San Bruno Fire Technical Debrief

Report from Debrief Meeting of Technology Use by Emergency Managers in the San Bruno Fire Incident (started on September 9, 2010)

For public release November 5, 2010

Date of Technical Debrief Meeting: Sept 22, 2010 4-10pm
Location: Google, Mountain View, CA
Organizer: Luke Beckman lukebeckman@gmail.com
Host: Google, Christiaan Adams csadams@Google.com and Brian Biedelman
Report Author: Jeannie Stamberger, PhD, Carnegie Mellon Disaster Management Initiative jeannie.stamberger@sv.cmu.edu
Executive Summary

33 people participated in the debrief meeting hosted at Google (7 via phone) for two hours, with a smaller team remaining for an additional four hours of discussion (see Attendees for complete list of attendance in-person and via phone). The debrief highlighted use of technology in the San Bruno Fire response employed by debrief participants, including novel organization and use of volunteer mappers by Incident Command. We heard a detailed debrief of events from Menlo Park Fire Chief Harold Schapelhouman, and information from the event by people on the ground including: Ryan Zollicoffer (Menlo Park Fire District), Gregory Smith (American Red Cross), Rakesh Bharania and Catherine Nelson (Cisco), Division Chief George Devendorf (Brian Biedelman and Christiaan Adams (Google mapping team), with additional details by Sumathi Lingappa, Sanjay Waghray, and Jake Fuentes (volunteer mappers), and Matt Rossie (San Mateo Sheriff Search and Rescue). Off-the-scene coordinated mapping for utilities described by David Coggeshall. Timelines of actions were provided by Chief Schapelhouman, Jeannie Stamberger, Jim Wollbrinck, and timing of actions also culled from the discussion. Peter Ohtaki described relevant on-going projects including FEMA NET Guard and the California Resiliency Alliance Disaster Asset Registry (CRADAR).

A working group was established, with meetings and sustained interest led by the Carnegie Mellon Silicon Valley Disaster Management Initiative (DMI) to develop solutions within the geographic area of San Mateo County (particularly Menlo Park and San Bruno) initially focusing on mapping data/technology. Solutions include data repository infrastructure and facilitation of communication across NGOs/for profit/for profit tech/volunteers/Emergency management/government, and organizations that act across these sectors. Projects for immediate development include: 1) Push Package of CAD-Dispatched Pre-Identified Resources 2) Registry of Free Volunteer Civilian Services, 3) Emergency Mapping Volunteer Operating Manual 4) Tool Development for Emergency Mapping Needs.

This report summarizes: Currently Available Resources; Observations; Key Observations/Information for Techies; and Next steps.
Currently Available Resources

- 919-392-4646 (24/7 hotline for Cisco Tactical Operations). The Cisco NERV (Network Emergency Response Vehicle) is a NIMS Type II Mobile Communications Center-rated resource that can provide communications resources for most humanitarian relief. Cisco Corporate Social Responsibility funds the van operations. They come with 72 hours of technical support and are fully supplied (food etc).
- California Resiliency Alliance. The California Resiliency Alliance is a public-private partnership, connecting private sector and emergency management. They typically work with CalEMA and private sector liaisons to respond to EOC requests to access private sector resources. Launching 2 projects: 1) NET Guard FEMA pilot project to organize IT, volunteers, and equipment to provide temporary IT service to EOCs or relief organizations. Currently, this project is identifying IT needs such as mapping 2) California Resiliency Alliance Disaster Asset Registry (CRADAR) by AidMatrix. CRADAR is a registry for private sector donated resources that could be made available at the request of incident command. The database also includes emergency contact information of people in the company who can release the resources. The registry was launched in fall 2010.
- San Mateo County Sheriff has 24-inch color paper plotters in Pelican cases.

