

ORL Examples in the Community:
Partnerships with the State of California



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The Problem

- Providing actionable data for situational awareness following a disaster is critical to decision makers
 - Improves their ability to anticipate requirements and provide appropriate resources for response.
 - Essential Elements of Information (EEI) necessary to achieve situational awareness are often generated from a wide array of organizations and disciplines, using any number of geospatial and non-geospatial technologies.

We must work to **enable coordination** between research scientists, applied scientists and decision makers in order to **reduce duplication of effort, maximize information sharing, translate scientific results** into actionable information for decision-makers, and **increase situational awareness**.

TRL to ORL Mapping



All Hazards Consortium

Operational Readiness Levels (Focusing on Quality & Availability)

Revised March 10, 2017



- Data available NOW
- Now-Situational Awareness (SA) & Decision Making (DM)
- Person available to contact (Fix the link/service? Interpretive service avail?)



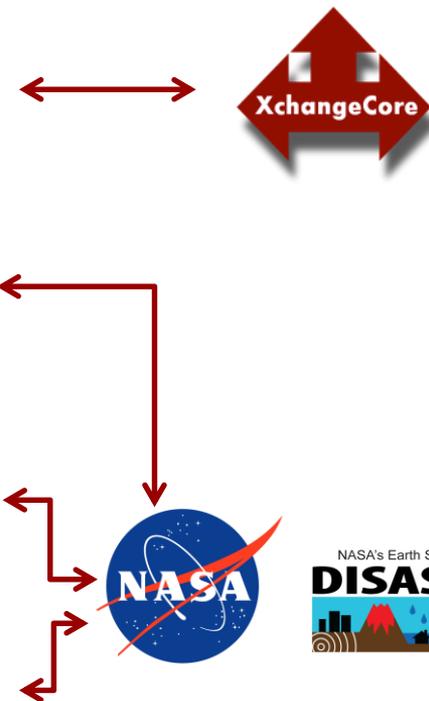
- Data available sporadically
- Event-driven, may be delayed due to acquisition and processing time required
- Could be very useful for SA & DM
- Person available to contact



- Data nearly operational, testing phase
- Not guaranteed
- Could improve SA and DM
- Target operations in 6-12 months



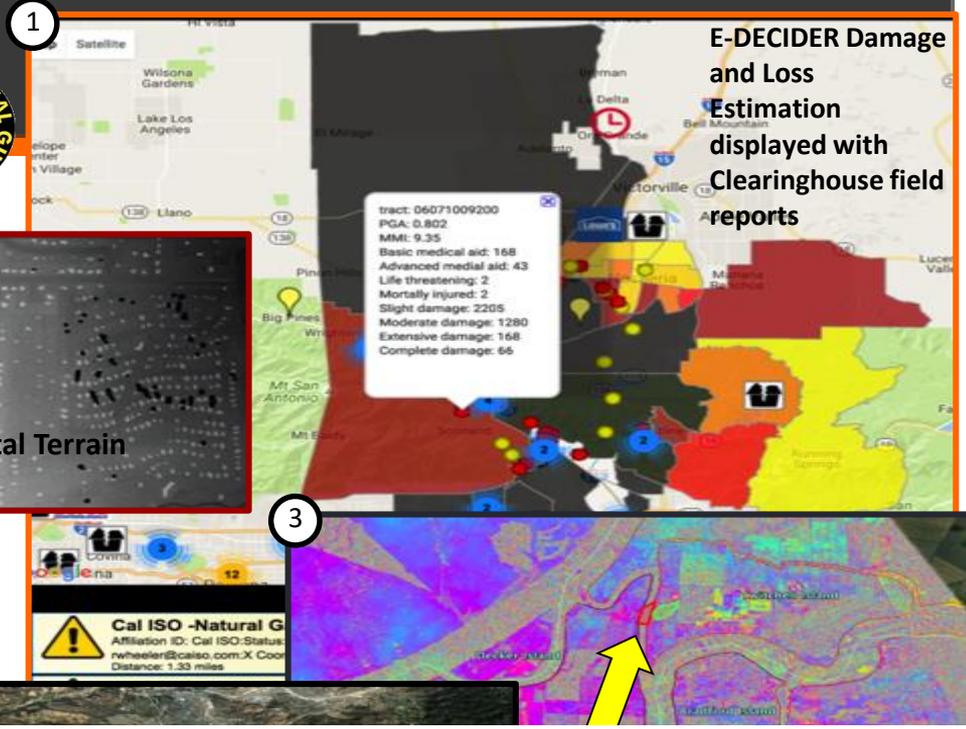
- Data Discovery, collection, processing, testing phase
- Being evaluated for accuracy, validated
- Target for operations 12+ months
- Not likely to be immediately useful for operations



Partnership with the CA Earthquake Clearinghouse: Vigilant Guard 17



- The California Earthquake Clearinghouse, California National Guard, and partners (including NASA) participated from 14-20 November 2016
- NASA provided response products and remote sensing imagery to the Clearinghouse via XchangeCore Web Service Data Orchestration for integration with field response and decision support
- NASA representatives also participated with National Guard imagery analysts at the Joint Operations Center at Beale AFB to provide product integration and analysis support
- NASA provided (1) rapid response assessment products from E-DECIDER and imagery from (2) Airborne Snow Observatory (ASO), (3) Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR), and (4) AVIRIS



