAR capabilities. Several hundred miles north of Los Angeles, the San Francisco Community Agencies Responding to

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Disaster organization orchestrated an educational tabletop exercise for area nonprofit and faith-based groups.

In addition, the U.S. Geological Survey, and the Target business chain, signed an agreement to improve the earthquake preparedness of the company's stores. One Target store, in Northridge, also served as the site of an earthquake response drill observed by official delegations from Japan, China, and Mexico (where similar drills are being planned, using the ShakeOut as a successful working model).

The Great California ShakeOut, which is now in its fourth year, inspired a series of similar drills in several states located in the area around the New Madrid fault zone (centered in the southeastern corner of Missouri, site of the 8.0 magnitude earthquakes in 1811-1812 that are recognized by seismologists as the greatest such quakes in U.S. history).

Not incidentally, what will be the second annual "Great Central U.S. ShakeOut" exercise is scheduled for 7 February 2012. More than three million people in 11 states participated in the first Great Central U.S. ShakeOut in April of this year. The 2011 Great Central exercise, which focused primarily on the "Drop, Cover, and Hold On" protective actions recommended by FEMA and other agencies, is considered to be a "direct descendant" of the highly successful California Shakeout exercises.

Virginia Western CC Automates Lockdown

A few years ago, Virginia Western Community College installed its emergency siren on an energy management system. But that move created some major problems for the Roanoke school. For one thing, the school's own staff did not run the energy management system. Control of the system actually remained in Richmond, the state capital, three and a half hours away.

That geographical inconvenience later became a potentially major problem when some of the "Richmond people" remotely accessed the system and accidentally set off the siren. "They actually put our college in lockdown three or four times by mistake – and, needless to say, that did not go over very well," said David Harrison, Virginia Western's director of information and educational technologies.

The community college obviously needed a way to control the siren locally. For that reason, Virginia Western installed a new emergency system, less than a year ago, that not only prevents more accidental lockdowns but also automates the Roanoke school's own emergency notification process.

Adding even greater urgency to this change was the 2007 "Virginia Tech Massacre," which killed 32 people and hit close to home for Virginia Western and other schools of higher learning throughout the entire state – neighboring states as well. Like many other universities and colleges around the country, Virginia Western focused even more intensely on improving its emergency preparedness efforts. The emergency system the school installed last month, though, is different in several respects from the systems at other colleges. "I think that it is probably one of the most unique implementations in the country," Harrison said.

Levers & Lockdowns, Push, Pull & Added Precautions

More specifically, what Virginia Western did was to install more than 30 blue-colored pull stations, clearly labeled "lockdown," at various locations scattered throughout its campus classrooms and hallways, The lockdowns look similar to the red-colored pull stations used throughout the entire country for fire alarms. When anyone sees something suspicious, that person can simply pull down the lever to start a series of response actions.

At Virginia Western, the campus sirens then go off – automatically, and immediately. Meanwhile, the campus police receive a text message specifying the location of the pull station used. At the same time: (a) Every Virginia Western Alert subscriber receives a text message alert; and (b) The system broadcasts lockdown messages to the college phones in every office and classroom.

With the emergency system, called the Situational Awareness Response Assistant, the college tried to come up with something both innovative and creative. The school's information technology team selected a system that monitors door openings and closings, built it into the emergency system, and added it to the automated lockdown. Since installing the new system, the college has not had any more false alarms.

Also, and probably of equal importance, no one has accidentally pulled down the lever at a pull station. If anyone did pull down one of the blue levers, Harrison commented, the new system would "actually even provide the location of the station that was pulled, so campus police would know exactly where the emergency was." An extra added precaution is that, because the college takes its emergency procedures so seriously, it tests the entire system once a month.

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School officials said that the college will soon start using the system to monitor backup generators in each building. That capability will be particularly helpful in the event of a power outage, because the system would automatically alert the school's support staff. Another upgrade currently planned, for the somewhat more distant future, will occur when the college brings the fire panels in every building onto the emergency alert system.

Major Levee Work Planned for Florida's East Coast

Considerable work must be done to shore up the levees that protect South Florida from flooding, according to new findings from the U.S. Army Corps of Engineers (USACE) – which has been working for several years on revising and updating earlier evaluations of all levees throughout the country, a task prompted by the failure of levees in New Orleans after Hurricane Katrina in 2005.

More specifically: Since 2009, USACE has identified numerous deficiencies in South Florida's East Coast Protective Levee, which keeps the Everglades from swamping not only Palm Beach County and Broward County, but also the state's most populous city, Miami, in Dade County just south of Palm Beach and Broward.

The Corps now has finalized its review of the 100-mile East Coast Protective Levee and found it to be "minimally acceptable" – the middle "grade" on the federal government's new three-tiered, levee-rating system. That evaluation comes after the South Florida *Sun Sentinel* reported last year that the Broward County section of the levee had failed to meet the certification standards established by the Federal Emergency Management Agency (FEMA).

The South Florida Water Management District, which maintains the levee, agrees with the FEMA and USACE findings and is already at work on a projected two-year effort to shore up the levee to a more acceptable rating. There seems to be "no imminent risk [of] failure associated with these levees," said Thomas Strowd, the district's director of operations. "What we are seeing is a post-Katrina emphasis on the levees, and we think that's a good thing." The district plans to spend $15 million upgrading the Broward section of the levee to address the concerns reported both by FEMA and the Corps of Engineers.

Higher Insurance Costs for "At Risk" Homes & Businesses?

The work improving the Palm Beach County section of the levee is expected to cost about $7 million. More work could be required when and if that stretch of the levee does not meet FEMA certification standards. Failing to meet those standards also could lead to higher home insurance costs for those who live in areas considered to be "at risk" from potential levee failures.

Among the many concerns about the levee raised by the Corps' inspectors are the following problems (or potential problems): erosion; the levees being too low; overgrown vegetation that obstructs maintenance; fencing and gates in disrepair; levee slopes being too steep; and culverts needing repair. Those problems, and others, must be fully addressed to "provide a greater degree of certainty that the [levee] system will perform as intended," according to the USACE report.

The levee improvements already underway, or planned to be carried out in the foreseeable future, are the following specific repairs and/or cautionary changes: raising approximately 2,000 feet of the levee about two feet higher; reinforcing certain sections of the outer base of the levee; removing some of the vegetation growing on the levee – and as many as possible of the burrowing animals living within the same vegetation; and installing monitoring stations to identify potential future areas of erosion.

The East Coast Protective Levee is one of the most important sections of more than 900 miles of levees that guard against flooding in South and Central Florida, home to some of the most heavily populated cities in the state. The federal review also highlighted the maintenance needed at various water conservation and treatment areas in South Florida.

Although the possibility of water seeping through the earthen levees is necessary for the restocking of drinking-water supplies, the Corps' position is that the levee improvements are needed primarily to stop the erosion from the sea that can lead to breaches of the levee large enough to cause significant inland flooding.

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