



**SAN DIEGO STATE  
UNIVERSITY**

**Homeland Security Master's Program**

**January 14, 2008  
DHS S&T Conference**

# **SAN DIEGO STATE UNIVERSITY**

**Viz Center**

**Center for Information Technology  
and Infrastructure,**

**Homeland Security Master's Program,**

**Center for Homeland Security  
Technology Assessment**

**SDSU** SAN DIEGO STATE UNIVERSITY

Bob Welty

Eric Frost

<http://citi.sdsu.edu>

Jeff McIllwain

# SDSU Visualization Center

## Example of Data Fusion for Making Decisions

Sensor Networks, Wireless / Optical Communications, Remote Sensing, Imaging, Data Fusion, Data Visualization, and Decision Support



# Homeland Security Master's Program

Two Co-Directors, Eric Frost and Jeff McIlwain for academic program tied to Homeland Security research effort, Co-Directed by Eric Frost and Bob Welty.

Started in 2004 as Interdisciplinary Studies: Homeland Security major, blossomed into fully standalone program, entitled simply “Homeland Security Master's Program”

36 units, 4 core classes, strongly interdisciplinary, primary motivation for students is Public Service

# Homeland Security Master's Program

Spring, 2008, approximately 130 graduate students, including from FBI, TSA, Federal Air Marshals, Border Patrol, Fire, Law Enforcement, industry, Public Health, Coast Guard, Army, Navy, Marines, students

Approximately 40 Faculty from across the University, including Physics, Chemistry, Information and Decision Systems (Business), Geography, Religious Studies, Life Sciences, Tourism, Criminal Justice, Languages, Communications, Public Health, and numerous others.

# Homeland Security Master's Program

## Four Core Classes:

Introduction to Homeland Security

Science and Technology in Homeland Security

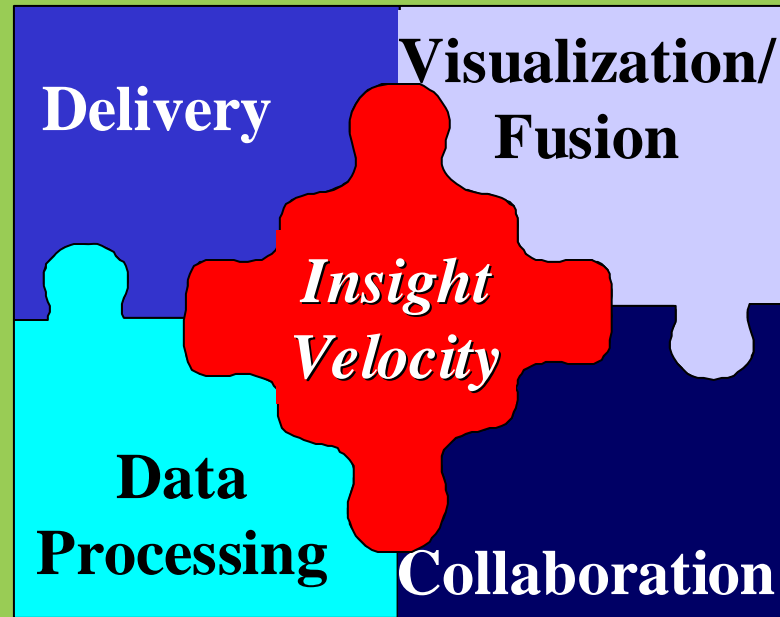
Emergency Management in Homeland Security

Law and Ethics in Homeland Security

Critical Infrastructure Protection, Terrorism and Counter-terrorism, Transnational Crime, GIS and Imaging, Information and Decision Systems, Chemistry and Physics Imaging, Study Abroad, and classes in several dozen departments

# Insight Velocity---Connecting Technology and Policy for Homeland Security

The Gating Factor to Improved Operational Efficiency and Financial Performance is *the Rate at which Information is Consumed and Transformed into Knowledge and Action = Expert Bandwidth!*



