



6<sup>th</sup> European Conference  
of the International Federation for  
Medical and Biological Engineering



# Disaster Management Challenges for Clinical/Biomedical Engineering Professions

## Program Elements and Innovation Resources

**Dubrovnik, Croatia**

September 7-11, 2014

**Fred Hosea III, Ph.D.**



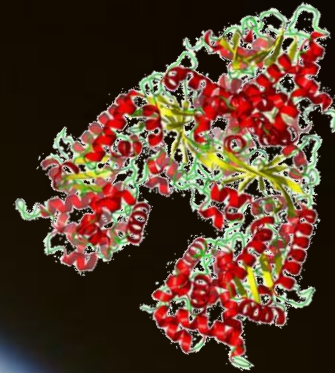
## Caveats

- This presentation is only illustrative of certain possibilities. It is not authoritative, exhaustive, definitive or scientifically based.
- Depending on your country, there may already be large organizational, professional, and budgetary infrastructures in place that are dedicated full-time to Disaster Management. Get to know them, and take advantage of working with them.

The more homework you do, the better you will understand what kind of contributions you and your organization can make, to fill gaps and to advance the field.

- Do drills regularly, and incorporate Disaster Mgt. tools and processes into your normal daily activities to increase your skill and readiness.
- Don't just plan for small, local events that you can manage successfully. "Test to Fail" so you can discover weaknesses in your program and in your wider system relations.
- Make contingency plans, in case high tech fails, staff members are absent, communication is down, and the disaster occurs at inconvenient times and places.

The Scope of Readiness  
required for Disaster Management is vast ...



from Category 5 hurricanes  
to microscopic anthrax bacteria, H5N1 viruses, and Ebola...

Caring for the individual, city, region, to international regions ...

Despite years of effort, most governments, businesses,  
professions, and citizens are poorly prepared.





## What are some causes of DISASTERS?

- Nature
- Ignorance
- False expertise
- Technology failure
- Optimistic/faulty assumptions
- Hostility (ethnic, political, economic, religious, national)
- Deception
- Failure to prepare
- Failure to respond
- Inadequate physical infrastructure and human resources
- Human error
- Terrorist acts
- Economic fraud, criminality
- Political motivations
- Etc.....

... and how can we possibly prepare for so many different risks with so many causes?

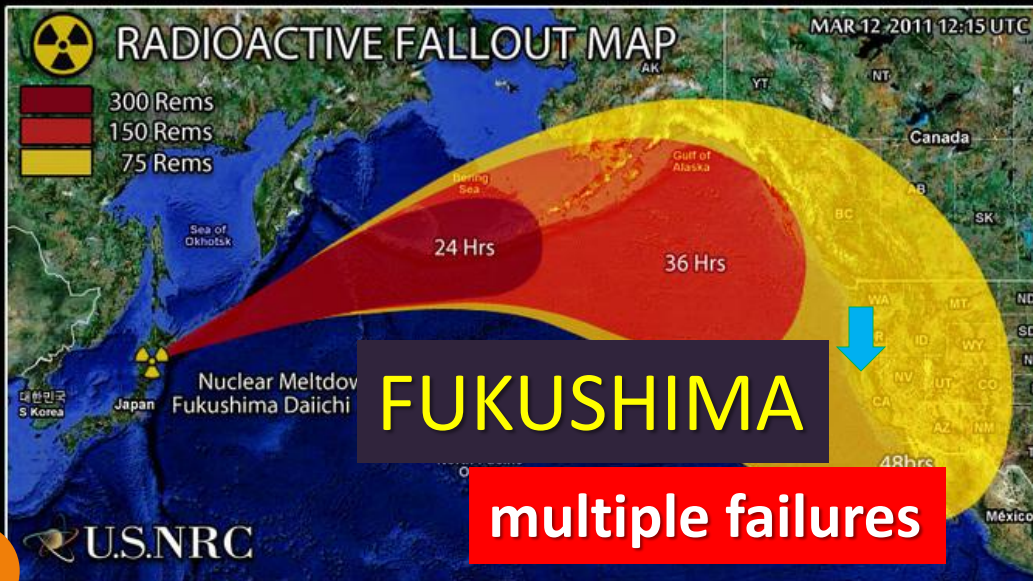


## KATRINA

faulty levee construction  
failure to evacuate  
inexperienced leaders

## CHERNOBYL

reactor design  
human factors



## BHOPAL

negligent design  
no alarms

# Jurisdictions and Resources often do not match Risk areas

NATIONAL DISASTER MANAGEMENT AUTHORITY



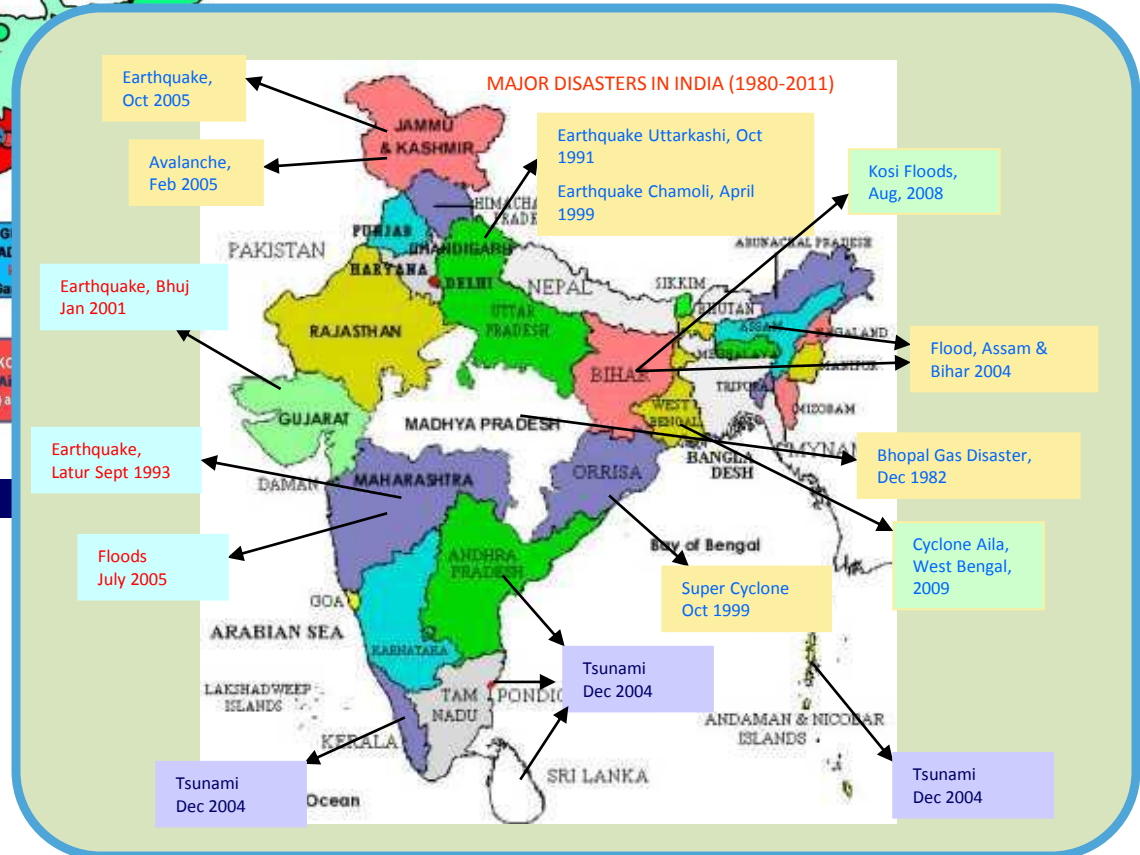
## AREA OF RESPONSIBILITY OF NDRF BNS



### Types of disasters

Biological hazards: epidemics  
Biological hazards: animal and insect infestation  
Geophysical hazards: Earthquakes  
Mass movement dry  
Tsunamis  
Volcanic eruptions  
Drought  
Extreme temperatures  
Wildfires / Urban fires  
Floods  
Mass movement wet  
Tropical storms, hurricanes, typhoons and cyclones  
Storms and tidal waves  
Industrial accidents  
Transport accidents  
Complex emergencies  
Famine/ food insecurity  
Displaced populations

Disasters often are not limited to a single official jurisdiction. Regional and inter-regional capabilities will require planning and coordination, Mutual Aid agreements, and interoperable technologies.





# DOES THIS QUALIFY AS A DISASTER ?

Some disasters are caused by business experts and credit-rating agencies following financial incentives to intentionally mis-calculate Risk...

Expertise??

$$\Pr[T_A < 1, T_B < 1] = \phi_2(\phi^{-1}(F_A(1)), \phi^{-1}(F_B(1)), \gamma)$$

Here's what killed your 401(k) David X. Li's Gaussian copula function as first published in 2000. Investors exploited it as a quick—and fatally flawed—way to assess risk. A shorter version appears on this

...faulty or deceptive expertise in assessing risk impacts millions ...

Probability

Specifically, this is a joint default

Survival times

The amount of time between now

Equality

A dangerously precise concept, since it leaves no room for error.

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THE WALL STREET JOURNAL.

AIG, Lehman Shock Hits World Markets

Focus Moves to Fate of Giant Insurer After U.S. Allows Investment Bank to Fail; Bankruptcies in Talks to Buy Core Lehman Unit



DAILY NEWS

2.5 MILLION READERS EVERY DAY

SHOCK MARKET



de-regulation

## IMPACTS ON HEALTHCARE:

- bankruptcy
- cutting of services
- international destabilization
- foreclosure, eviction
- layoff and unemployment
- substance abuse
- crime
- domestic violence
- homelessness
- medical indigence
- destitution
- depression
- suicide

HAITI



vulnerable infrastructure

9/11



multiple causes

Chronic Starvation



photo by Filipe Moreira

multiple causes  
often not prioritized as a disaster

et cetera .....



