



Hurricane Response - A Virtual Communications Exercise

December 12-13, 2007

After-Action Report

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The New Jersey Business Force is a non-profit, non-partisan consortium of companies and institutions dedicated to improving Homeland Security through effective Public-Private partnerships

NJBF-NJIT VIRTUAL COMMUNICATIONS EXERCISE 12-13 DECEMBER 2007

OVERVIEW

The New Jersey Business Force (NJBF)) and the New Jersey Institute of Technology (NJIT) conducted a virtual, distributed statewide exercise to test available information and communication technologies (ICTs) against the backdrop of a Category 3 hurricane scenario. The scenario depicted a fast-moving hurricane named Edouard making landfall along the New Jersey seashore. In all, 21 companies, agencies and universities from across the NY-NJ region participated. The purpose of the exercise was threefold:

- Experiment with existing NJBF ICTs in innovative ways
- Integrate additional ICTs framed within the Business Emergency Operations Center (BEOC) activity theory/action research strategic plan
- Examine the potential challenges the Private Sector and government can expect when a major hurricane comes ashore in New Jersey

Mr. James Eberwine from the National Weather Service provided the setting by analyzing and reporting on the fictitious storm Edouard. Although New Jersey has considerable experience with hyper-storms and Nor'easters, many decades have passed since it last bore the brunt of a major hurricane head-on. A Category 3 hurricane making landfall along Cape May, Atlantic, Burlington, Ocean, or Monmouth County would undoubtedly damage, degrade and destroy critical infrastructure and, most probably, disrupt existing communication infrastructure and systems for an extensive period.

During such incidents and emergencies, the Private Sector will self-generate information originating from its own domestic and international operations. Hence, a BEOC becomes a communications node for capturing and analyzing data and a conduit for information sharing with other organizations. When activated, BEOCs become additional touch points and clearinghouses for private sector specific information.

A BEOC also supports private sector liaisons assigned to county and state emergency operations centers. From a government perspective, the Private Sector is a large, amorphous entity. Getting one's "arms around" the various business, non-profit and faith based organizations is a daunting task. While this challenge will persist for the foreseeable future, the establishment of BEOCs will help with the process of tapping Private Sector resources by emergency managers in time of need.

A Business Emergency Operations Center model proof of concept was first demonstrated during October's TOPOFF 4 Looking Glass exercise. Looking Glass underscored the importance of decision making based on real-time information during "unfamiliar" emergencies. The Public Sector must negotiate in advance the protocols for engaging the Private Sector during Response and Recovery. To do so after a catastrophe strikes, manmade or natural, is too late.

A primary goal of the virtual exercise was to build a "network of networks" using multiple technology platforms. Experimentation with "mash ups" of systems and technologies can improve information sharing between the Public and Private Sectors and lead to a common operating picture. Previous exercises run by the NJBF, other organizations and under the TOPOFF series have repeatedly emphasized the Private Sector's (businesses, non-profits and faith-based institutions) need for timely, accurate and actionable information to ensure continuity of operations during catastrophic events and, ultimately, economic and societal recovery.

PARTICIPANTS

- New Jersey Institute of Technology
- New Jersey Network
- Monmouth University
- Wayne State University (Observers)
- National Weather Service
- NC4
- NJ Resources
- CIT
- AIG – New York City
- Atlantic County Medical Coordination Center
- Cooper University Hospital – Regional Medical Coordination Center
- Somerset County Medical Coordination Center
- Burlington County Office of Emergency Management
- Hudson County Office of Emergency Management
- Ocean County Office of Emergency Management
- Monmouth County Public Health
- Monmouth County Radio Amateur Civil Emergency Service (RACES)
- Fort Monmouth
- USNORTHCOM – Interagency Coordination Directorate – Private Sector Integration, Domestic Initiatives
- Armament Research, Development and Engineering Center (ARDEC) Picatinny Arsenal (Observers)
- Verizon (Technical Support)

INFORMATION TECHNOLOGIES

December's virtual exercise employed multiple information systems to communicate among sector participants and between organizations. Adapting available information networks in different ways ensured redundancy and connectivity among private sector entities and government agencies. Some participants received information from more than one system: alerts from the NC4 NJBF private channel, two-way audio/visual conferencing over the Marratech network, datacasting of recorded presentations using the broadcast spectrum, and a prototype Business Emergency Operations Center Portal. RACES (ham) operators using Automatic Position Recording Systems (APRS) transmitted private sector SITREPS (situation report) by radio E-mail to NORTHCOM and county public health departments through voice messaging.