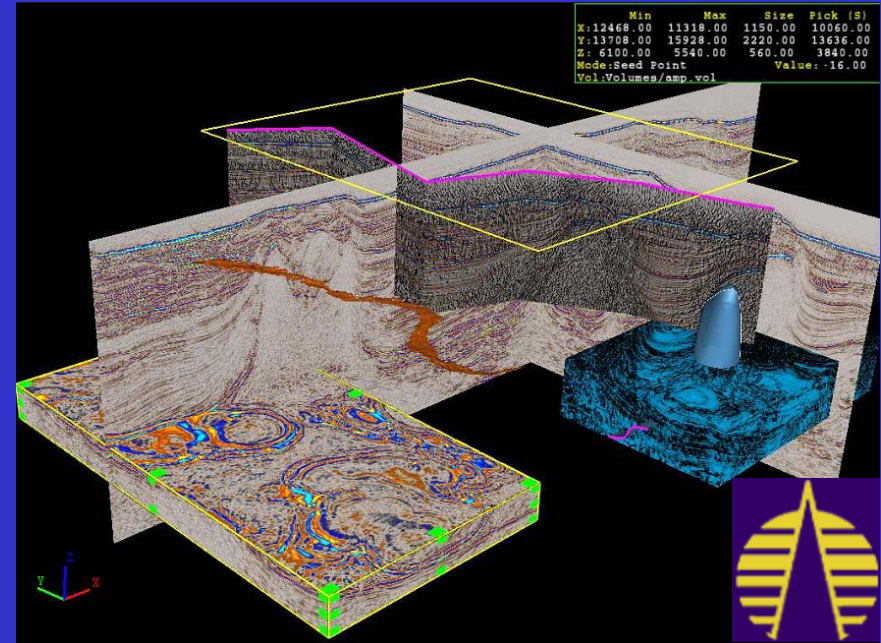
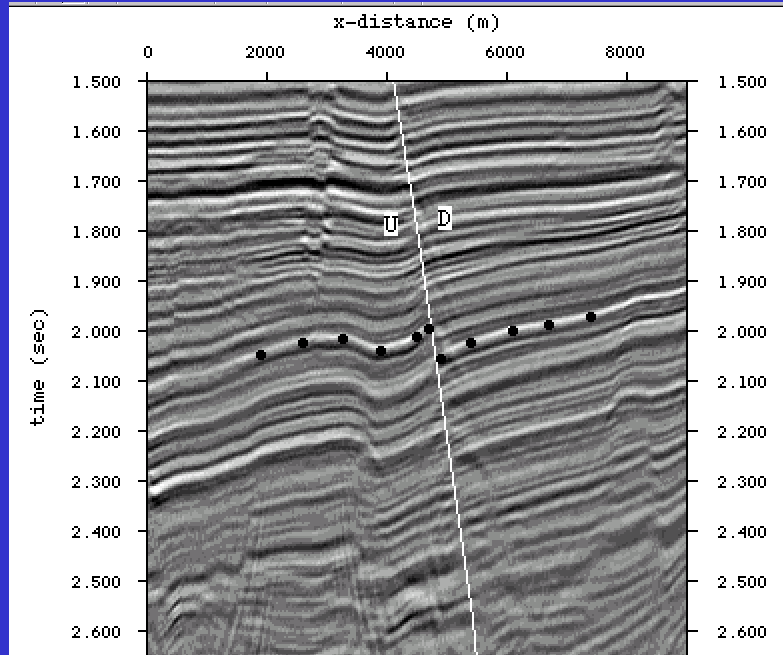
## Scenario