# Key Points for Biomedical and Clinical Engineering professions

- Many social institutions around the world have devoted years to planning, preparing, responding, and recovering from disasters. **Many of these plans are outdated, poorly communicated, based on obsolete assumptions and roles, and fail to take advantage of new technologies.**
  - As the next generation of clinical technologies emerge, there will be many **new, gray areas** of professional practice and new responsibilities that will need to be evaluated and assigned to the most appropriate professional group.
  - **Disaster Management is one area among several where the models and technologies of healthcare where Biomedical and Clinical Engineering professions have significant leadership opportunities.**
  - Biomedical and Clinical Engineering professions are often the best informed and most experienced professionals to provide expertise in:
    - Managing the lifecycle of medical devices and systems
    - Understanding clinical workflow vulnerabilities and pragmatic alternatives
    - Managing supply-chain/vendor/manufacturer relations
    - Collegial relations with doctors and nurses
  - Biomedical and Clinical Engineering professions will need to expand and update their scopes of practice, their skillsets, their training and service models and their leadership roles.
- This presentation will present an overview of selected organizational and informational resources for Disaster Management, and identify several promising technological innovations that can improve our ability to prepare for disasters, and provide continuity of care when they occur. The field is huge, and careful work is needed to avoid being overwhelmed by the scope of the challenges.
  - Because of the great variation of disaster types, distribution of government and institutional resources, and socio-economic history, it will be necessary for each hospital/clinic to do its own assessment and plans, using the current models and checklists as reference points, to develop the skills, plans, and working alliances best suited to each location.
  - **Significant resources are currently available at little to no-cost via public/non-profit programs, government grants, open source software and the internet. We don't have to re-invent the wheel.**

For your Safety, please fasten your seat belt .....







# Institutional Resources



# United Nations Inter-agency Clusters support the Disaster Mgt. cycle





# United Nations Hyogo Framework



International Strategy for Disaster Reduction

## SUMMARY of the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters (Hyogo Framework)

### Expected outcome, strategic goals and priorities for action 2005-2015

Where does your  
Organization fit?

#### Expected Outcome

The substantial reduction of disaster losses, in lives and in the social, economic and environmental assets of communities and countries

#### Strategic Goals

The integration of disaster risk reduction into sustainable development policies and planning

Development and strengthening of institutions, mechanisms and capacities to build resilience to hazards

The systematic incorporation of risk reduction approaches into the implementation of emergency preparedness, response and recovery programmes

#### Priorities for Action

**1. Ensure that disaster risk reduction (DRR) is a national and a local priority with a strong institutional basis for implementation**

- DRR institutional mechanisms (national platforms); designated responsibilities
- DRR part of development policies and planning, sector wise and multisector
- Legislation to support DRR
- Decentralisation of responsibilities and resources
- Assessment of human resources and capacities
- Foster political commitment
- Community participation

**2. Identify, assess and monitor disaster risks and enhance early warning**

- Risk assessments and maps, multi-risk; elaboration and dissemination
- Indicators on DRR and vulnerability
- Data & statistical loss information
- Early warning: people centered; information systems; public policy
- Scientific and technological development; data sharing, space-based earth observation, climate modeling and forecasting; early warning
- Regional and emerging risks

**3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels**

- Information sharing and cooperation;
- Networks across disciplines and regions; dialogue
- Use of standard DRR terminology
- Inclusion of DRR into school curricula, formal and informal education
- Training and learning on DRR: community level, local authorities, targeted sectors; equal access
- Research capacity: multi-risk; socio-economic; application
- Public awareness and media

**4. Reduce the underlying risk factors**

- Sustainable ecosystems and environmental management
- DRR strategies integrated with climate change adaptation
- Food security for resilience
- DRR integrated into health sector and safe hospitals
- Protection of critical public facilities
- Recovery schemes and social safety-nets
- Vulnerability reduction with diversified income options
- Financial risk-sharing mechanisms
- Public-private partnership
- Land use planning and building codes
- Rural development plans and DRR

**5. Strengthen disaster preparedness for effective response at all levels**

- Disaster management capacities: policy, technical and institutional capacities
- Dialogue, coordination & information exchange between disaster managers and development sectors
- Regional approaches to disaster response, with risk reduction focus
- Review & and exercise preparedness and contingency plans
- Emergency funds
- Voluntarism & participation

#### Cross Cutting Issues

Multi-hazard approach

Gender perspective and cultural diversity

Community and volunteers participation

Capacity building & technology transfer

Contributing to the achievements of the internationally agreed development goals (including the MDGs)

# United Nations Hyogo Framework

2



Continued  
SUMMARY of the Hyogo Framework for Action 2005-2015:  
Building the Resilience of Nations and Communities to Disasters (Hyogo Framework)

Who are your local and Regional liaisons into the National model?

## Implementation and Follow-Up

In order to achieve the goals and act upon the priorities identified in this Framework, the following tasks have been identified to ensure implementation and follow-up by States, regional and international organizations in collaboration with civil society and other stakeholders. The ISDR partners, in particular the Inter-agency Task Force on Disaster Reduction and secretariat, are requested to assist in implementing this Framework for Action.

### General Considerations

Implementation by different stakeholders, multi-sectoral approach; participation of civil society (NGOs, CBOs, volunteers), scientific community & private sector is vital

States primarily responsible; an enabling international environment is vital, incl. strengthened regional capacities

Build multi-stakeholder partnerships

Particular attention to:  
- Small island developing States: Mauritius Strategy;  
- Least developed countries;  
- Africa

States, regional and international organizations to foster coordination among themselves and a strengthened International Strategy for Disaster Reduction (ISDR)

Follow-up integrated with other major conferences in fields relevant to DRR; reviews as appropriate

### Actors

	States	Regional Organizations and Institutions	International Organizations (including UN System and IFIs)
Critical tasks	<ul style="list-style-type: none"> <li>Designate national coordination mechanisms for the implementation and follow up, communicate to the ISDR secretariat;</li> <li>National baseline assessments of the status of DRR;</li> <li>Publish and update a summary of national programme for DRR including international cooperation;</li> <li>Develop procedure for reviewing national progress including systems for cost/benefit analysis and ongoing monitoring on risk;</li> <li>Consider acceding to, approving or ratifying relevant international legal instruments and to make sure they are implemented;</li> <li>Promote the integration of DRR with climate variability and climate change into DRR strategies and adaptation to climate change; ensure management of risks to geological hazards.</li> </ul>	<ul style="list-style-type: none"> <li>Promote regional programmes including for technical cooperation, capacity development, the development of methodologies and standards for hazard and vulnerability monitoring and assessment, the sharing of information and effective mobilization of resources;</li> <li>Undertake and publish regional and sub-regional baseline assessments;</li> <li>Coordinate and publish reviews on progress and support needs, and assists countries in preparation of national summaries;</li> <li>Establish specialized regional collaborative centers;</li> <li>Support the development of regional mechanisms and capacities for early warning, including for tsunami</li> </ul>	<ul style="list-style-type: none"> <li>Engage in the implementation of the ISDR by encouraging integration of DRR into humanitarian and sustainable development fields;</li> <li>Strengthen the capacity of the UN system to assist disaster-prone developing countries in DRR and implement measures for assessment of progress;</li> <li>Identify actions to assist disaster-prone developing countries in the implementation of the Hyogo Framework, ensure their integration and that adequate funding is allocated; assist in setting up national strategies and programmes for DRR;</li> <li>Integrate actions into relevant coordination mechanisms (UNDG, IASC, RCs and UN Country Teams);</li> <li>Integrate DRR into development assistance frameworks such as CCA/UNDAF, PRSP;</li> <li>In collaboration with networks and platform support: data collection and forecasting on natural hazards and risks; early warning systems; full &amp; open exchange of data;</li> <li>Support States with coordinated international relief assistance, to reduce vulnerability &amp; increase capacities;</li> <li>Strengthen international mechanisms to support disaster stricken States in post-disaster recovery with DRR approach</li> <li>Adapt &amp; strengthen inter-agency disaster management training for DRR and capacity building.</li> </ul>

### ISDR (Inter-Agency Task Force on Disaster Reduction & secretariat)

- Develop a matrix of roles and initiatives in support of followup to the Hyogo Framework;
- Facilitate the coordination of effective actions within the UN system and other international and regional entities to support the implementation of the Hyogo Framework, identify gaps, facilitate processes to develop guidelines and policy tools for each priority area;
- In broad consultation, develop generic, realistic and measurable indicators. These indicators could assist States in measuring progress in the implementation of the Hyogo Framework;

- Support national platforms & regional coordination;
- Register relevant partnerships with Commission on Sustainable Development;
- Stimulate the exchange, compilation, analysis and dissemination of best practices, lessons learnt;
- Prepare periodic review on progress towards achieving the objectives of the Hyogo Framework and provide reports to the UNGA & other UN bodies

### Resource Mobilization: States, Regional and International Organizations

- Mobilize resources and capabilities of relevant national, regional and international bodies, including the UN system;
- Provide and support the implementation of the HFA in disaster prone developing countries, including through financial and technical assistance, addressing debt sustainability, technology transfer, public-private partnership and North-South and South-South cooperation;
- Mainstream DRR measures into multilateral and bilateral development assistance programmes;

- Provide adequate voluntary financial contribution to the UN Trust Fund for DR to support follow-up activities to Hyogo Framework; review usage and feasibility for the expansion of this fund;
- Develop partnership to implement schemes that spread out risks, reduce insurance premiums, expand insurance coverage and increase financing for post-disaster reconstruction, including through public and private partnerships. Promote an environment that encourages a culture of insurance in developing countries.



**UNISDR developed these basic definitions on disaster risk reduction to promote a common understanding on the subject for use by the public, authorities and practitioners.**



The terms are based on a broad consideration of different international sources. Feedback from specialists and other practitioners to improve these definitions will be most welcome.