E-DECIDER Damage and Loss Estimation displayed with Clearinghouse field reports

2
ASO Digital Terrain Model

3

4



Incident Situational Awareness Exchanged

XchangeCore is a set of web services that: (a) **translate** among different web services data formats back-and-forth for a two-way exchange, (b) **transform** non-web service data formats into web services, (c) **orchestrate** *Common Operational Data* into content packages that assure highest relevance of the data for consumers, (d) **secure agreements** among providers and consumers to assure delivery of content only to authorized applications, and (e) **synchronize data** in real-time by notifying applications of updates to assure currency and consistency across the exchange community.



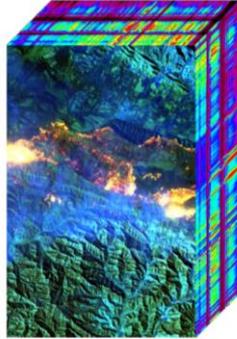
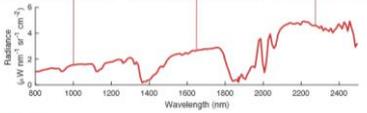
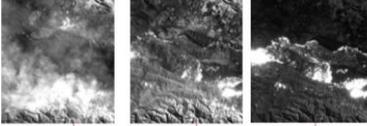
- Data available NOW ← **Technology**
- Now-Situational Awareness (SA) & Decision Making (DM)
- Person available to contact (Fix the link/service? Interpretive service avail?)

NASA Disasters Program Response to CA Wildfires

Spectroscopic Fire Measurements from NASA's Airborne Visible Infrared Imaging Spectrometer (AVIRIS)

AVIRIS is an *imaging spectrometer* that flies on NASA Armstrong Flight Center's high altitude ER-2 aircraft. It observes light in visible and infrared wavelengths, measuring the full spectrum of radiated energy. Unlike regular cameras with three colors, AVIRIS has 224 channels from the visible through the shortwave infrared. This permits mapping of fire temperature and fractional coverage, and surface properties including fuel load.

1000 nm channel: scattered by smoke
 1650 nm channel: sees the surface
 2250 nm channel: sees energy of active fires



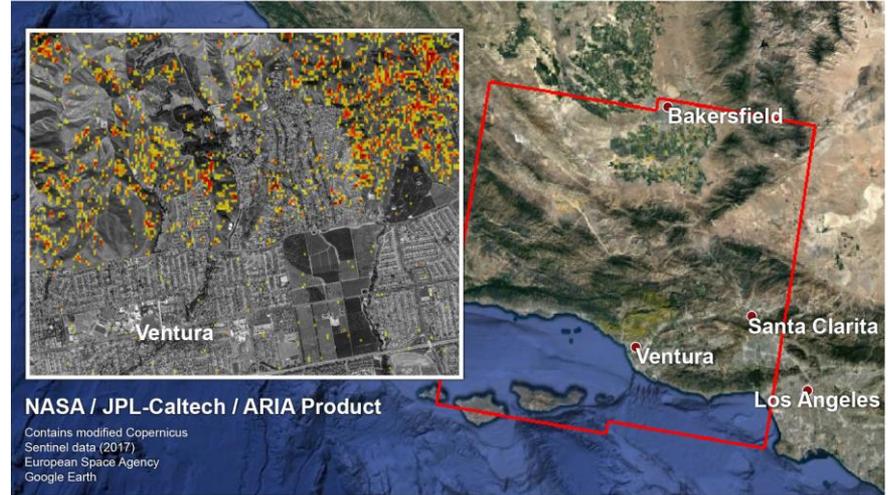
False color image from AVIRIS data cube acquired on Dec 5 2017. The front face shows: (red) active fires at 2250 nm; (green) surface at 1650 nm; and (blue) smoke at 1000 nm.



12/11/17

AVIRIS Imaging Spectroscopy / Jet Propulsion Laboratory, California Institute of Technology

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NASA / JPL-Caltech / ARIA Product

Contains modified Copernicus Sentinel data (2017)
 European Space Agency
 Google Earth

<https://disasters.nasa.gov>



Some final thoughts...

- Data standards and interoperability as defined by “trusted” data will aid with enabling sharing in crisis situations – ORLs are a first step to allow us to assign a standard to data for this
- Technology interoperability and common operational data allow each organization to use the specialized tools and technologies that best support their roles and responsibilities in responding to a disaster
- Will allow better coordination among participating organizations
- EOC managers can make informed decisions about logistics and resources when they have real-time information about the disaster impacts
- Participation in exercises gives us the unique opportunity to both demonstrate capability, evaluate our response process, and improve for future disasters
- Capacity building during and between exercises and leveraging partnerships (particularly such as our long-standing California State partnership) will allow better understanding of stakeholder needs



Thank you for your attention!

Questions?

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