- ✓ Capital
- ✓ Opportunities
- ✓ People

*Plenty*  
*Plentiful but Immature*  
*Bandwidth Limited*



# Delivering Data and Voice and Location Globally, Homeland Security Real Training



**1993**  
100- MB  
10% viewed  
2-3 maps  
12 months  
**800KB/month**

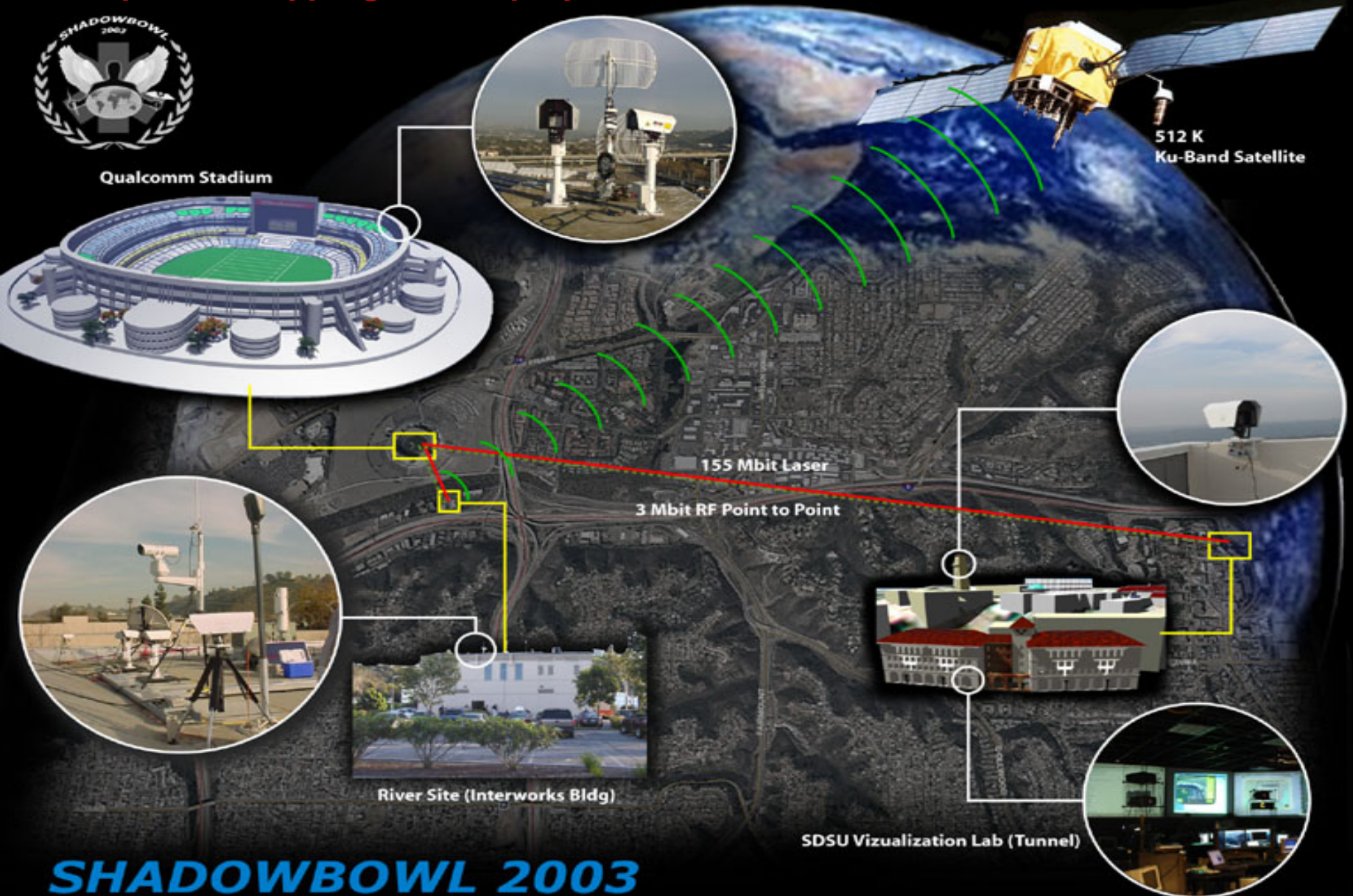
**400,000 fold  
productivity  
improvement**

**2004**  
400+ GB  
100% viewed  
Volumes  
1 month  
**400GB/month**



# Ex: ShadowBowl Communication Networks

Rapid Prototyping and Deployment for Cameras, Sensors, and Data Fusion



**SHADOWBOWL 2003**



# SDSU Viz Center in ShadowBowl

<http://www.shadowbowl.sdsu.edu>



**GPS Satellites**

**Sensors**

**Fire**  
**Pathogens**  
**Weather**  
**Radiation**  
**Chemical**  
**Water**  
**Thermal**



What could WE do  
now, in 2008?

**SHADOWBOWL**



# Mash-up Example: Missing People (icon on image) Using GeoFusion Imagery as Underlayer for any SQL Database



**GeoPlayer™**

**GeoMatrix Gateways**  
Katrina Impact

**Map Layers**

- Digital Globe Satellite
- NOAA Aerial Imagery
- Map
- Earth Bathymetry
- Terrain
- Political Boundaries
- PlaceNames

**Fly To**  
destination

**Find Address**  
(ex: 2300 Selma, New Orleans, LA  
or: Banks and Scott, New Orleans, LA)  
Go

**Credits**  
Katrina GIS Team  
Hosting: SDSU/  
SDSC

Home Help

GeoFusion

New Orleans-Katrina Hurricane Damage

Dry

Wet



Disconnectedness defines danger.