# Global Disaster Alert and Coordination System



## Global Disaster Alert and Coordination System

GDACS is a cooperation framework between the United Nations, the European Commission and disaster managers worldwide to improve alerts, information exchange and coordination in the first phase after major sudden-onset disasters.



[HOME](#) [ALERTS](#) [VIRTUAL OSOCC](#) [DATA, MAPS & SATELLITE IMAGERY](#) [SCIENCE PORTAL](#) [ABOUT GDACS](#)


### Latest disaster alerts



#### EARTHQUAKES

-  Nicaragua (4.6M) 30 Aug 10:31UTC
-  Tajikistan (4.8M) 29 Aug 01:04UTC
-  Guatemala (5.2M) 28 Aug 08:27UTC
-  Talaud Islands, Indonesia (4.6M) 27 Aug 22:16UTC
-  Southern Xinjiang, China (4.6M) 27 Aug 14:05UTC
-  Syrian Arab Republic (4.7M) 27 Aug 10:02UTC
-  Timor Region (4.7M) 26 Aug 23:58UTC
-  Papua New Guinea (4.8M) 26 Aug 18:16UTC
-  Iran, Islamic Republic of (4.9M) 26 Aug 04:11UTC
-  Iran, Islamic Republic of (4.5M) 26 Aug 01:12UTC

#### TROPICAL CYCLONES

-  CRISTOBAL-14 Bahamas (138.4km/h) 29 Aug 15:00UTC
-  MARIE-14 Mexico (259.1km/h) 29 Aug 09:00UTC
-  KARINA-14 Off shore (130.4km/h) 27 Aug 03:00UTC

Disasters in past 4 days.

### Current emergencies



#### OPEN EMERGENCIES

### News about GDACS



#### LATEST NEWS

### Members

#### LOG IN

Username

Password

Log into

User name can be different for different services.  
To create an account, log in without username.

### Overview map of latest disaster alerts





# UN ORGANIZATIONAL RESOURCES

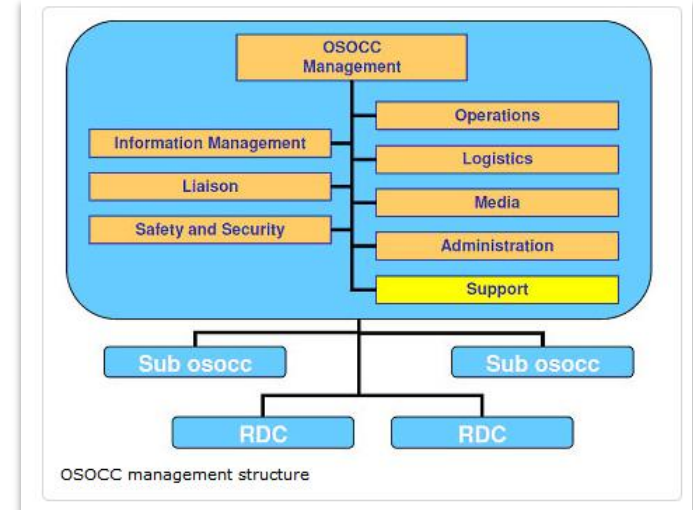
An OSOCC is set up to help local authorities in a disaster-affected country to coordinate international relief. Following a disaster, the OSOCC is established as soon as possible by the first arriving international urban search-and-rescue team or United Nations Disaster Assessment and Coordination team deployed by OCHA.

An OSOCC has three primary objectives:

To be a link between international responders and the Government of the affected country.

To provide a system for coordinating and facilitating the activities of international relief efforts at a disaster site, notably following an earthquake, where the coordination of many international USAR teams is critical to ensure optimal rescue efforts.

To provide a platform for cooperation, coordination and information management among international humanitarian agencies.



## Coordination Tools

- Cluster Coordination
- Surge Capacity
- UNDAC
- INSARAG
- OSOCC & RDC
- Logistics Support
- Humanitarian Civil-Military Coordination
- Needs Assessment
- Environmental Emergencies

# United Nations Risk Reduction Framework



CADRI is an inter-agency initiative whose mission is to expand existing efforts to develop robust and sustainable capacity for disaster risk reduction worldwide. We cooperate with national and local governments, UN entities, NGOs and other international organizations to advance the five priorities of the Hyogo Framework for Action.

<http://www.cadri.net/>

## CADRI core organizations

Our core organizations are the United Nations Development Programme (UNDP), the United Nations International Strategy for Disaster Reduction (UNISDR secretariat), and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA).



### UNDP

UNDP is a global development network: through this network the UN advocates for change and connects countries to knowledge, experience and resources to help their people build better lives.

► [View UNDP](#)



### UNISDR

UNISDR is the inter-agency secretariat of the International Strategy for Disaster Reduction (ISDR). The ISDR system includes all DRR institutions, organizations and practitioners.

► [View UNISDR](#)



### OCHA

OCHA is an entity within the United Nations Secretariat whose role is to strengthen the international community's collective effort, particularly the United Nations System, to make emergency response more effective.



# United States: National Incident Management System - NIMS

## NIMS Resource Center

### Information & Documents

- About the National Incident Management System (NIMS)
- NIMS Document [2.7MB PDF]
- NIMS Brochure [2.3MB PDF]
- National Response Framework Resource Center
- Related Guides, Annexes & Documents
- NIMS Rollout Materials

### NIMS Implementation & Compliance Guidance

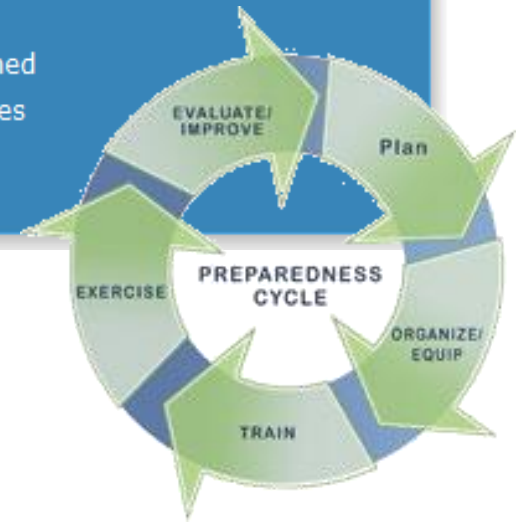
- Implementation and Compliance Guidance by FY
- Implementation and Compliance Guidance for Stakeholders
- NIMS Compliance Assistance Support Tool (NIMSCAST)
- Grants Information

### NIMS Components

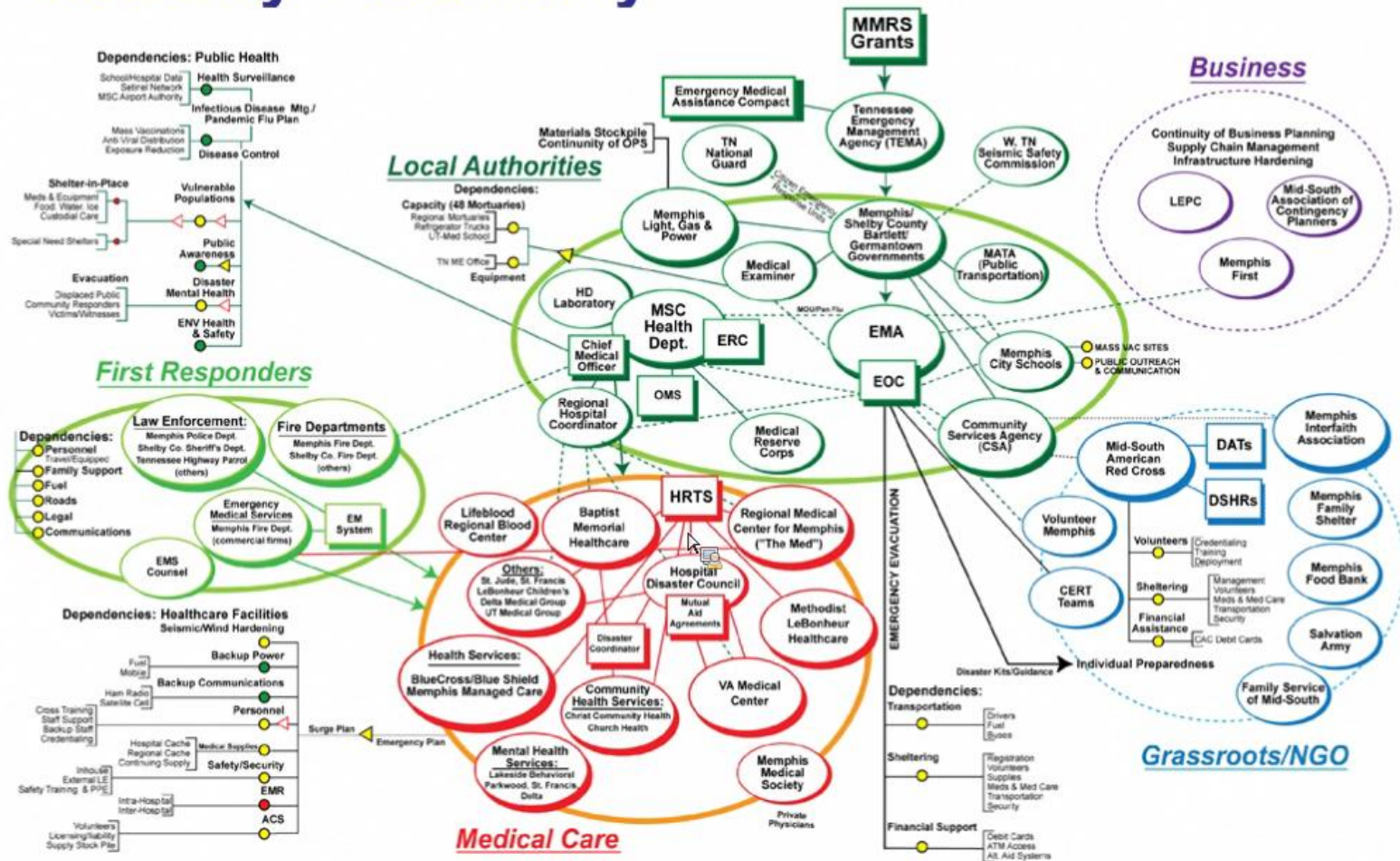
- Preparedness
- Communications & Information Management
- Resource Management
- Command & Management
  - Incident Command System
  - Multiagency Coordination Systems
  - Public Information
- Ongoing Management & Maintenance

