RELIEF

Research & Experimentation for Local & International Emergency First Responders

February 2013 [Issue 6]

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Director's Corner

February's event marked the three year anniversary of RELIEF. Like most 3 year olds RELIEF has mostly mastered the transition from crawling to walking and has a few bumps and bruises to show for the effort thus far. One of the lessons that we have learned is that RELIEF is firmly established enough to need its own briefing and coordination session when not held independently of other activities. However that will not be a problem for the May event since for the first time ever RELIEF will be fully funded as an independent field event. See the "What's Next" section for details and keep an eye out for the Request for Information (RFI) that will be released soon.

For the 13-2 event RELIEF hosted delegations, including representatives at the Senior Executive Service (SES) level, from both the Department of Homeland Security (DHS) Science & Technology Directorate and the Federal Emergency Management Agency (FEMA). It is heartening to see these two organizations working together to support the exploration of processes that may make an even larger difference in the lives of those affected by future disasters. I say even larger because a senior FEMA official told me that due in part to the work conducted at the last RELIEF event FEMA was able to help distribute more resource to more people faster than they ever had before. Walking indeed!

However the power of RELIEF remains that it strives to create a *multi-institutional* learning environment and we all know that the federal government is only part of the solution. We must continue to keep the doors open for volunteer organizations, state and local organizations of all flavors, and of course keep exploring the capabilities that new technologies may represent. So send in those white papers and keep the ideas and suggestions coming!

Regards,

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13-2 Experiments

Stream Full Motion Video with Small Packet Throughput Across BGAN Channel – California Army National Guard ◆ Rapidly deployable 4G/LTE system with satellite interconnect – Hughes Wireless ◆ Inmarsat BGAN Converge (BGAN Bonding) New System Testing/Evaluation – Inmarsat / Naval Postgraduate School Hastily Formed Networks ◆ Situational Awareness Mashups at the Edge – Carnegie Mellon University ◆ Blue Force Tactical for Remote Medical Monitoring and Enhanced Situational Awareness – Wireless Innovations ◆ Range Baseline Network – Range Networks Inc ◆ Rapid Open Geospatial User-Driven Enterprise (ROGUE JCTD) – LMN Solutions ◆ Web Style Data Search and Management for Spatial and Non-spatial Data – Voyager GIS ◆ XCapture DM - Real-Time Knowledge Collection and Sharing System for Disaster Management – AlphaTRAC Inc. ◆ Encrypted Twitter Messaging – Ultra-Prologic ◆ Real Time Social Media Analytics for Situational Awareness – IBM ◆ Handheld Telemedicine and Triage for HADR Ops – MedWeb ◆ Innovation Team Framework – FEMA Innovation Team ◆ Humanitarian Emergency Response Operations Logistics Tactical Operations Center HERO LOGTOC Phase II – Strategic Mobility 21 ◆ Very Rapid Response to Natural and Man-Made Disasters: Creating a New Strategic Capability for the United States – SkyLife Tech ◆ Small Aerial Support System – Lockheed Martin ◆ GCS Panther/ Hawkeye III-Lite – L-3 ◆ Imagery Needs to Focus on Operational Risk Management (INFORM) – California State University Long Beach ◆ Fema Corp Tablets – FEMA Innovation Team ◆ Context-Sensitive Situational Awareness Server/Client – Physical Optics Corporation

JIFX Update

For the third time RELIEF was collocated with the Joint Interagency Field Exploration (JIFX) event. Addressing the needs of both Department of Defense and Department of Homeland Security, JIFX focuses on the problem sets of all nine DoD Combatant Commands (COCOMs) as well DHS, the Federal Emergency Management Agency (FEMA), United States Coast Guard, and United States Customs and Border Protection (CBP). The event provides a forum for science & technology innovation and interagency collaboration. In order to achieve this, JIFX first produces a semi-annual Request For Information (RFI) detailing areas of interest to the DoD & DHS entities. JIFX then accepts research proposals written in response to this RFI from a wide array of actors including members of private industry, academia, government research labs, and non-profits. In addition to the benefits of working directly with DoD and DHS science and technology personnel, participants are also provided the opportunity to have their work reviewed by active duty military, Coast Guard, FEMA first responders, and CBP officers to help gauge the utility of the proposed technology at its formative stages of development. We look forward to future collocations of RELIEF and JIFX providing for increased sharing of ideas and resources. *For more information, please email jifx@nps.edu.*

