Southern California Earthquake Center

Post-Earthquake Response Planning

Mike Oskin, UC Davis
Leader for Geology, Science Planning Committee
The SCEC Partnership

National Science Foundation

5-year Cooperative Agreements for Base Program

USGS

Science for a changing world

National Partners

International Partners

Core Institutions

Participating Institutions
SCEC Mission Statement

• **Gather data** on earthquakes in Southern California and elsewhere

• **Integrate information** into a comprehensive, physics-based understanding of earthquake phenomena

• **Communicate understanding** to the world at large as useful knowledge for reducing earthquake risk
Toward a comprehensive, physics-based understanding of earthquake phenomena

Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3)

Dynamic rupture model on SAF

Shaking hazard model

M≥6.7 Earthquake Participation Rates (per year)
SCEC4 Theme: Tracking Earthquake Cascades

Earthquake origin time

Long-Term Seismic Hazard Modeling

Operational Earthquake Forecasting

Time-Dependent Forecasting

Tsunami Warning

Real-Time Information

Post-Event Information for Response and Recovery

Earthquake Early Warning

Anticipation time

Response time

Single-event cascade

Tectonic loading

Stress accumulation

Nucleation

Slow slip transients

Dynamic triggering

Stress transfer

Fault rupture

Surface faulting

Landslides

Liquifaction

Seismic shaking

Fires

Seafloor deformation

Tsunami

Human casualties

Disease

Socioeconomic aftereffects

Foreshocks

Aftershocks

Century
decade
year
month
week
day
minute
hour
day
year
decade

Anticipation time
Response time

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SCEC Post-Earthquake Response Goals

• Coordinate scientific observations and experiments
  – Fault rupture mapping
  – Instrument deployment
  – See response.scec.org

• Advance and test earthquake science
  – Seismic hazard modeling
  – Ground motion prediction
  – Earthquake forecasting (time-dependent hazard)

• Foster communication and open data sharing
  – Rapid dissemination of information
  – Collection of open community data sets
  – Agency-academic collaboration

• Communicate earthquake science to the public
Two Goals for Aerial Reconnaissance

• Location of fault rupture
  – Preliminary imagery collection
  – Planning for rupture mapping
  – Strategic deployment of instruments (GPS, seismometers)
  – Designing post-earthquake lidar data collection

• Pockets of anomalous rupture
  – Testing and refining ground-motion prediction from aftershocks

• Post-event phenomena (aftershocks, post-seismic creep) decay rapidly, thus it is critical to get information and instruments deployed as quickly as is feasible.
• Aftershocks are the most predictable of earthquakes. Post-earthquake response is an opportunity to improve earthquake forecasting and, perhaps, capture the nucleation phase of a large aftershock.