### Briefings, Training & Other Resources

- NIMS Briefings
- NIMS Alerts and FAQs
- NIMS Training
- ICS Resource Center
- Smart Practices & Lessons Learned
- Forms/Job Aids, Tools & Templates
- Glossary/Acronyms
- Additional Resources



# Community Relationships: Health Security Taxonomy





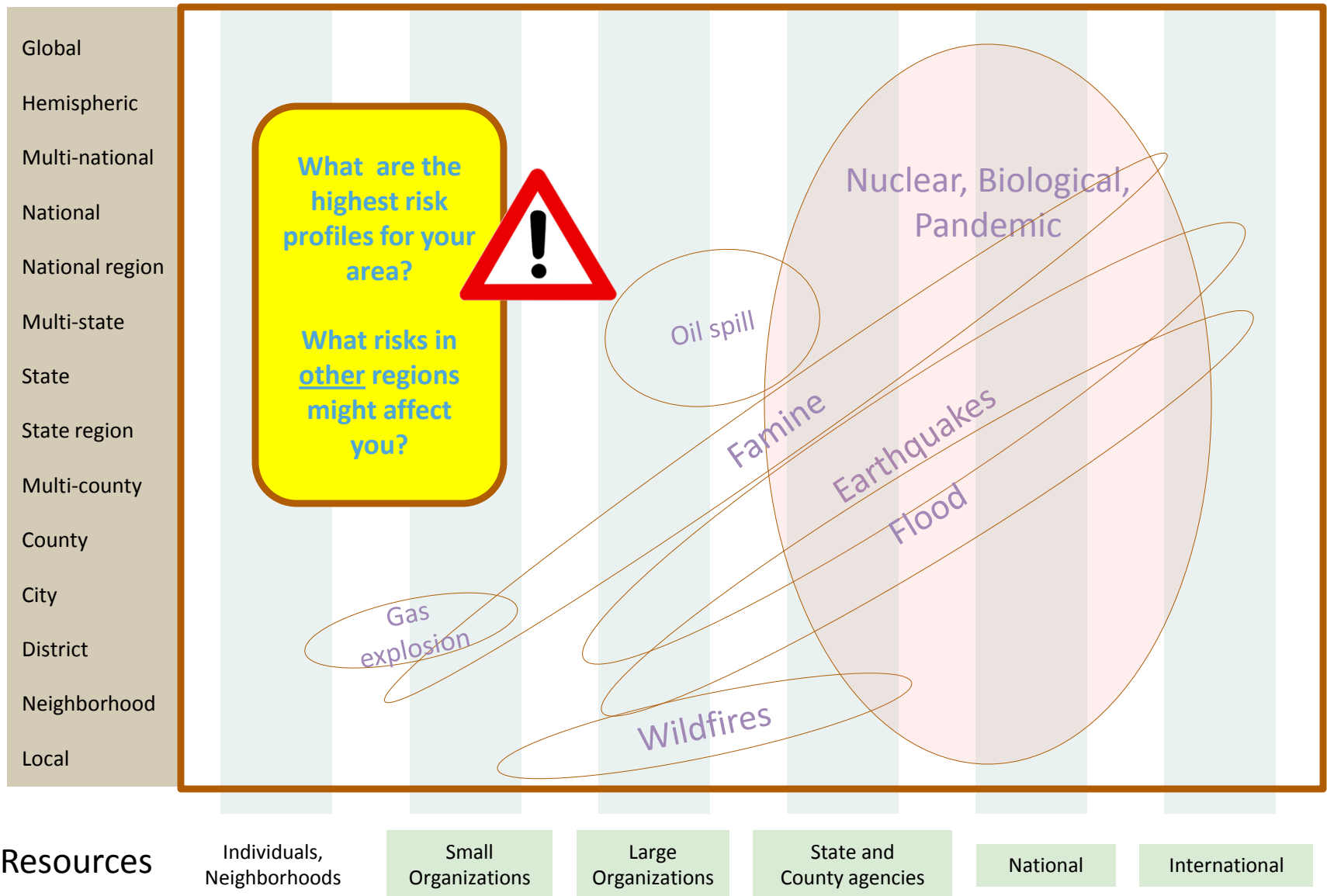
## Who else might need to be involved in your planning?

Building Science Professionals  
Contractors and Vendors  
Children's Working Group  
Disaster Survivors  
Emergency Managers and Personnel  
Fire Service  
Government (Federal, local, and state)  
HAZUS User Groups  
Home (Property) Owners  
Individuals  
Institutions  
Kids  
Language translators  
Livestock Owners  
Parents and Teachers  
Pet Owners  
Individuals with Access & Functional Needs

Press Resources  
Private Sector  
Tribal Representatives  
Universities  
Volunteers  
Language translators  
Livestock Owners  
Parents and Teachers  
Pet Owners  
Individuals with Access &  
Functional Needs  
Press Resources  
Private Sector  
Tribal Representatives  
Universities  
Volunteers

# ORGANIZATIONAL RESOURCES

## Scale of Risk





## A City-based program run by the Fire Department

The Mountain View (California) Fire Department Office of Emergency Services (OES) is responsible for helping city employees, residents, businesses and schools prepare for, respond to and recover from emergencies and disasters, both natural and man-made.

Duties of the Office of Emergency Services include:

- **Preparing** the city by maintaining the city's Emergency Plan and Emergency Operations Center (EOC), and designing and conducting drills and exercises.
- **Training** all city staff on the Standardized Emergency Management System (SEMS) and personal preparedness, as well as recruiting and training members of the city Emergency Response Team (ERT).
- **Planning and coordinating** response for emergencies with other local jurisdictions and Regional, State and Federal Agencies is also facilitated by OES.
- **Serving as a resource** for schools, businesses, community groups, service organizations and neighborhood associations, providing information, training, assisting with exercises and participating in community events.
- Conducting Community Emergency Response Team **(CERT) training** to prepare individuals to assist in disaster recovery on teams and with neighborhood groups. Training and certification is offered to individuals, organizations, school districts, companies and neighborhood groups.
- Assisting in the **formation of Neighborhood CERT Groups** which support the CERT program with information to residents and periodic exercises to practice and maintain CERT skills. When 911 services are not available in a disaster, neighborhood groups can be critical in collecting and relaying neighborhood needs to the city's Emergency Operating Center.



# A large-hospital model for business continuity management



## 10 KEY Operations Concepts

- Mobilizing Emergency Personnel and Resources
- Warning the Staff and Patients
- Taking Immediate Action
- Caring for Casualties
- Assessing the Damage
- Restoring Essential Services
- Informing the Public and Organization
- Record Keeping
- Planning and Executing Recovery
- Evaluating and Improving Performance

Mention of technologies is for illustrative purposes only.  
No endorsement or recommendation is implied.