Observations

- There was duplication of mapping effort, by several different actors including: volunteer teams on different shifts who lacked information or access to previous work; teams on the ground (e.g., ESRI folks mapping in the EOC and volunteer mappers at the ICP); agencies (e.g., work conducted by David Coggeshall for PG&E overlapped with volunteer mapper work).
- Even several weeks after the incident, all professional and volunteer activities are not known. There are stories, but little is known about them. For example, the San Francisco Fire Department saved a neighborhood, animals were rescued, and burn victims were found. A lot happened on the law side, but their actions in the San Bruno fire are not well known in the fire community.
- NTSB’s job improved with early GPS tags of fluorescent tagged blast sites, GPS tagged before the scene was disrupted. This made data analysis possible; they did not have that level of detail before.
- Information was lost in hand-offs. For example, the EOC’s email address was lost in the transfer of teams at 6:30am Saturday September 10 and URL location of Google team My Maps did not get transferred to next team. Reasons for information loss in hand-offs include: not knowing who to hand off information to; not giving information to the right person (e.g., Googlers gave login information to people working in their area, but it didn’t make it to the hand-off team).
The first shift of mappers transferred KML files to the second shift (Googlers), but the second shift did not receive other GIS data or paper maps.

- **Communication among professional groups** initially was with face-to-face meetings. Initially, they drove in trucks from the ICP to EOC to show the Google team maps to the EOC. They later communicated with email.
  - Missing communication links: San Bruno EOC information needed at ICP—such as names of people needing transport, and assistance in the search phase such as who is missing.
  - Cisco Tactical Operations’ NERV was activated, and then cancelled by CALFIRE prior to arrival on scene on Thursday night. The Incident Command Post was aware of the activation but unaware of the cancellation. Cisco NERV was re-activated by NCRIC on Saturday.
  - San Mateo Sheriff Search and Rescue did not know about availability of map products from mapping volunteers.

- **Mapping was done online and offline.** Transitions across online and offline were not always smooth.
  - At first, printing paper maps required driving to Kinkos or EOC.
  - **Cell phone connectivity was patchy** and especially poor at night. Mapping teams established connectivity with a combination of phones of different carriers, and used a mobile Wi-Fi hotspot. The Cisco NERV was used by the Incident Command staff and the Google mapping team once it arrived on scene for augmented communications and connectivity.

- Maps showing impacted area and total number of dwellings were **priceless** for American Red Cross for planning and locating evacuation and shelter sites. [Note – this statement was recorded from Gregory Smith of the American Red Cross, but Mark Lowpensky notes: I know the evacuation site was identified before any mapping was done and I believe the shelters were also all identified before any mapping was started. (These items both occurred Thursday night)]

- **Lack of cross-links among data.** House APNs and owner’s names would have helped.

- **Volunteer mappers were deployed to the ICP and EOC.**

- **How volunteers were recruited – tenuous connection, relied on personal relationships.** The only way that volunteer mappers were recruited was because Chief Schapelhouman had worked with Luke Beckman and knew of his work in Haiti. Chief Schapelhouman was working with e-mail to send the FMAG (CalEMA Fire Management Assistance Grant email) when he saw e-mails from both Peter Ohtaki and Luke Beckman offering assistance. Luke Beckman used his personal connections to activate volunteers in the field. For example, after contact from Luke Beckman, Jeannie Stamberger used Twitter and volunteer group email lists to recruit mapping volunteers. There is concern on the tenuousness of this connection (e.g., what if Luke had been asleep?), and the lack of availability of volunteer resources to those without these personal connections. This needs to change to a system which has more connections (making it more robust) and where use of volunteers is not dependent on personal connections.

- **Could have provided more volunteer mappers.** Two volunteer mappers were sent to the field on Saturday, based on known needs. However we received 7 offers of assistance within 2 hours of the notice going out, 7 additional offers of assistance and an offer of a GigaPan by noon on
Saturday, and 4 additional offers of assistance Saturday afternoon including a trained survey
mapping and 3-D mapping team (Terrain Lab from SRI) and a forensic anthropology team
(Foothill College Dept of Anthropology). Because the request went out at 8pm on Friday night,
offers of assistance were low because many people had logged off for the night. Because it was
over a weekend we only received notice on Monday about the availability of the Nokia/Navtek
3-D laser image car; offers would have pursed if the need was expressed by incident
command. Note from Mark Lowpensky: I am not sure if it was the volunteered GigaPan, but
NTSB did take panoramic pictures of the scene.