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EXPERIMENTATION RECAP

Problemsolving Domestic Disaster Response: The FEMA Innovation Team

Following the destruction left by Hurricane Sandy, FEMA explored the deployment of a Innovation Team under the FEMA Think Tank initiative. The initiative brought together a diverse group of government and non-government actors to provide solutions to complex problems that emerged in the multi-sector response. These solutions took two forms: problem solving immediate issues in the response and identification of long-term and systemic issues to be addressed in future experimentation venues. It was these long-term systemic issues that were the focus of the Innovation Team's research at RELIEF 13-2. Although several areas were discussed and explored, issues relating to communication and mobile data collection emerged as the primary focus of the event.

Communication. While deployed after Superstorm Sandy, the FEMA Innovation Team had identified a challenge when trying to share a single Internet backhaul solution amongst multiple locations. The lack of deployable terrestrial IP-capable radio solutions were the leading challenge. It was determined that the US Coast Guard, as well as many other USG agencies, already possesses Persistent Systems' WaveRelay technology. An ad-hoc experiment was developed to test the ability to deploy such nodes during a disaster to provide terrestrial backhaul of commercial Internet connectivity between sites. In the experiment, a VSAT from Hughes was transported to a ridge overlooking McMillan Airfield. This experiment not only validated the potential for WaveRelay technology to be used by FEMA personnel during future responses, but also identified a path forward for a policy discussion around created a shared USG backhaul infrastructure during major domestic disaster response operations.

Mobile Data Collection. The Innovation Team's work problem solving immediate issues during the Sandy response included a successful project implementing a ad-hoc, multi-node WiFi network set up by a volunteer group in the RedHook neighborhood of Brooklyn. This network enabled FEMA Corps volunteers to deploy door-to-door in the neighborhood with FEMA-owned iPad tablets, and to register the residents for FEMA assistance without a need for them to travel to a Disaster Response Center. During this process the issues of range and outside interference to the WiFi network were identified as the primary disruptions. The Innovation Team attended RELIEF to explore potential solutions to bolster this capability by problem solving these issues. After linking up with fellow participants from Range Networks, an ad-hoc experiment was designed to examine the potential to establish a private cellular network on frequencies under control of the US Government, which could provide connectivity to the FEMA tablets during future disaster response operations. Range Networks set up an EDGE and 3G cellular network operating in 1800 MHz band which is nationally designated for DoD use. After inserting a non-AT&T SIM card into the FEMA iPads, the tablets were able to view and register on the network set up by Range Networks. They were able to successfully browse the Internet on both EDGE and 3G networks, and could be restored to the original AT&T network easily. This experiment is viewed with great potential to influence FEMA's ability to quickly and accurately gather valuable information during future responses. responses.

For more information on these initiatives please email Desi Matel-Anderson at desiree.matel-anderson@fema.dhs.gov.

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Information Sharing in HADR Operations

Encrypted Twitter. Ultra Electronics hosted an experiment based on their AES 256 bit encrypted Twitter system. Addressing the need for secure sharing of information over Twitter, the group interacted with multiple organizations testing the system's compatibility and application to a multitude of HADR mission-sets. Additionally, the group from Ultra worked extensively with the Joint Vulnerability Assessment Branch (JVAB), a government sponsored vulnerability assessment team, to identify potential strengths and weaknesses in their system. The feedback provided valuable feedback to the system. *For more information, please email Kent Tuley at kent.tuley@ultra.prologic.com.*