# Communication Resources

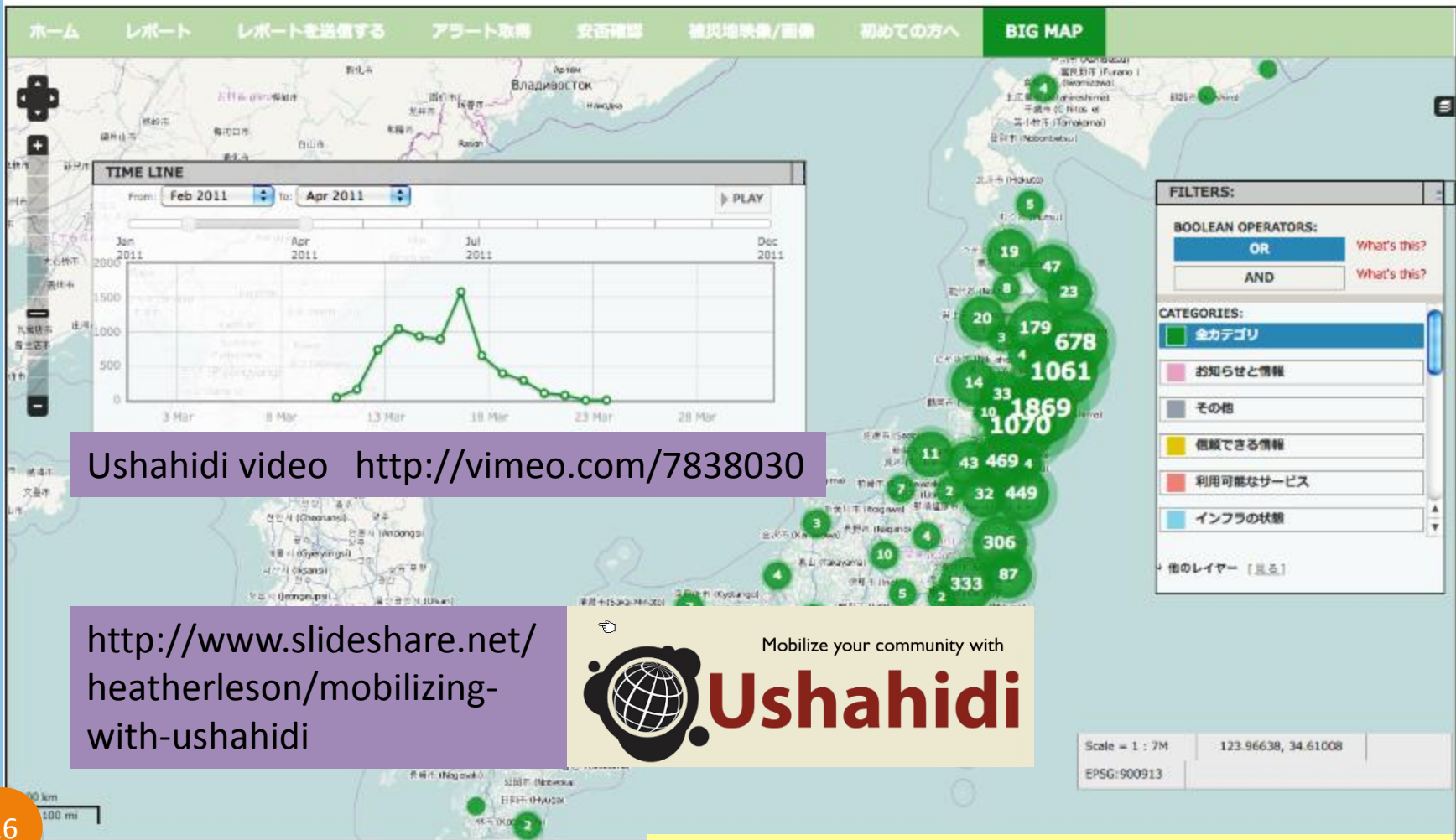


# USHAHIDI SYSTEM USED IN MULTIPLE DISASTERS

## Ushahidi Crisis and Emergency Response

Added by [Heather Leson](#), last edited by [Heather Leson](#) on Apr 20, 2012 (view change)

Mapping Information for crisis or emergency response is one of the best known uses of Ushahidi and Crowdfunder. Inspired by the Haiti response map, individuals technology communities have responded with a maps around the world. There are also preparedness maps and simulation projects.



Mention of technologies is for illustrative purposes only.  
No endorsement or recommendation is implied.

# The Common Operating Picture Platform

## Common Operating Picture

A user friendly internet map for sharing situation awareness among public and private safety organizations during large incidents that require significant coordination of emergency response resources.

**Menlo Park Fire District**  
32 Almendral Ave  
Atherton, CA 94027-4002  
<http://www.menlofire.org/>

FacilityType  
02-Fire  
15 Yellow Update

**Status is: Yellow**  
Doors are jammed!  
small fire in rear.  
Water leaking,  
phones are out  
DavidC@08-20 01:32:41  
Clear Add Comment Save Cancel

Facility Status

Facility Info

Resource Info

San Mateo  
**Menlo Park Fire District**  
MNL  
03  
32 Almendral Ave  
Atherton CA 94027-4002  
x  
<http://www.menlofire.org/>  
Latitude 37.46258 Longitude -122.206296