Dr. Tom Barnett, *The Pentagon's New Map*, 2004

Comms first.

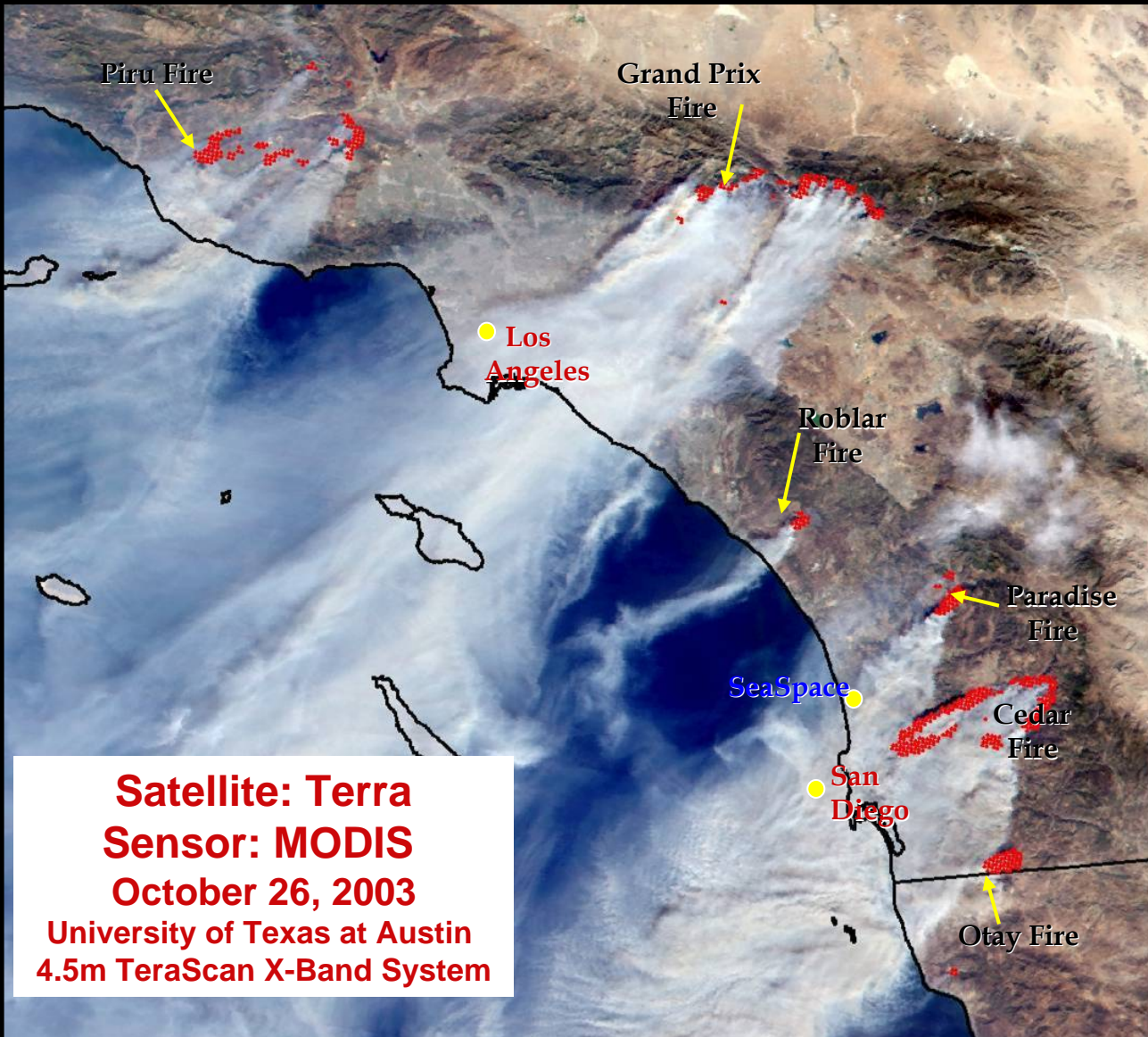
Dr. Sheryl Brown, CIO, United States Institute of Peace