The NJBF NC4 private channel provided warnings and updates about the relentless approach of Edouard through the posting of exercise injects. Organizations without access to NC4 could monitor Edouard's march toward the Garden State by logging onto the Business Emergency Operations Center (BEOC) portal at <http://dungeo.com/BEOC-Portal/>. The experimental BEOC portal was constructed by New Jersey Institute of Technology (NJIT) graduate students. The physical site of the BEOC itself was housed on the NJIT campus during December 12-13.

The exercise commenced with warning notices being entered on the NC4 NJBF private channel about the formation and movement of a major hurricane. Next, Jim Eberwine of the National Weather Service gave

three detailed situation reports during the two-day exercise using Marratech video-conferencing provided by Verizon. Marratech technology permitted simultaneous, real-time video/audio streaming and dialogue. Verizon's technicians created a private, secure BEOC room on Marratech for exercise briefings and information exchanges.

The final situation report on Day 2 detailed the impact of Edouard's landfall along the Jersey Shore. Subsequent discussion among video conferees examined the immediate priorities of local OEMs and Departments of Health. The most pressing issues faced involved:

- Implementing mass sheltering as a last resort for those unable to evacuate
- Re-establishing communications with affected areas
- Restoring the medical system
- Conducting damage assessments
- Ensuring good public relations
- Bringing specialized workers into disaster area for restoration actions especially those with sorely needed skill sets like carpenters, electricians, plumbers, etc.
- Creating shared situation awareness with county agencies through parallel communication conduits

Reconstituting the supply chain was a critical Recovery activity for the Private Sector. Considering the potential magnitude and destruction inherent in a regional disaster like the one presented, New Jersey could find itself isolated for an indeterminable amount of time regardless of the Emergency Management Assistance Compacts signed with neighboring states. Self-sufficiency was deemed a desired end state and the only recourse for the hardest hit counties and communities until state and Federal resources are mobilized and deployed. "When will aid arrive?" is a difficult question under these circumstances. Technology does not provide the complete answer but, in the hands of experts, it fosters adaptive decision making through the advantage of collaboration.

The Marratech BEOC Room allowed businesses to review preparatory measures and discuss potential problems with designated County Office of Emergency Management (OEM) and Public Health coordinators. Atlantic, Burlington, Ocean, and Monmouth Counties represented the New Jersey's coastal region. Camden, Hudson and Somerset Counties also participated but to a lesser degree because of commitments or technological issues.

Stephen Datkowitz from New Jersey Network (NJN) used datacasting broadcasts to send live video of James Eberwine's Marratech briefings to locations with DataSecure receivers. Sites with receivers heard Mr. Eberwine's remarks and the comments of others and saw the associated weather maps and slides in real-time. Datacasting employs unused portions of the TV broadcast spectrum. It really serves as a private channel to pass along sensitive information and, like RACES, provides additional redundancy.

While communication over datacasting is a one-way, its broadband features allow transmissions to reach a large and widely dispersed audience. The affordability of its components makes datacasting attractive to organizations with limited budgets. More importantly, datacasting ensures viability when other telecommunications systems like the Internet suffer overload or fail entirely.

Activation of the Business Response Network (BRN) (<http://www.businessresponsenetwork.org/>) was programmed in the Master Scenario Events List (MSEL) for Day 2. The BRN is a registry of private sector assets but houses other capabilities to include the solicitation and preliminary cataloging of spontaneous donations. TOPOFF 4 Looking Glass and the Southern California Wildfires illustrated the importance of specifying those items most in need as a way of preventing lower priority items from clogging the logistics pipeline. The unanticipated direction the Virtual Exercise took prevented a comprehensive test of the BRN. Consequently, the BRN had minimal play this time around. This fact should not overshadow the vital function the BRN performs in mobilizing private sector resources, human and material, during crisis.