- **Difficulty of Volunteers Offering services:** Cisco knew the event happened immediately and
were prepared to offer their services, however, they were not able to get callbacks from the
EOC as the EOC was engaged in supporting the incident. Chief Schapelhouman noted phone
numbers aren’t usually helpful because everyone is calling them. Solution: be part of a pre-
packaged process incorporated into Computer Aided Dispatch (CAD) so you get the call rather
than calling them. Mark Lowpensky notes: - Cisco and the EOC - It is better to call dispatch and
use landlines and not rely on cell phones (being in CAD is the best, but you could always get a
message to someone in the field by calling dispatch and they would relay the messagep.

- Cisco observed **ICS worked**– fire and law worked well together. Chief Schapelhouman said they
used a border-drop system that was very effective.

- For the first time a **public “my map”** generated for the emergency was spammed and had to be
shut down.

- **Data accuracy was a problem in the field.** It would have been helpful to have phone numbers of
people providing data or making previous iterations of maps to call when a data conflict arose.

- **Manual geo-tagging was conducted.** A Googler team went out with cameras, GPS, pen and
paper to collect images of damaged cars (spray painted with a number) and GPS waypoints
of damaged cars and houses. A coding system was developed in the field to link GPS waypoints
with damaged cars (using the number spraypainted on the hood) and damaged houses (used
“B” in waypoint name for building). Manual cross-referencing was then conducted on photos
uploaded in Picassa. Data was not complete. Photos are very useful (worth a thousand words).

Geotagged photos were really helpful when data were aggregated with paper-mapped data,
and data was incomplete and inaccurate. Orientation of image is important.

- **Mappers received data dumps.** People would come by and drop off to volunteer mappers at the
EOC paper maps with hand-written notes and hand drawn maps for entry into a geospatial
database.

- **Primarily one way data transfer.** While people provided data to be entered into maps, maps
containing this information were not widely requested. Reasons could include: 1) people didn’t
know about mapping efforts 2) didn’t know how to use map information

- Observations from Mark Lowpensky
  o Hardware is required for outputting maps
  o Confusion is caused by open vs secured wireless access points
  o It would be useful to have a list/cheat sheet of things we may request from the EOC. For
example, to use ArcView to export the parcel data for a specific area so we do not need
to deal with data for the whole city/county.
Key Observations/Information for Techies

- There are **two types of maps: strategic and tactical**. Strategic maps may be produced every 12 hours and will be used to provide a situation summary to city managers, media etc. Tactical maps are small-scale maps specific for a task/team and are produced every few hours. Tactical maps are printed maps used in the field with constantly updated information.

- **Professional first responders want to use paper maps.** Getting color maps in the field is still an issue; these are often needed. Laser printers are preferred to inkjet, because ink from inkjet printers run when paper is wet. Additional mapping features may improve utility of printed tactical maps such as shrinking placeholders, universal utility in black/white or color printing, and optimizing for small-scale maps (e.g., the scale of a few houses).

- **Not having to pay for civilian services speeds use of services.** Payment requires figuring out who will pay, delaying use of services.

- What is an **ICS Information Unit**? It is a role within the ICS. The purpose of the role depends on if it is used by the Fire Department or Police department. For example, an ICS Information Unit can be for distributing information to the public or to collect information for investigation purposes (e.g. curates clues in an investigation for detectives). However, the current definition of the ICS Information unit role does include information support for emergency operations, such as mapping, connectivity, computers, IT, communications. The latter is an unmet service by the ICS that we could create and civilians provide.

- When generating maps, must be careful about the **level of detail** which is made publically available, or put on strategic maps shown to the media. For example, maps made presented to media removed location of fatalities. However, this information is extremely important on tactical maps.

- ICS does not have a post for interacting with civilians. The ICS post that knows who has **pre-existing intel is probably logistics**.

- **Incident Action Plan** (IAP) is normally updated for each operational period (8 or 12 hours – according to Mark Lowpensky), and printed for the next period (although Jim Varner notes they are produced every few hours). These are needed as hard copies (printed on paper) and digital copies (because most emergency operators are using computers to generate the IAPs and software such as Word Docs and PDF forms). Integration of maps into IAPs is needed. For example, a South San Francisco chief asked for printouts to embed into IAPs.

- **Difficult to offer services currently.** Even if you have the phone number of a commander, they receive so many calls you will be unlikely to get a hold of them. Cisco had the problem of not getting through to the EOC when they heard about the event.