searchKey MNLE3  
CallSign E3  
Type EngineType1  
FEMAKind  
FEMAType

  
EquipPhotoName E3 2007 Pierce Dash.oif  
PhotoKey MNLE3



School

Water Leak

GPS Tracking

Display Controls



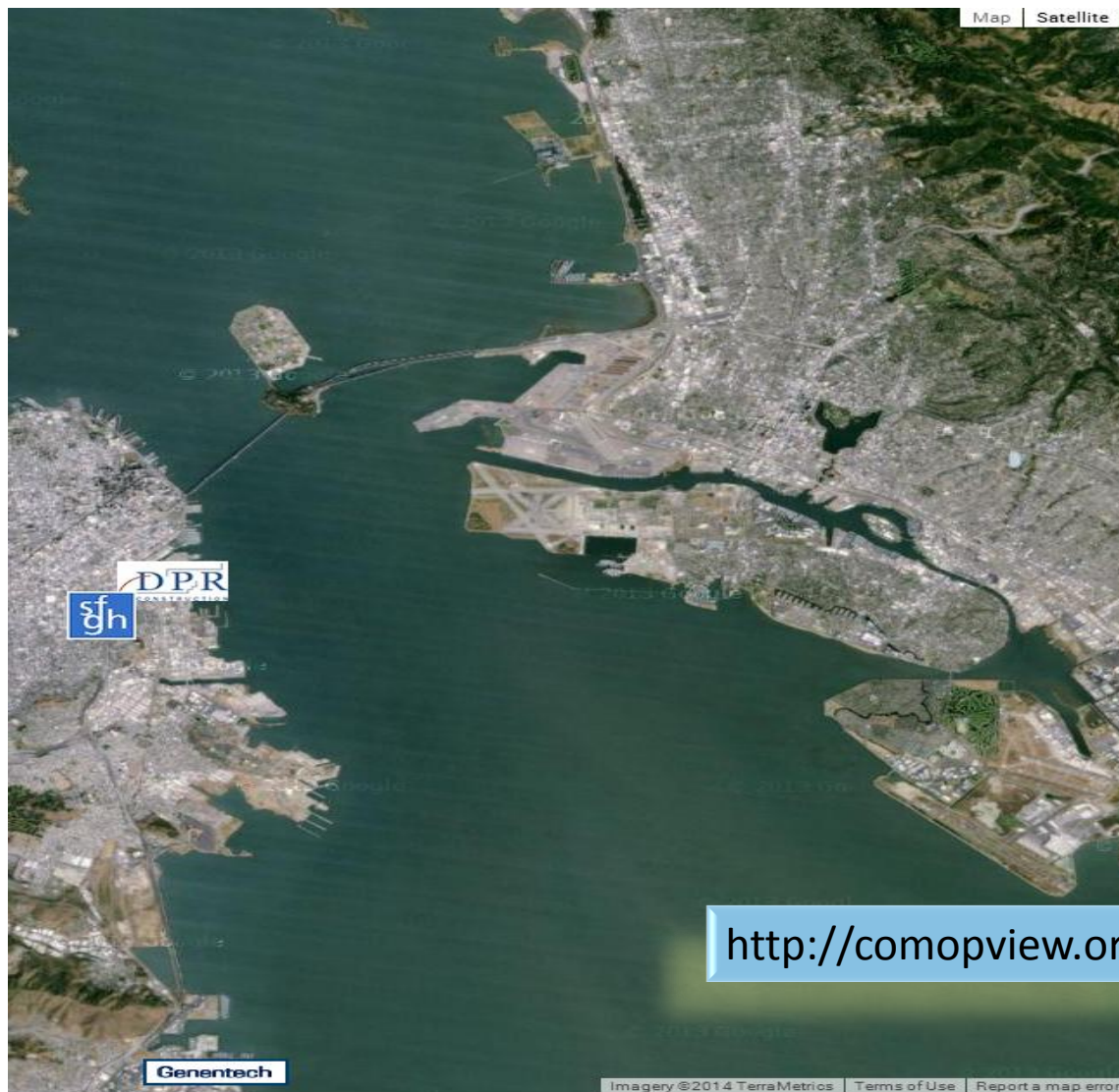
# Regional Network of Agencies



## Golden Gate Safety Network



# Regional Overview, Demonstration Sites



## Interactive FloorPlans Demonstration Sites



Genentech



USF - Harney



UCSF Building 3



SAN FRANCISCO  
PUBLIC SCHOOLS



UCSF Hospital



Sacred Heart Campus



Palo Alto Schools

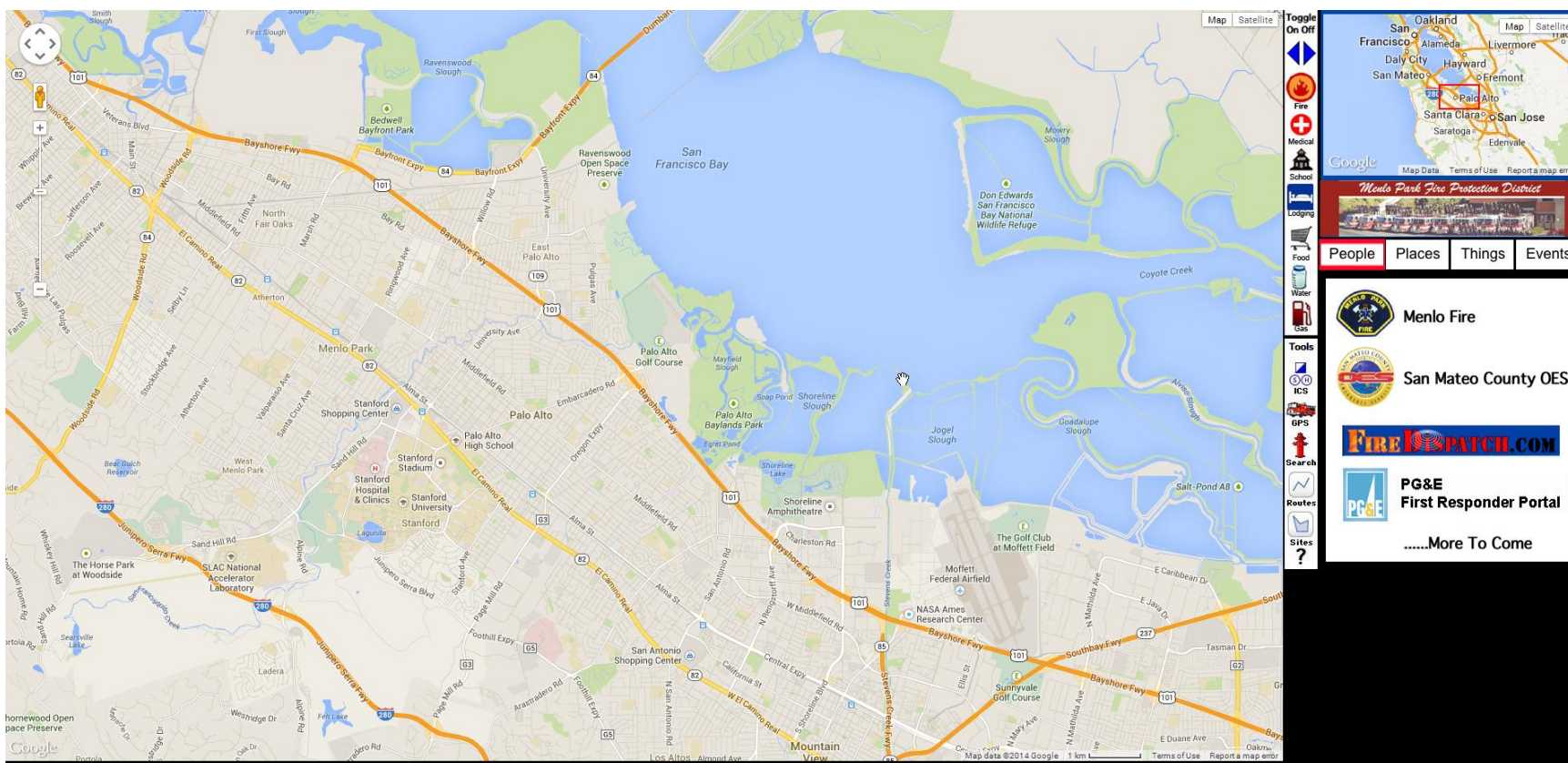


Carnegie Mellon B23

<http://comopview.org/sfc/>

# City Focus

<http://dsl017-119-127.sfo1.dsl.speakeasy.net/menlofire/index.html>





# Building / Facility Focus



Carnegie Mellon University  
Silicon Valley



Floor Plan Prototype  
CMU SV - Building 23

Floor 2

Floor 1

Site

Basement

<http://comopview.org/cmu/>

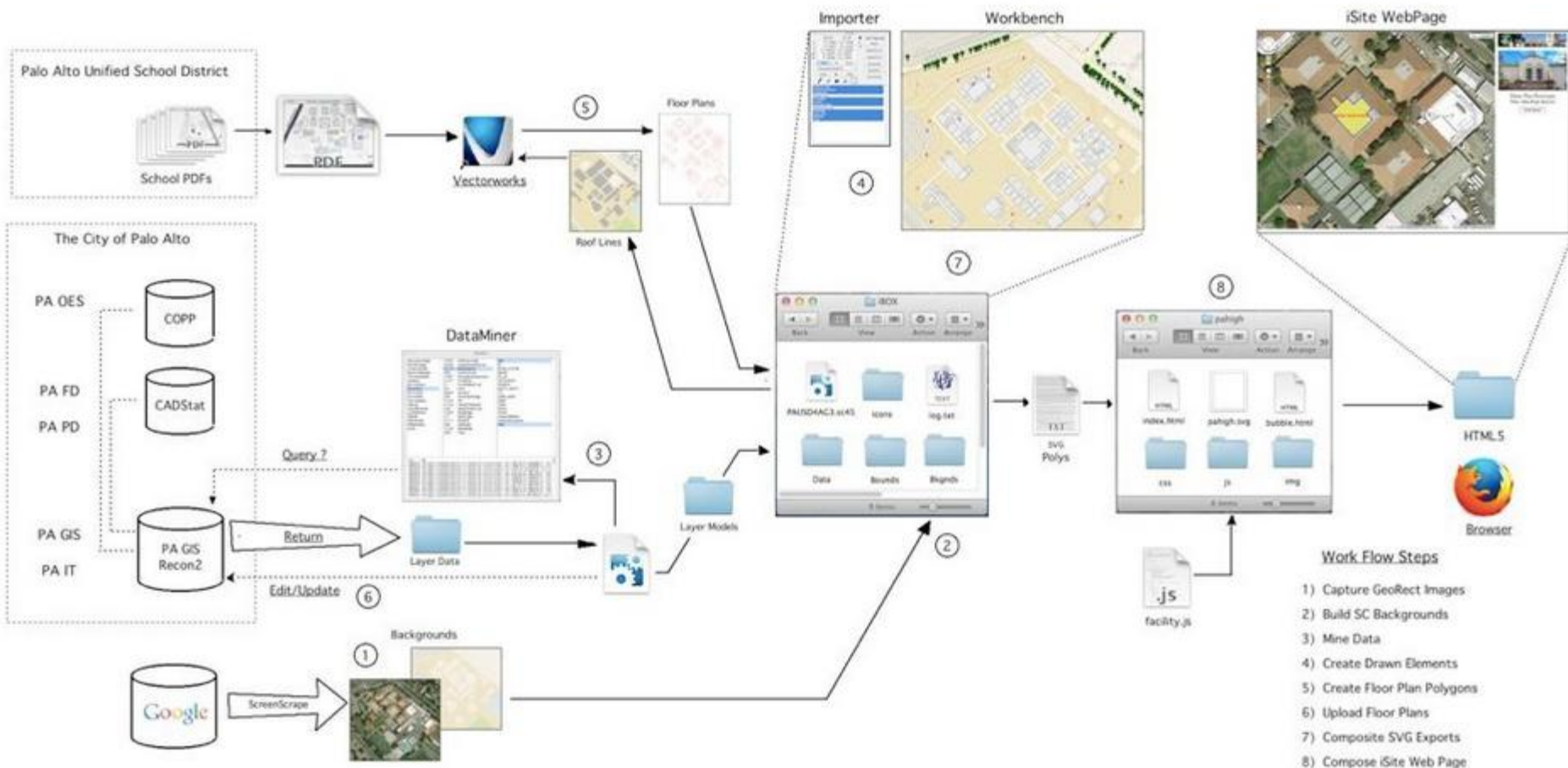


# GGSN iSite Format Compiler

## PDF to Open Floor Plan Display

Golden Gate Safety Network  
iSite Format Compiler

David Coggeshall - San Francisco Communications  
Mark Lucas - Wetware  
March 2014



# Safety Element Checklist

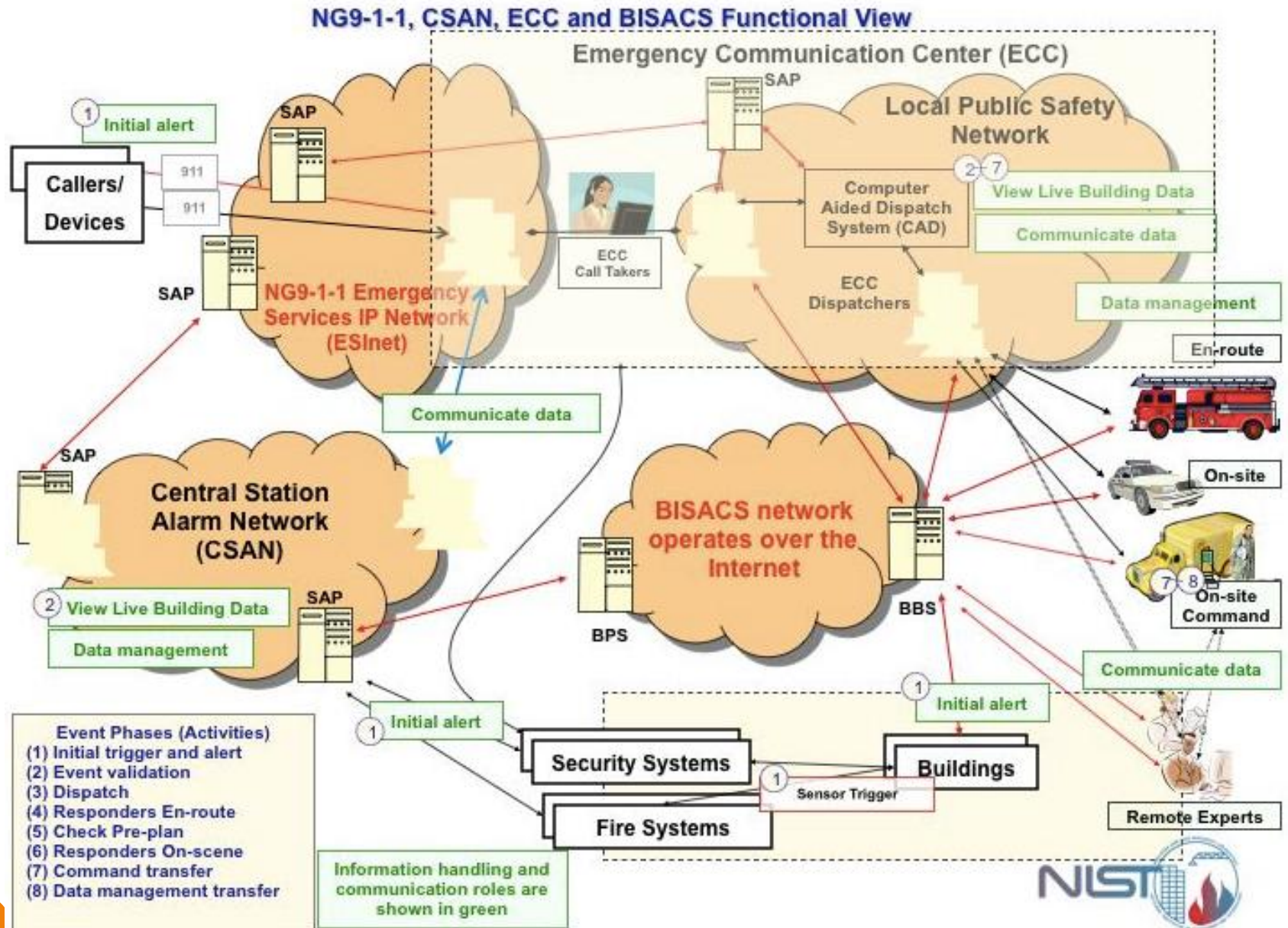
## Palo Alto School Safety Plans

- |                                  | Icon |
|----------------------------------|------|
| • General                        |      |
| • Site and Building Schematics   |      |
| • Exterior Site                  |      |
| • Site Perimeter                 |      |
| • Fire Access                    |      |
| • Gate                           |      |
| • Bollards                       |      |
| • Impassable                     |      |
| • Removable                      |      |
| • Building Rooflines & IDs       |      |
| • Entrance/EXIT                  |      |
| • Roof Access Points             |      |
| • Hydrants & Other Water         |      |
| • FDCs & Standpipes              |      |
| • PIV                            |      |
| • OS&Y                           |      |
| • Outdoor Utility Shutoff Valves |      |
| • Water                          |      |
| • Gas                            |      |