The strength, speed and breadth of Edouard would, in all likelihood, preclude the immediate dispatch of mutual aid from states bordering New Jersey. Even with the luxury of advance warning and the assignment of a Principal Federal Officer for emergency management purposes, it would take more than 48-hours at best before the first Federal assistance arrives (exercise assumption). County OEM coordinators can begin streamlining the requisition process by pre-identifying potential private sector resources the emergency management community might need when preparing for a disaster of magnitude. Participants from county agencies believed the Private Sector could help meet the following shortfalls:

- Utility crews for water, gas and electrical restoration
- Food, ice and water
- Cots, blankets and pillows
- Beds for evacuated patients
- Large tents
- Medications, insect repellent and medical supplies
- Heavy equipment
- Light generators
- Tarps, 2X4 lumber, nails and general building materials
- Tires for ambulances, fire trucks and other emergency vehicles
- Flash lights and batteries
- Work boots and socks
- Body bags
- Mental health counselors

Prior to landfall, county officials can also give the Private Sector valuable preparatory guidance. In conclusion, the discussions stimulated by Edouard scenario highlighted the criticality of self-reliance and self-sufficiency.

The Virtual Communications Exercise presented Monmouth County Radio Amateur Civil Emergency Service (RACES) with an opportunity to demonstrate their unique capabilities using “ham radios.” RACES is typically employed during situations where normal governmental communications systems have sustained damage or when additional communications are required or desired. The group is composed of volunteers who are frequently mobilized for emergencies like the recent flooding in the Northwest and Southern California Wildfires. Last October, Southern California lost wireless, cable and Internet services in many communities due to damaged wires, towers and electrical lines. RACES operators bridged the resulting gaps in communications capacity. Under the RACES mission, amateur radio operators provide communications support to emergency management entities throughout the United States and its territories.

When primary means of communications fail, RACES is the backup system of choice since its use of low frequency bands makes it a reliable means of communication assuming the operator has a power source. RACES operators can send voice messages, and, with supporting software, text transmissions and limited packets of information over the Internet. The inclusion of RACES in the Virtual Exercise added another alternative for linking BEOCs to other control centers.

For the Virtual Exercise, Monmouth County RACES sent a BEOC situational report to USNORTHCOM and a request for medical services to Monmouth County Public Health. Public Health agencies in New Jersey have radios but USNORHTCOM received their situation report by radio-generated E-mail. Below, are the messages transmitted by RACES operators during the exercise:

NJBF BEOC Virtual Exercise Message – Private Sector Hurricane Edouard Situation Report

The damage and disruption caused by Hurricane Edouard's landfall in New Jersey has seriously impacted all economic sectors. The utilities industry – water, gas, electricity and water treatment – is the hardest hit. Assessment teams are conducting meticulous surveys in nine of NJ's 21 counties. The interior parts of the state have the best chance of being brought back on line sooner than the littoral areas. The unprecedented loss of homes/buildings and infrastructure will delay restoration for weeks if not months. Health care in the affected areas cannot resume any semblance of normal operations until utilities are fully restored. Damaged roads, abandoned automobiles and debris is limiting trucking activities to about half of pre-storm levels. Hurricane Edouard's fiscal impact will likely exceed \$100 billion based on best estimates.

NJBF BEOC Virtual Exercise Message – Simulated Request for Monmouth Public Health Assistance

New Jersey Resources is requesting Monmouth County Public Health Department give its field emergency repair crews who must enter impact zones inoculations for tetanus and diphtheria. Immunizations should also include cholera among the inoculations required for emergency services and health care workers due to an abundance of standing water, high humidity and swarming mosquitoes.