- **How to get through.** It is better to call dispatch and use land lines and not rely on cell phones. Being in CAD is the best, but you could always get a message to someone in the field through dispatch. (-Mark Lowpensky)
Next Steps

Working Group

Solution Working Group

Members of the debrief meeting were invited to develop concrete solutions in a working group. The working group will work with first responders participating in the San Bruno fire (and other first responders) to develop solutions. The Carnegie Mellon Silicon Valley Disaster Management Initiative (DMI) offers continued leadership and a venue to convene meetings to accomplish development of solutions. The working group convened on October 11 at the DMI, and will have further meetings. The working group will develop solutions within the following scope:

- Geographic area: San Mateo County, San Mateo, Menlo Park
- Topical focus: initial focus is mapping data/technology, communicating this information among people and the data infrastructure to move these data
- Actors: NGOs/for profit/for profit tech/volunteers/Emergency management/government, and organizations that act across these sectors

Membership of the working group will expand to include groups not at the debrief meeting such as telecom companies, and other groups (e.g., SendWordNow). The working group will focus on productive cooperation and reduction of overlap/duplication of effort.

Immediate Projects


1. Push Package of CAD-dispatched pre-identified resources

The push package would consist of resources identified in advance of the event that professional first responders can quickly activate during an emergency using the computer-aided dispatch (CAD) system. CAD-activation would speed activation of civilian resources and avoids the necessity of personal relationships to access civilian donated/volunteer resources (the method used in the San Bruno Fire) and the potential problem of someone not getting the call. Initial components may include:

- A network of people to call on including
  - Contact information of people at debrief
  - Registry of Free Volunteer Civilian Services
- California Resiliency Alliance projects: 1) NET Guard FEMA pilot project to organize IT, volunteers, equipment to provide temporary IT service to EOCs or relief organizations; it is currently in the stage of identifying potential needs such as mapping. 2) Disaster Asset Registry (AidMatrix, contact is Keith Thode) will identify private sector resources available for donation directed by incident command with emergency contact info of people in the company who can release that resource (e.g., Cisco NERV); targeted around donated resources; it is currently in the stage of populating the registry.
The skills/talents/capabilities of veterinarians (e.g., technical skills such as computer mapping, veterinary medicine) for emergency responders to immediately draw on in an emergency. The registry may focus on individuals contributing their time rather than organizations. The registry would be incorporated into the computer-aided dispatch (CAD) system, so professional first responders can access civilian resources without personal connections. The registry would have lists of phone numbers and skills/talents/capabilities of civilian volunteers offering their services free in an emergency. Registrants would:

- be credentialed;
- be managed with a civilian command and control system;
- have a code of conduct;
- be briefly familiar with ICS and the rigors of working in a ICP;
- show up with supplies to support themselves for 12 hours;
- show up with basic equipment to accomplish their missions (e.g., laptops); and,
- initially focus on mapping, but ultimately include a range of skills requested by EOCs (e.g., veterinarians to support SAR activity).

A prototype registry will be developed immediately from list of meeting attendees and volunteers responding to mapping request. Maturation of the registry will require addressing several issues that need to be resolved to achieve a working registry:

- How to credential volunteers
  - About: Problem with the friend of a friend is they cannot cross the security line. Chief Schapelhouman had to get these guys to get across the line. Security gets tighter, no uniform or ID.
- How to interface volunteer communities with ICS. Historically, we know that volunteer communities don’t communicate well with ICS. Suggest an ICS staff member to manage this relationship and be the point of contact for volunteers.
- Incorporation of a database of civilians into the CAD system requires support by the professional responder community.
- Development of a 2-pager to familiarize volunteers with disaster operations and best practices (e.g., bring an Ethernet cord, laser printer preferred to inkjet)
- Do the volunteers need to do anything to be covered under DSW? If so, we should ensure they are ready before deployment. See the following resources:
   - 1-2 pager “operating manual” for mapping volunteers, addressing:
     - Credentialing methods;
     - Standard operating procedure;
     - Information transitions/hand-offs across shifts;
     - ICS structure (e.g., battalion chief is the intersection);
     - Prevention of work duplication;
     - Who they should connect with at the scene;
     - Locations where mapping may be occurring; and
     - Information types being mapped.

