



**Calhoun: The NPS Institutional Archive**  
**DSpace Repository**

---

Faculty and Researchers

Faculty and Researchers Collection

---

2011-05

## RELIEF Newsletter / May 2011 / Issue 1

Monterey, California: Naval Postgraduate School.

---

<http://hdl.handle.net/10945/37078>

*Downloaded from NPS Archive: Calhoun*



Calhoun is a project of the Dudley Knox Library at NPS, furthering the precepts and goals of open government and government transparency. All information contained herein has been approved for release by the NPS Public Affairs Officer.

**Dudley Knox Library / Naval Postgraduate School**  
**411 Dyer Road / 1 University Circle**  
**Monterey, California USA 93943**

<http://www.nps.edu/library>

# RELIEF

Research & Experimentation for Local & International Emergency & First-Responders



May 2011 [Issue 1]

## Director's Corner

### In this edition

Notes from the  
Director

RELIEF 11-3  
Experiment  
recap

Finding Shelter  
Forced Migration

RELIEF 11-4  
Preview

Please visit  
our  
webpage for  
more  
information

When the Naval Postgraduate School first hosted RELIEF in February 2009 at Camp Roberts, we had hoped to create the same type of dynamic interactive collaborative environment for the humanitarian community already enjoyed by Special Operations research groups. Our first event featured solar energy grids, water purification systems, sustainable shelters and even fresh solar baked cookies delivered by some guy named Crowley. A group of humble hackers known as “crisis mappers” also chomped at the bit, iterating new solutions to humanitarian response, facing the same austere situational constraints (unreliable network access, little cell coverage) as the field workers they aimed to help.

Earlier this month, attendees were back for more RELIEF (11-3). Old players joined new (including more than a dozen virtual participants spread across the globe), in taking advantage of the unique research environment we strive to create, one that encourages innovation and learning the old fashion way: try, fail, learn, repeat.

Taking a page from our own book, we also experimented with some new things this time around, including a simulated migration and a shelter building event. These activities were intended to build camaraderie and bring the challenges of affected populations into sharper focus. Our experience with “try, fail, learn” taught us to not repeat this type of thing again ;-). We’ve realized participants’ time is precious when reaping the intended benefits of the collaboration space RELIEF provides and these activities consumed too much of this limited resource.

We also realized that a formal written report slows the tempo of innovation, and is therefore detrimental to the collaborative spirit RELIEF intends to create. So now, we’ll try to keep you updated with a quarterly newsletter. It should serve as a vehicle for discussion, informing you of relevant happenings, show you who was involved, and tell how to learn more.

At Camp Roberts, **we are the sandbox...** we just need you to bring the toys. Anything goes: gadgets, tools, prototypes, and whatever else you can manage to carry. Whether your contribution is a tangible technology, emergent idea, or general insight and experience from the field, we know it’s valuable. We encourage you to submit your white paper for consideration.

We’re upping the ante for this next RELIEF (11-4). I won’t go into details just yet, but can promise it will be unlike any other RELIEF we’ve hosted before. Apply for an invitation, come join us in Paso Robles **August 3 to 5**, and see for yourself.

As always, the RELIEF team is open to hear how to make RELIEF better for the community. I encourage you to look over this newsletter, discuss it with your colleagues, and let us know.

Best regards,

Ray Buettner  
Director, Field Experimentation  
Naval Postgraduate School  
(rrbuett@nps.edu)

# Crowdsourced Collaboration

Crowdsourced data is here to stay. From earthquakes in Haiti to Japan to civil upheavals in Egypt and Kenya, copious amounts of data have been generated by social networks during natural disasters or other emergency events. These disparate texts, Twitter feeds, and Facebook postings offer valuable information from the ground and from the affected population first responders seek to assist.

Integrating the high volume of input from unknown actors presents a number of challenges, though. The validity of information is uncertain while volunteers struggle to filter important messages into actionable tasks. Over the course of the week, the QuickNets team collaborated with the volunteer and technology community to find answers. By the conclusion of RELIEF, the working group implemented an end-to-end information flow that was capable of filtering several thousand text messages, simultaneously identifying several hundred that contained actionable information including geolocation of the reports for use by responders.

*For More information, contact Mark Bradshaw (mark.a.bradshaw@navy.mil)*



*Arcturus, an unmanned air vehicle (UAV), prepares for launch.*

## RELIEF 11-3 Experiment Recap

Camp Roberts is an ideal environment for this exercise. Connectivity is poor... it's hot, dusty, and moderately barren. It is expected that the next exercise in August will validate the improvements and mark the system as field-ready.

*[Jason Rexillius]*

### Forward Deployed

Armed with a handful of commercial off the shelf (COTS) technologies that fit into a carry-on pack, Jason Rexillius brought a multipurposed, rapid response package to life. The fully self-sustaining kit aims to support humanitarian operations during the first 48 hours of response.

Jason began experimentation with a few general assumptions regarding the operating environment immediately following a natural disaster: **(1)** there is no power grid; **(2)** access to vehicles or generators is intermittent at best; **(3)** most communications networks are null; existing networks are wholly overwhelmed, where "ad hoc networking capability with multiple communications channels are key; and **(4)** response teams should not be expected to be Information Technology (IT) experts.