The virtual exercise examined the interoperability of several ICTs. In particular, NC4 alerts could be datacast and read wherever computers had special receivers, software and antennas. Datacasting hardware has dropped in price and the lower cost now affords an opportunity to field the equipment suite to a much larger audience. Briefings on Marratech could also be recorded and then re-transmitted on the DigitalSecure system. Whereas Marratech is two-way communication in a designated "chat room," datacasting is a one-way transmission. Recipients of a datacast could then contact a BEOC directly or, possibly in the future, respond back through the BEOC Portal or other "back-channels." The example of Fort Monmouth illustrates this point.

Fort Monmouth followed exercise events strictly through the BEOC Portal and was in telephonic contact with the BEOC at NJIT. If Edouard had been an actual Category 3 hurricane, the Post could have monitored private sector developments on the Portal and, in particular, the status of reporting sectors within their locale. Furthermore, CIT monitored the exercise through the NJBF NC4 Private Channel due to firewall issues with the Marratech client. Although the exercise design team knew who was on Marratech, an accounting of who logged onto NC4 or the BEOC Portal was lacking.

NJIT is examining the "human and socio-technical factors" at work during collaborative response and recovery scenarios and analyzing available ICTs to make "human and organizational interfaces" with the BEOC architecture more efficient and effective. The BEOC Portal is in the nascent stage of design and will become more robust with each exercise going forward. Even so, a very promising first-step was taken.

PRELIMINARY EXERCISE FINDINGS

FINDING # 1: A Category 3 hurricane scenario became the backdrop for providing predictive data to a diverse audience using collaborative technologies, the impetus for cross-disciplinary conferencing during prevention, response and recovery as well as possible shortages the Public Sector may encounter during a fast-moving adverse weather event. The ensuing dialogue between public sector and private sector entities produced a candid assessment of the potential hazards and challenges planners from all sectors might face under actual circumstances. The availability of synchronous communications permitted diverse sector groups to connect and overcome geographical distance and organizational barriers. Overall, there was a balanced blend of participants from the Public Sector (OEMs, MCCs, and public health), Private Sector and the Department of Defense. Finally, the virtual exercise was state-wide in execution if not regional in scope.

FINDING # 2: The methodology applied was paradigmatic in terms of how exercises are generally run. A virtual format is free flowing and participants determine their own level of play. Those who joined the Marratech desktop video conference SITREPS and discussions remained at their work stations or offices. The ability to tap one or more information sources saved time and obviated the need to travel to another location. Conversely, firewall or IT policies prevented several agencies and companies from downloading and installing the Marratech client software. In the future, the troubleshooting of technology problems must occur prior to the next virtual exercise. In addition, a systems check is strongly advised.

FINDING # 3: The NJBF experimented with a "mash up" of systems and technologies to identify synergies among systems rather than pursue interoperability with individual platforms. Specifically, New Jersey Network transmitted Jim Eberwine's briefings over DigitalSecure from the NJN Trenton facility. The ability to datacast recorded Marratech sessions exists and upcoming experiments will test this capability along with the redistribution of the NC4 NJBF Private Channel notices through DigitalSecure. Other exercise information was available through NC4, the Business Response Network, Marratech conferencing, and RACES radio operators. Furthermore, Dr. Chumer's Command and Control graduate class built a functioning BEOC portal and posted injects and entries throughout the two-days.

FINDING #4 - New Jersey has formal mutual aid agreements with the surrounding states of Delaware, Maryland, New York, Pennsylvania, etc. During a catastrophic event like the one Edouard portrayed, all contiguous states would undoubtedly experience similar if not a proportional level of devastation and paralysis. The probability of mutual aid coming from a neighboring state would decrease precipitously. Aid would eventually arrive but from states outside the Northeast region, therefore time and distance will, in all probability, thwart a rapid response and recovery.

FINDING #5 – The medical community faced daunting challenges under the conditions depicted in the Edouard scenario. Rains, gusting winds and surge tides would complicate evacuations along the shore even before a Hurricane Warning is issued. Hospitals, trauma centers and residential facilities would face a shortage of transportation assets to move patients and the infirm inland. Treatment centers will in all likelihood encounter shortages of medical supplies and pharmaceuticals due to disruptions in the supply chain. Public Health would turn to the Private Sector for assistance especially in the pre-event phase.