4. Tool Development for Emergency Mapping Needs
   - Custom icons in a tray. Consider using the Google in-house disaster items as starter list.
   - Feature requests for mapping tools – e.g., being able to print at scale, gridlines for UTM and NGS grids, mechanism for tiling
   - Create standards and best practices for emergency mapping volunteers. Standards may include data formats (e.g., KML, .csv). Standards/best practices would meet a number of needs identified in San Bruno experience including:
     - smoothing the online/offline transition
     - prevent need for duplication
   - Development of a standard push package or template for emergency mapping (e.g., it include necessary layers, appropriate icons, and data in standard formats). The working group will identify what this should look like.

Projects for Later Development
   - DMI as a clearinghouse for sharing of agency and utility data among emergency operation centers during an emergency.
   - Identifying other problems potentially solved by tech
   - Aid speed to check in survivors
   - Credentialing
   - Ease the transition from offline to online
   - Design for mapping types: Tactical use of imaging; Tactical vs. Strategic use of imaging
   - Printers/plotters, Generators, Wi-Fi on the ground
   - Standards for technology hand-off at shift changes
   - Mapping at EOC vs. ICP
Attendees

In person

- Christiaan Adams (Google Earth/Crisis Response)
- Luke Beckman (InSTEDD) (650) 740-5853
- Brian Biedelman (Google)
- Harold Brooks (American Red Cross)
- Ben Chang (Menlo Park Fire Department)
- David Coggeshall (Golden Gate Safety Network)
- Division Chief George Devendorf (CFI, Fire Marshal and Division Chief, San Bruno Fire)
- Jake Fuentes (self, volunteer mapper)
- Sumathi Lingappa (self, volunteer mapper)
- Mark Lowpensky (San Mateo County Sheriff Search and Rescue)
- Peter Ohtaki (Director, California Resiliency Alliance)
- Matt Rossie (San Mateo County Sheriff Search and Rescue)
- Chief Harold Schapelhouman (Chief, Menlo Park Fire Department)
- Mike Sena (Northern CA Regional Intelligence Center, www.ncric.org)
- Trey Smith (NASA Ames, DMI)
- Jeannie Stamberger (Associate Director, DMI) jeannie.stamberger@sv.cmu.edu, 650-380-1158.
- Christa Taylor (InSTEDD)
- Keith Thode (COO, AidMatrix)
- Eric Tsay (Menlo Fire)
- Jim Varner (DMI)
- Sanjay Waghray (self, volunteer mapper)
- Michaela Williams (American Red Cross)
- Jim Wollbrinck (San Jose Water, California Utilities BASIC and CESA)
- Ryan Zollicoffer (Menlo Park Fire Department)

On the phone

- Rakesh Bharania (Cisco Tactical Operations)
- Andrew Brown (SCEWN/DMI)
- Jody Cummings (PG&E)
- Catherine Nelson (Cisco, Tactical Operations)
- Brandon Overbauer (PG&E)
- Eric Park (NASA Ames - GeoCam)
- Elizabeth Proctor (PG&E)
- Gregory Smith (Bay Area Chapter, Director for San Bruno incident, American Red Cross)
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<th>Acronym</th>
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<tr>
<td>APN</td>
<td>Assessor Parcel Number</td>
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<td>BASIC</td>
<td>Bay Area Security Information Collaborative</td>
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<td>CAD</td>
<td>Computer-Aided Dispatch</td>
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<td>CalEMA</td>
<td>California Emergency Management Agency</td>
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<td>CAL FIRE</td>
<td>California Department of Forestry and Fire Protection</td>
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<td>CESA</td>
<td>California Emergency Services Association</td>
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<td>CFI</td>
<td>Certified Fire Inspector</td>
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<td>Cisco NERV</td>
<td>Cisco Network Emergency Response Vehicle</td>
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<td>COO</td>
<td>Chief Operations Officer</td>
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<td>CRADAR</td>
<td>California Resiliency Alliance Disaster Asset Registry</td>
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<td>Disaster Services Worker</td>
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<td>Emergency Operations Center</td>
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<td>A GIS software corporation</td>
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