With these situational constraints in mind, Jason set out to validate the ability of his forward deployed system. He

practiced deployment procedures and various operating conditions in the field, testing connectivity and ad hoc networking procedures along the way. Hardware and software gaps were discovered, including the fact that certain COTS equipment does not fare well in Paso's mild desert temperatures of 95°F or more. As with most humanitarian technologies, however, building hard capabilities is the easy part... it's wading through the soft (i.e. ad hoc) network issues that's much more difficult. One must combat congested WiFi networks and end users' conflicting versions of software, inevitably making an already difficult situation into a monumental clusterjam. Jason hopes to tackle these issues at RELIEF 11-4 with more more trial and error

*For More information, contact Jason Rexillius (contact@rexillius.com)*

# Algorithmic Aides

As mobile connectivity quickly improved in days following the Haitian earthquake, so did the amount of crowdsourced information, much of it coming in Creole. Rob Munro's San Francisco apartment served as traffic hub for the hundreds of thousands of texts flying about.

Since the majority of the aid workers who ultimately used this information only spoke English, the workload on the limited number of translators was high. About 2000 translators were able to work together online to translate 80,000 messages coming from Haiti, but what if there were 800,000 messages or far fewer available translators?

Following from this experience, Munro has created an algorithm that can prioritize messages in different languages. English-only speakers can read translations and identify the most urgent messages while the algorithm continually looks for the most urgent messages in the original Creole.

At RELIEF 11-3, he used data collected from Haiti to test this machine-learning/ natural language processing system. It utilizes a customized algorithm to learn how to identify actionable information within incoming SMS messages in any language despite zero initial knowledge. In this experiment, volunteers on the microtasking system manually tagged messages as 'actionable' or 'not actionable' while the machine iteratively learned the linguistic and spatio-temporal features that will ultimately let a computer system automatically prioritize future incoming messages.

Results indicated that once "trained," the system could potentially give a 10x speed up in prioritization during high volumes of processing, serving as one viable strategy for identifying actionable information in need-in-the-haystack scenarios that can be generated by social media.

*For More information, please contact Rob Munro (rmunro@stanford.edu)*



*RELIEF participants find out what finding shelter really means.*



*Dr. Ray Buettner reflects on the shelter building activity*

## Walking Papers

The Walking Papers system is a paper-based method for creating digital annotations to OpenStreetMap.org. It has been used to successfully annotate large amounts of OSM at once. In its original form, users take pen to paper, marking pathways and various points of interest. These user generated maps are then scanned into back into the digital database that scrubs and integrates the information into existing fully editable open source maps.

User feedback from previous field tests at RELIEF indicated that camera phones would be more available than scanners. For this testing round, Michal Migurski, the creator of WalkingPapers rebuilt the image processing to make it more robust for camera phone usage, adding several features exploring usage with other systems along the way.

During RELIEF, we ran a field test sending participants out to annotate features along the runway at MacMillian Airfield, using a variety of cameras to document the results. Based on user feedback, the team shifted the system from one that required scanners to one that is camera-phone based. While it was found that some phones do not have the proper resolution to transfer data, the group was able to immediately relay this feedback to Michal Migurski (working remotely); he was then able to make realtime adjustments to processing software and send them back to the field for more testing. The community around Walking Papers is further exploring it's application to non-road data, and are planning on further tests in the coming months.

*For more information, please contact Todd Huffman (huffmantm@gmail.com) or Michal Migurski (mike@stamen.com)*



*Safety Sam (Stover), our FEMA S&R expert, directs attention to the affected population during the forced migration activity.*

## Why Micro Tasking?

Thoughts from George Chamales.

The ability for open crowd sourcing platforms to collect intense amounts of information and present information from citizens on the ground is tried and tested. What is often not discussed, however, is the significant amount of time and resources necessary to take a large number of unstructured messages, identify those that are actionable, and determine the location of the message sender. Previous humanitarian-based deployments have relied on various combinations of shared spreadsheets and professional crowd-sourcing platforms that require special technical setup or rigid commercial platforms. Thus far, this approach has proven error prone, inefficient, and wholly incompatible with the unforgiving environments associated with most humanitarian operations.

We tackled this problem by building a microtasking prototype based on an experimental set of programming code, implementing a micro-tasking system for crowdsourced processing of SMS messages received by the Ushahidi platform. As part of the field test, we replayed a set of the SMS messages received during the Haitian earthquake as a result of the ad hoc Haiti 4636 initiative. Utilizing thirty volunteers from around the world, the team filtered, categorized, and geolocated incoming texts using a micro-tasking approach that allowed users to determine actionable messages in a parallelized assembly-line workflow. By the end of the experiment, over 9000 messages were sent through Ushahidi to QuickNets, with 30 international volunteers working in shifts to parse the messages and refine micro-tasking tools; of the approximately 2000 messages processed, 700 actionable reports resulted.

The exercise presented us with an excellent opportunity to evaluate our code, build a structured dataset that could be used by other research projects, and generate metrics that can be used to determine the workforce requirements needed to process these types of messages.

*For More information, please contact George Chamales (george@konpagroup.com)*

# RELIEF 11-4

## What's Next...

At the moment, there is no iterative process for ongoing cross sectoral *research and development* (R&D) within the humanitarian community.

With you, we want to try to create such a process. What are the motivating questions? How could we identify (and qualify) gaps in processes and policy? Who would be involved? What could be done? Above all, *what do you need from a collaborative space to support this kind of research?* Send us your thoughts. We want to know.

Apply for an invitation to join us for **RELIEF 11-4** (August 3-5). Be part of the discussion.

Visit our [website](#). Send us an email ([relief@nps.edu](mailto:relief@nps.edu)). We really want to hear from you. Feel free to forward this on and be in touch.