

Breakout Session 1

Group 3

Data Products

Leader: Maggi Glasscoe

Reporter: Jay Parker

Sang Ho Yun, Mike Burl, Yehuda Bock, Ken Hudnut, Shirley
Tseng

The research described in this article was in part carried out at the Jet Propulsion Laboratory, California Institute of Technology, under contract with the National Aeronautics and Space Administration. Copyright 2011. All rights reserved. Government sponsorship acknowledged.

Question 1: What is the information that you need to respond to an earthquake?



- ✧ Windshield survey
 - ✧ Time intensive (fire department)
 - ✧ Synoptically with imagery?
- ✧ Fires following eq
 - ✧ Incidence response daily tempo - evening reports, overnight assessment, morning assignments
 - ✧ Imagery for updates (more quickly than hourly)
- ✧ Situational awareness
- ✧ Accurate, known, trusted, familiar
- ✧ Stable demonstration product, standardize
- ✧ Prioritized list of where to dispatch responders
- ✧ Hazardous materials, building inventory, structural engineering analysis (licensed; need open data sets, crowd sourced? Red-yellow-green tagging five category damage)

Question 1: What is the information that you need to respond to an earthquake?



- ✧ Red-yellow-green standardizing data products (red - severe impact, yellow - moderate, green - nominal impact) FEMA; political boundaries
- ✧ Match scale of response system with damage
- ✧ Real time image reconnaissance and telemetry and downlink
- ✧ Electro-optical, radar, change detection, on-board processing, translated to kmz

Question 2: What are your needs in planning future events?



- ✧ Coordination with CalEMA HAZUS group & ShakeMap HAZUS scenarios
- ✧ Support for development of OpenSHA?
- ✧ Mirror sites? Data + system
- ✧ Crowd sourcing + geotagging?
- ✧ Quality assessment on algorithms

Question 3: What are the current gaps in the response and planning information?



- ✧ Feed products into manager systems with proprietary layers
- ✧ Limited access to detailed infrastructure information (homeland security/restricted access, licensed, not releasable)
- ✧ Limited building inventory
- ✧ Lifeline information (“public works” but privately owned)

Question 4: How can NASA remote sensing and modeling help fill these gaps?



- ✧ Get plugged into ReOC SOC
- ✧ Get information in timely manner
- ✧ Augment with UAV and integrate with satellites
- ✧ Processing capabilities
- ✧ Development of products across projects – influence how NASA provides data products for response
- ✧ Once data is reported, share data
- ✧ Higher resolution data from classified or commercial sources (ingest imagery)

The applications ...



Every agency is assessing the impact of the event on their infrastructure and making a priority list of actions.

Emergency responders - minimize loss of life

Open roads, fires, building collapses.

Engineering / utility / infrastructure response -

Integrity and impact of secondary hazards

Need to broadcast the findings/ imagery to the larger audience

Need georeference imagery to the SOC A.S.A.P.

What information is needed?



Step #1 - What is the scope of the disaster

USGS products - eq location, shakemap, PAGER, etc

Aerial imager - where is the rupture, what was damaged, secondary risks

Radar, optical, thermal => day/night

Displacements / gradient w.r.t. infrastructure, population

Damage maps

Perimeter of damage/ amount of damage

Minor vs major damage -- need elevation



What information is needed? E-DECIDER

Need high resolution orthorectified optical imagery

Need thermal to recognize and characterize hot spots and the fire hazards

Need thermal to recognize leaking dams and levees

Need radar for cloud penetration

Need radar for night time characterization



What information is needed? E-DECIDER

Reliable pre-event imagery - should E-DECIDER keep an updated archive of pre-event imagery?

Rectified optical imagery for rapid change detection products

Common projection, terrane corrected, etc

LiDAR elevation data building collapse, infrastructure assessment

Mobile platforms for data collection and data delivery

Situational awareness



As the hazard progresses

Expand ROI away from primary area to assess secondary hazards

Extent refinement

Need time-series for post-event and secondary hazard deformation characterization

Probability - situational awareness - puts event into larger context with nearby faults / eq history.

Situational awareness



For dam and levee concerns - should E-DECIDER include inundation models?

E-DECIDER 2012 Golden Exercise Hayward fault

Planning future events



Pre event planning -

geology, stockpile imagery, landslide risks

Logistical

How do you get it? Where is it stored? Data formats? How do you work with it?

How do you deliver the data?

Map interface to the imagery + mobil

Large strips, Google (.kmz)



Gaps in response and planning **E-DECIDER**

One-stop shopping for all available imagery, geodetic, models, etc -- Ease of access + mobile - projections

No reliable, systematically collected imagery - updated

optical, thermal, and radar


Damage estimation tools

Inventory -

Physical infrastructure - lifelines, etc

LiDAR imagery of cities, combined with parcel (value, home type)

How can NASA remote sensing / modeling help?

The logo for E-DECIDER, featuring the text 'E-DECIDER' in a bold, black, sans-serif font. A red circular graphic with a black silhouette of a person's head and shoulders is positioned over the 'E' and 'D'.

Data management and delivery

Orthorectified optical imagery in a uniform projection / data format.

Imagery tied to elevation

Change detection products

Data delivery - Map Servers

One stop site that delivers data, models, products over the internet & mobil devices

Questions?

E-DECIDER 

Gaps in response and planning E-DECIDER

LiDAR elevation for hydraulics, landslides, etc

What information is needed?

Need thermal to recognize and characterize hot spots and the fire hazards

Need thermal to recognize leaking dams and levees

Building on the EEI

Clearing house partners

Mobil platform - access quickly

Two way path, update in realtime

Photos, assessment (geo, engineering, etc)

Need to find the scope of the disaster



What information is needed? E-DECIDER

Step #2 -

Displacements, gradients, inundation models

Should E-DECIDER bring in inundation models as a secondary hazard product?

myplan