Real time social media analytics for situation awareness. Also in the social media vein, IBM attended with a tool that utilizes a set of algorithms and data mining techniques aimed at automating source verification, data relevance, and real time alerting to key decision makers working within the National Incident Management System framework or abroad in support of partner nations or Non Governmental Agencies. During the event the IBM team explored using a social media archive of over 26 million tweets around crisis scenarios, such as Syria, to train a set of models to recognize timely, relevant, and actionable information to alert decision makers. These techniques rely on a series of machine learning and dictionary-based approaches to distinguish value from noise. *For more information, please email Andrew Marvin at amarvin@us.ibm.com.*

Rapid Open Geospatial User-Driven Enterprise (ROGUE). A DoD sponsored Joint Capabilities Technology Demonstration (JCTD), ROGUE seeks to produce, consume and assess unclassified geospatial and geospatially referenced data and information across all members participation in a HA/DR operations. During the event the ROGUE team was able to measure the performance of the systems with multiple user digitization at the same time with more disparate nodes. Additionally, the team explored tying in a web style data search and management for spatial and non-spatial data from fellow participants Voyager GIS. This ad hoc experiment explored the utility of Voyager GIS to augment ROGUE capabilities with GIS harvesting capabilities. *For more information, please email Scott Clark at scott.clark@lmnsolutions.com.*

Situational Mashups at the Edge. Exploring a solution to rapidly provide critical, mission specific information to first responders while limiting their cognitive load, Carnegie Mellon University structured an experiment exploring a solution to integrate public or private data sources, create and execution of custom queries and filters on the data sources, and customize how the data is displayed. The experiment used mostly search and rescue / first responder scenarios to create comprehensible mashups for better situational awareness during joint response operations. During the week, CMU pulled geo-tagged data from CMAS, Twitter, Flickr, and Foursquare for the dates around Hurricane Sandy. The tool enables a visualization of what people were saying about the event, pictures regarding the event and information about the affected areas in real time during the hurricane. *For more information, please email Gene Cahill at gmcahill@sei.cmu.edu.*

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Collaborations in Communication Technologies

Increasing bandwidth. A common communication tool used worldwide, Broadband Global Area Networks (BGANs) are small, tactical satellite connections that allow organizations to connect to the internet through man-portable terminals. BGANs are common tools used worldwide to achieve internet connectivity during disaster response operations but their portability and wide range of operation can only support a relatively small bandwidth connection. Aimed at addressing this issue of limited bandwidth, the Naval Postgraduate School's Hastily Formed Networks (HFN) group attended the event to explore the utility of a new bonded BGAN terminal. Working with the new, bonded BGAN terminal provided by Inmarsat, HFN collaborated with the California Army National Guard to test streaming mull motion video through the new system. *For more information please contact Brian Steckler at steckler@nps.edu.*

Cellular Connectivity. Hughes Network Systems attended the event to test the interoperability of their 4G/LTE system. The group worked with a range of different organizations performing numerous ad-hoc networking experiments addressing the need for rapidly deployable, cellular based networks to support disaster response missions. During an integrated scenario experiment, participants utilized the 4G system, powered off of a emergency back-up power system from MetAir in order to create a tactical network for data to be visualized from a prototype metal detector supplied by Kopis Mobile. The data was visualized on the Department of Energy's RaptorX situational awareness software suite. Bringing together a handful of different participants, this experiment tested a standalone system for first responders to power, network, and visualize field data during a simulated response operation. *For more information, please email Duncan Cameron at Duncan.cameron@hughes.com.*

What's Next...

RELIEF 13-3 & JIFX/RELIEF 13-4

RELIEF (13-3) will occur May 6-9 2013 and will continue to focus on areas of importance to domestic and international humanitarian assistance and disaster response technology and policy.

Stay tuned to our website for information relating to the 13-4 combined JIFX/RELIEF event planned tentatively for August 2013 at Camp Roberts, CA.

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