Requests for resources from medical planners through NJ OEM would include vehicles and aircraft. Following landfall, Private Sector support can help make damaged, Medical Coordination Centers (MCC), hospitals and home care facilities operational again.

FINDING #6 – County OEMs make formal requests for resources to the New Jersey Office of Emergency Management through E-Team. State OEM then prioritizes requests received and allocates assets based on need. Remaining shortfalls are then made up by the Private Sector. Medical Coordination Centers gather information and statuses from health care components for forwarding up the chain-of-command. Conceptually at least, the BEOC should have connectivity to the ROIC/NJ OEM for real-time event monitoring and pre-staging of resources to improve responsiveness and incident management support.

FINDING #7 – Today, hurricane preparedness is a 12-month endeavor. Planners and emergency managers must contemplate not only the potential scourge of Atlantic hurricanes but the destructive power Nor'easters can wield. Consequently, risk messaging becomes an important consideration for both government and the Private Sector. Preparing the public for major storms is very important activity especially given the Northeast's lack of experience with major hurricanes. Having a family emergency plan is more imperative now than ever.

FINDING #8 – The proposed BEOC activity theory/action research plan is an outgrowth of both the TOPOFF 4 Looking Glass program and December's Virtual Communications Exercise. Once vetted during 2008-2009, the plan will delineate specific technology thrust areas underlying an array of communication and information sharing capabilities resident within a BEOC and consistent with the President's October 2007 information sharing directive. On-going developmental and experiential initiatives will concentrate on the eventual establishment of a virtual and physical Business Emergency Operations Center.

- Notifications and Alerts – NC4
 - Integration of E-team with BEOC technologies and BEOC login approval to interoperate with the state's E-Team platform
- Notifications and Alerts – NJN
 - Further adaptation of "secure" datacasting
 - Datacasting appliance development
 - Testing potential miniaturized appliances
- Notifications and Alerts – RACES (civilian) and U.S. Army Military Affiliate Radio System (MARS)
 - The MARS program consists of licensed amateur radio operators interested in military communications on a local, national, and international basis as an adjunct to normal communications
 - Use and integration of ham radio technologies for back-up communications
- Collaboration – Marratech
 - Desktop video-conferencing with enhanced capabilities, i.e. integrating cell phone communications
- Collaboration to Achieve Physical Command and Control - Armament Research, Development and Engineering Center (ARDEC) Emergency Operations Center
 - Utilize the new Picatinny EOC facility as a test bed to develop exercise simulations and access technologies
 - Develop and "stand up" a physical BEOC at NJIT
- Collaborative Mobile Command and Control – Monmouth University's Rapid Response Center

- Mobile command and control technology integration with developing BEOC constructs
- Incident Management Support – Business Resource Network (BRN) Database
 - Facilitate resource inventory control and resource sharing functions
- Total Integration – BEOC Portal
 - Transition the integrative BEOC Web Portal from a class project to “working prototype”
 - Further experimentation with adaptable user interfaces

CONCLUSION: December’s virtual exercise accentuated the essentiality of information sharing and situational awareness during a rapidly unfolding natural disaster. The technologies employed throughout the virtual exercise underscored the fundamental elements necessary to build common operating pictures and facilitate decision making. The synergy produced by experimenting with technology systems in new and different combinations will not only increase redundancy and the availability of reliable information sources and but offer viable technology solutions for reaching a larger, more diverse audience. Moreover, cooperation among county agencies and private sector organizations was aided, even if notionally, by leveraging the special features and strengths each network manifests.

A collaborative environment for exchanging real-time information emerged during the virtual exercise which ultimately produced a notable degree of shared situational awareness. The representation of public sector (OEMs, MCCs, Public Health), private sector and Department of Defense entities was conducive to open information exchanges, group analysis and collaborative problem-solving. Obtaining frank participant feedback therefore becomes an important objective during future exercise Hot Wash meetings and will hopefully generate the empirical data necessary to move forward with the next iterations of BEOC activities.

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