- |                            |   |
|----------------------------|---|
| • Electric                 |   |
| • Fuel                     | X |
| • Irrigation               |   |
| • Photo Voltaic            |   |
| • Photograph               |   |
| • Unknown                  |   |
| • Equipment Positions      |   |
| • Evacuation Staging Areas |   |
| • Building                 |   |
| • Knoxbox & Keys           |   |
| • Sprinkler Systems        |   |
| • All Sprinklered          |   |
| • Partially Sprinklered    |   |
| • Not Sprinklered          |   |
| • Hose Cabinet             |   |
| • HVAC                     |   |
| • Stove                    |   |
| • Technical Systems        |   |
| • Alarm/Annunciator Panel  |   |
| • Alarm Reset              |   |

- |                                     |   |
|-------------------------------------|---|
| • Telecom                           |   |
| • Elevator Systems & Keys           |   |
| • Public Address and Other Comms    |   |
| • Video Cameras                     | X |
| • Floor Interiors                   |   |
| • Architectural Schematics          |   |
| • Entry/Exits                       |   |
| • Stairs/Elevators                  |   |
| • Sprinkler Riser                   |   |
| • Indoor Utility Shutoffs           |   |
| • Water                             |   |
| • Gas                               |   |
| • Electric                          |   |
| • Sprinkler                         | X |
| • Critical Locations                |   |
| • Medicine                          | X |
| • HazMats                           |   |
| • Pull Stations                     | X |
| • Fire Extinguishers & Hose Closets |   |
| • AEDs - Automatic Defibrillators   |   |
| • Rooms & Areas                     |   |
| • ID - Room Number                  |   |
| • Name - Label                      |   |
| • Classification                    |   |
| • Locks & Access Control            |   |
| • Designated Areas                  |   |
| • Evacuation Routes                 |   |
| • Shelter in Place                  |   |

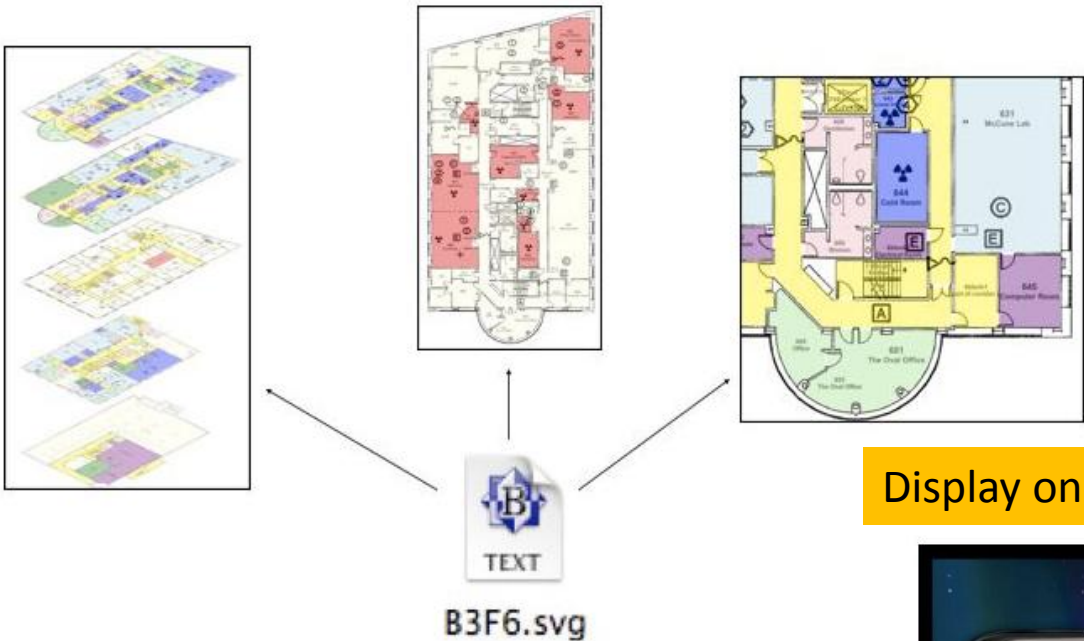
## CUSTOMIZATION: Identify and Integrate agency data sources





## CUSTOMIZATION: Build Layers and Categories

## Simple, Lightweight File Format



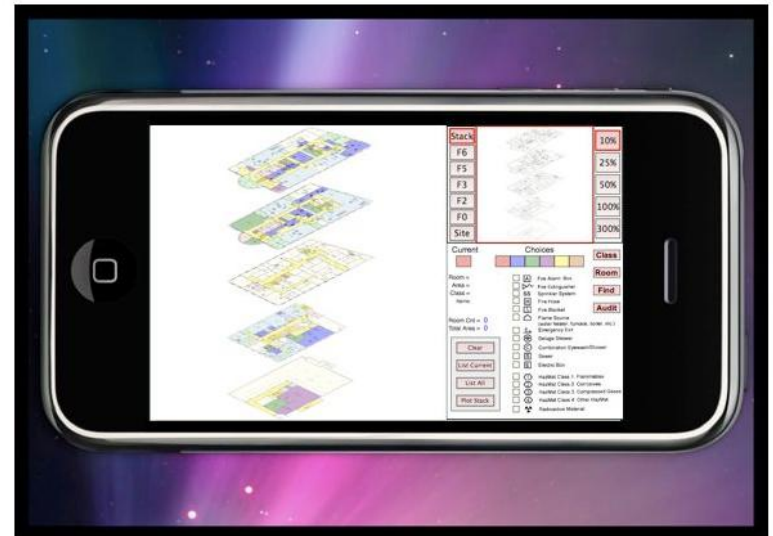
# Building Information Display



**SAN FRANCISCO COMMUNICATIONS**

- San Francisco Communications
- MapLab Project
- 79 Rossi Avenue, SF CA 94118
- 415 387-8760
- 415 602-2174 iPhone
- [ibcomm@aol.com](mailto:ibcomm@aol.com)
- <http://maplab.org/demo>

Display on monitor, tablet, or smart phone



# The Common Operating Picture Platform

## Common Operating Picture

A user friendly internet map for sharing situation awareness among public and private safety organizations during large incidents that require significant coordination of emergency response resources.

**Menlo Park Fire District**  
32 Almendral Ave  
Atherton, CA 94027-4002  
<http://www.menlofire.org/>

FacilityType  
02-Fire  
15 Yellow Update

**Status is: Yellow**  
Doors are jammed!  
small fire in rear.  
Water leaking,  
phones are out  
DavidC@08-20 01:32:41  
Clear Add Comment Save Cancel

Facility Status

Facility Info

Resource Info

San Mateo  
**Menlo Park Fire District**  
MNL  
03  
32 Almendral Ave  
Atherton CA 94027-4002  
<http://www.menlofire.org/>  
Latitude 37.46258 Longitude -122.206296

searchKey MNLE3  
CallSign E3  
Type EngineType1  
FEMAKind  
FEMAType

  
EquipPhotoName E3 2007 Pierce Dash.oif  
PhotoKey MNLE3



School

Water Leak

GPS Tracking

Display Controls

# Sahana Foundation provides comprehensive functionality

**Sahana Edén Humanitarian Management Platform**

**Situation**

- Incidents
- Assessments
- Assets
- Inventory Items

**Decision**

- Requests

**Response**

- Projects
- Activities
- Commitments
- Sent Shipments
- Received Shipments

**Login**

Registered users can login to access the system

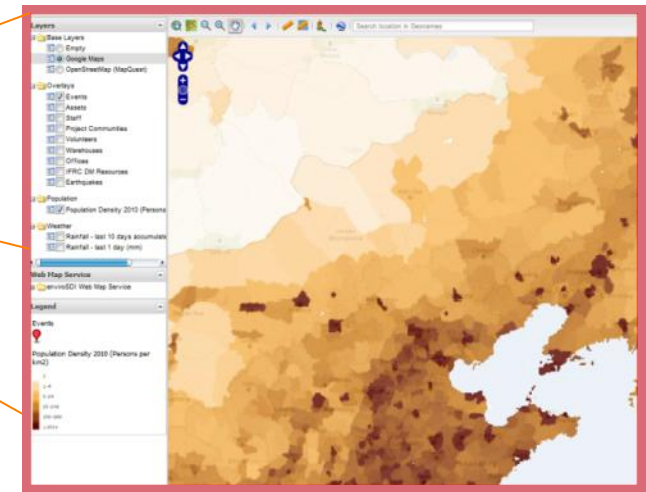
E-mail:

Password:

**Facilities**

- Shelters
- Warehouses
- Hospitals
- Offices

**Community Chat**



**Warehouses**

- List All
- Search

**Warehouse Stock**

- Search Warehouse Stock
- Adjust Stock Levels
- Report

**Received Shipments**

- List All
- Search Received Shipments

**Sent Shipments**

- List All

**Items**

- List All
- Search

**Catalogs**

- List All

**Requests**

- List All
- List All Requested Items
- List All Requested Skills

**Commitments**

- List All

**Inventory Management**

This module allows Inventory Items to be Requested. Inventory Items include both consumable supplies & t...