**STRONG ANGEL III**  
INTEGRATED DISASTER RESPONSE DEMONSTRATION

<http://www.strongangel3.net>

# MODIS imagery for Tactical Fire Response



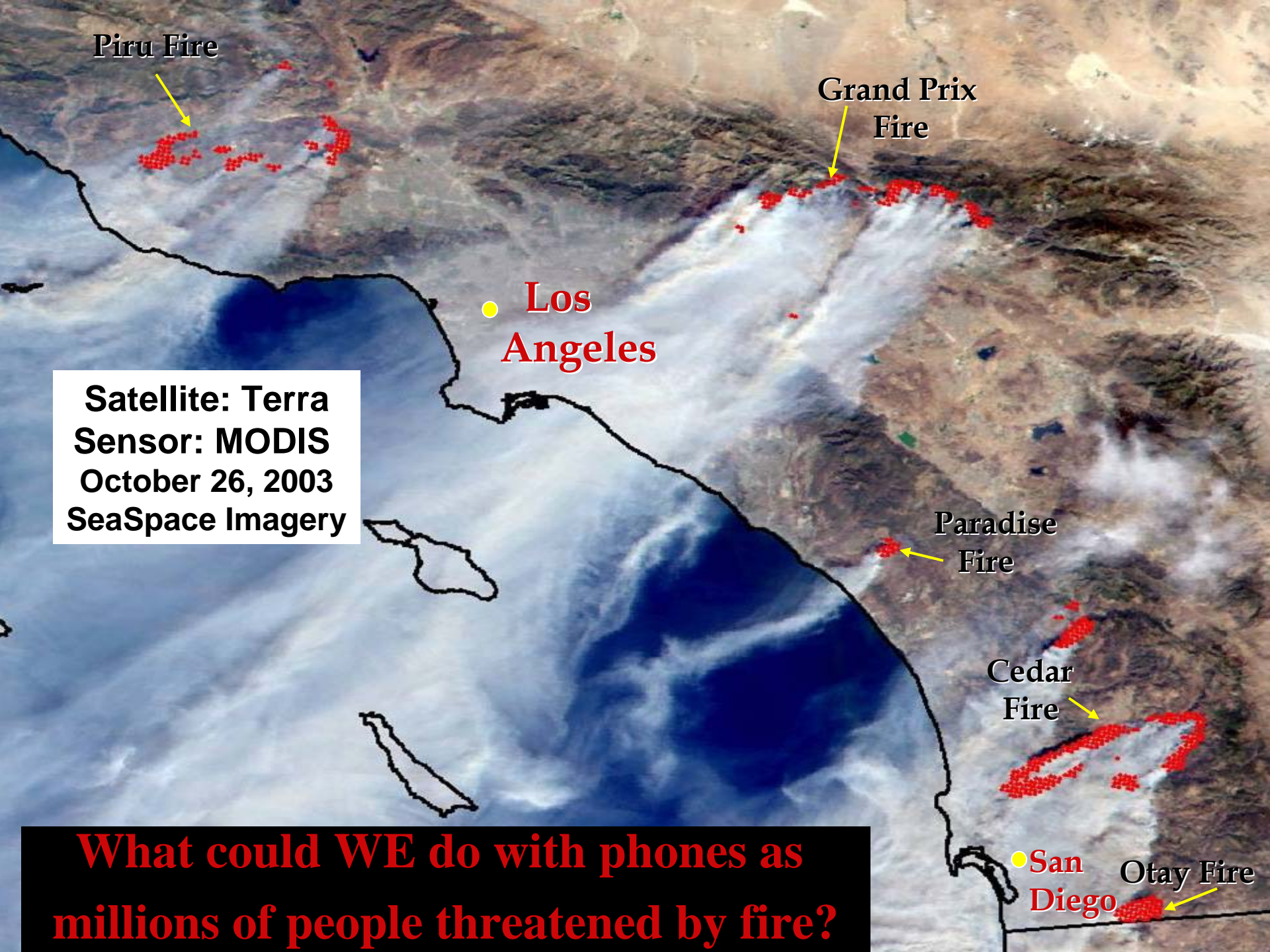
## Vulcan Example:

### The Devastating Southern California Fires of October 2003

- Over 660,000 acres burned
- Over 2500 homes burned
- 24 Deaths

What can WE do  
For Rapid Fire  
Response?





Piru Fire



Grand Prix Fire



Los Angeles

Satellite: Terra  
Sensor: MODIS  
October 26, 2003  
SeaSpace Imagery

Paradise Fire



Cedar Fire



San Diego

Otay Fire



What could WE do with phones as millions of people threatened by fire?