**Inventories:**

- Warehouses
- Offices
- Shelters
- Hospitals
- Search Inventory items

**Shipments:**

**Receive**

- Receive New Shipment
- List All Received Shipments
- Search Received Shipments

**Items:**

- Create New Item
- List All Items
- Search Items

**Catalogs**

- Create New Catalog
- List All Catalogs & Add Items to Catalogs

**Assessment Templates**

- List All

**Disaster Assessments**

- List All

**Template Summary**

Name: First 72 Hours Status: Pending

Sections that are part of this template

Section	Background Information	Observation	Food and Nutrition	Health
Protection				
Infrastructure				

**Summary by Question Type - (The fewer text questions the better the analysis can be)**

Search:

Position	Section	Yes, No	Multi-Option	Location	Time	Options
1	Background Information	0	0	4	1	0
2	Observation	0	0	0	0	0
3	Food and Nutrition	5	0	0	0	0
4	Health	0	0	0	0	0
5	Protection	3	0	0	0	0
6	Water and sanitation	8	0	0	0	0
7	Shelter	13	0	0	0	0
8	Livelihoods	0	0	0	0	0
9	Infrastructure	0	1	0	0	0
Total		29	1	4	1	0

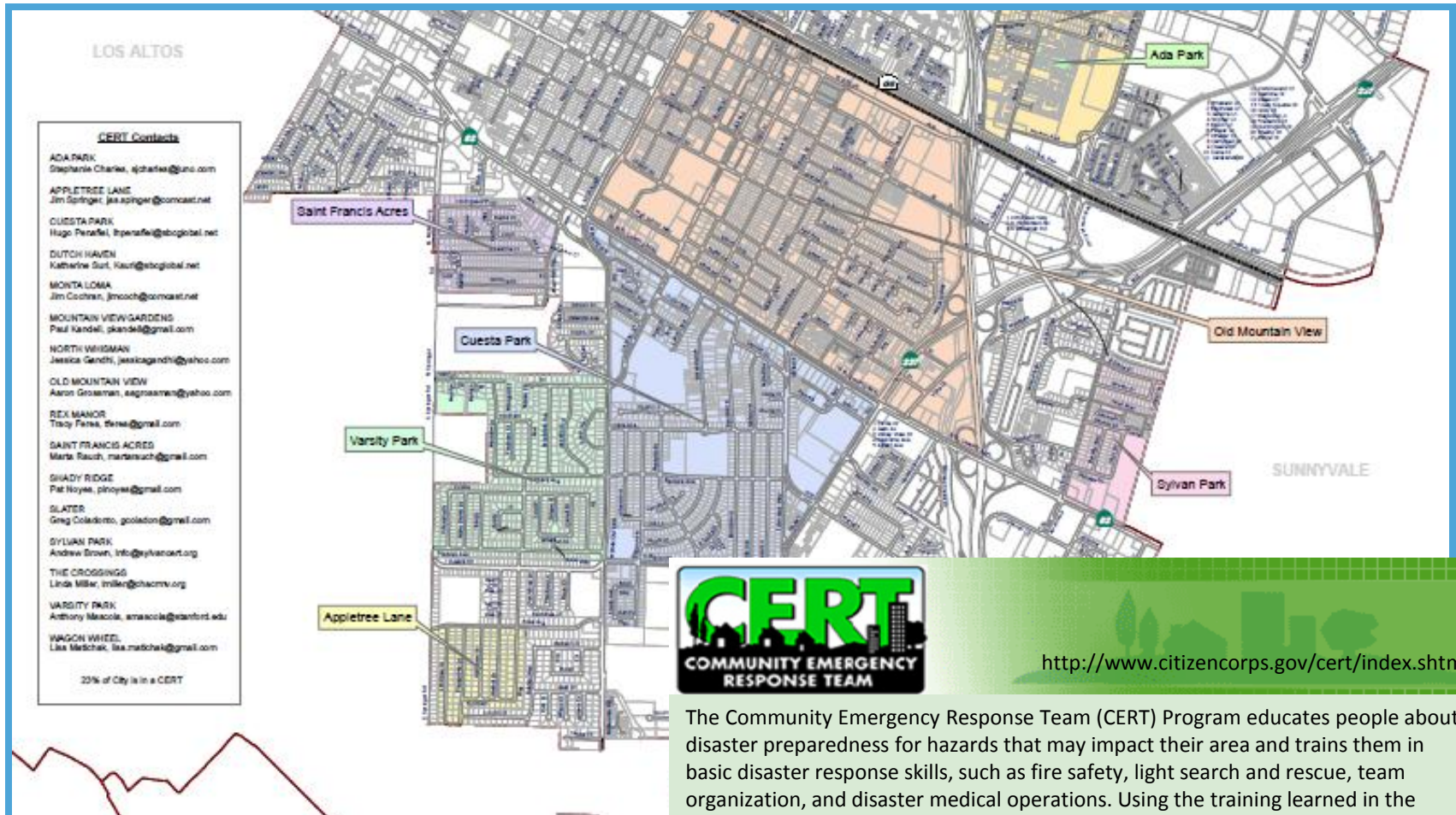
First Previous 1 Next Last

<http://demo.eden.sahanafoundation.org/eden/>

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No endorsement or recommendation is implied.



# CERTs (Community Emergency Response Teams) may take certain responsibilities in specific neighborhoods that can be plotted onto a Google Earth map



[http://www.ci.mtnview.ca.us/city\\_hall/fire/programs\\_n\\_services/cert\\_neighborhood\\_groups.asp](http://www.ci.mtnview.ca.us/city_hall/fire/programs_n_services/cert_neighborhood_groups.asp)

The Community Emergency Response Team (CERT) Program educates people about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. Using the training learned in the classroom and during exercises, CERT members can assist others in their neighborhood or workplace following an event when professional responders are not immediately available to help. CERT members also are encouraged to support emergency response agencies by taking a more active role in emergency preparedness projects in their community.

# RESOURCES: Google Crisis Response Tool Set

Google Crisis Response  
a google.org project

HOME RESPONSE EFFORTS FOR RESPONDERS FAQ

## Making critical information more accessible in times of disaster

When disaster strikes, people turn to the internet for information. We help ensure the right information is there in these times of need by building tools to collect and share emergency information, and by supporting first responders in using technology to help improve and save lives.

Photo courtesy of: Bill & Melinda Gates Foundation\*

<http://www.google.org/crisisresponse/>



## Google Fusion Tables

Gather, visualize and share data online with your staff and other response organizations and constituents. Use Google Fusion Tables to:

- Visualize your data from shelter lists to power outages instantly as a map or a chart.
- Identify data patterns to aid in crisis decision making
- Show the world your work in real time by embedding your map or chart in a web page
- Collaborate with other responders by merging your data, allowing you to see all important related information in one place





# RESOURCES: Google Crisis Response Tool Set

“Use online technology to quickly reach people in need and to efficiently run your internal operations during a crisis. We recommend you implement these best practices and try out some of the Google tools highlighted ...”

## Google Public Alerts

During a crisis, individuals go online to search for the latest emergency information. Google has created a platform to disseminate relevant emergency alerts to users when and where they're searching for them. As a response organization, you can use Public Alerts to get your information to the public. [Contact us](#) if you're interested in participating. You can get a head start by following these 4 steps:

- Get your alerts into the Common Alerting Protocol ([CAP 1.2](#)) standard using some of the [resources](#) we created to help you with this process (most commercial alert pushing tools support CAP already)
- [Validate](#) that you've set-up your feeds correctly
- Subscribe your alerts to [Google Alert Hub](#) and check that they're working
- Contact us when you're ready using [this form](#) so we can start on the next steps. You may still be able to work with us even if your alert data does not currently conform to the CAP standard

## Custom Google Maps

While many people are familiar with Google Maps for finding directions, responders can also easily create custom Google maps when they need to supply critical crisis information to their teams or to the public. Use custom Google Maps to:

- Mark crisis information such as road closures and resources such as emergency medical stations
- Draw lines and shapes to highlight paths and areas that are covered in debris
- Add your own text, photos, and videos to provide context
- Share your map with co-workers, media outlets, and partners. Control whether it's available publicly, or privately within your network.
- Import [KML](#), [KMZ](#), and [RSS](#) formatted data into your map, to host on Google's servers and share broadly

## Google Person Finder

Following a crisis, people often get separated, and responders play a role in helping people locate one another. Google Person Finder, launched by the Google Crisis Response team, helps with this process by providing an open platform for individuals and organizations to let people know who they're looking for and to enter updates about missing persons. As an organization you can:

- Embed Google Person Finder in your website to allow people to directly access and use the tool
- Download data from Google Person Finder to match with your information or take to the field
- Upload data you've collected into Google Person Finder

## Google Sites

Easily create and update a website with critical response information from anywhere at any time. You can display a variety of important information in one place—including forms to collect information, videos of the crisis, photos of the devastation, and maps that illustrate resources. Use Google Sites to:

- Create a simple website quickly without having to hire a web developer or know any HTML programming
- Customize the look and feel of your site to show it's from your organization
- Create sub-pages to keep your content organized and easy for viewers to locate
- Protect your information by keeping your site as private or public as you'd like





# RESOURCES: Google Public Alerts and Fusion Tables

**Google public alerts**  
a google.org project

Advanced search

Important alerts from across the web when and where they're needed most. [Learn more](#)

[Link to page](#)

Show: all alerts, in all locations, sorted by relevance

**A Severe Thunderstorm Warning in Central Tennessee**  
Hail and/or strong winds likely.  
Alert active for next 33 minutes  
[weather.gov](#)

**B Severe Thunderstorm Warning in Central Tennessee**  
Hail and/or strong winds likely.  
Alert active for next 48 minutes  
[weather.gov](#)

**C Flood Warning for Clay and Richland Counties, IL**  
Never drive through flooded areas.  
Alert active for next 1 day, 9 hours  
[weather.gov](#)

**D Flood Warning in Southern Wisconsin**  
Never drive through flooded areas.  
Alert active for next 6 hours  
[weather.gov](#)

**E Flood Warning in Puerto Rico**  
Never drive through flooded areas.  
Alert active for next 18 minutes  
[weather.gov](#)

Map Satellite

©2012 Google - Map data ©2012 MapLink - [Terms of Use](#)

Feedback

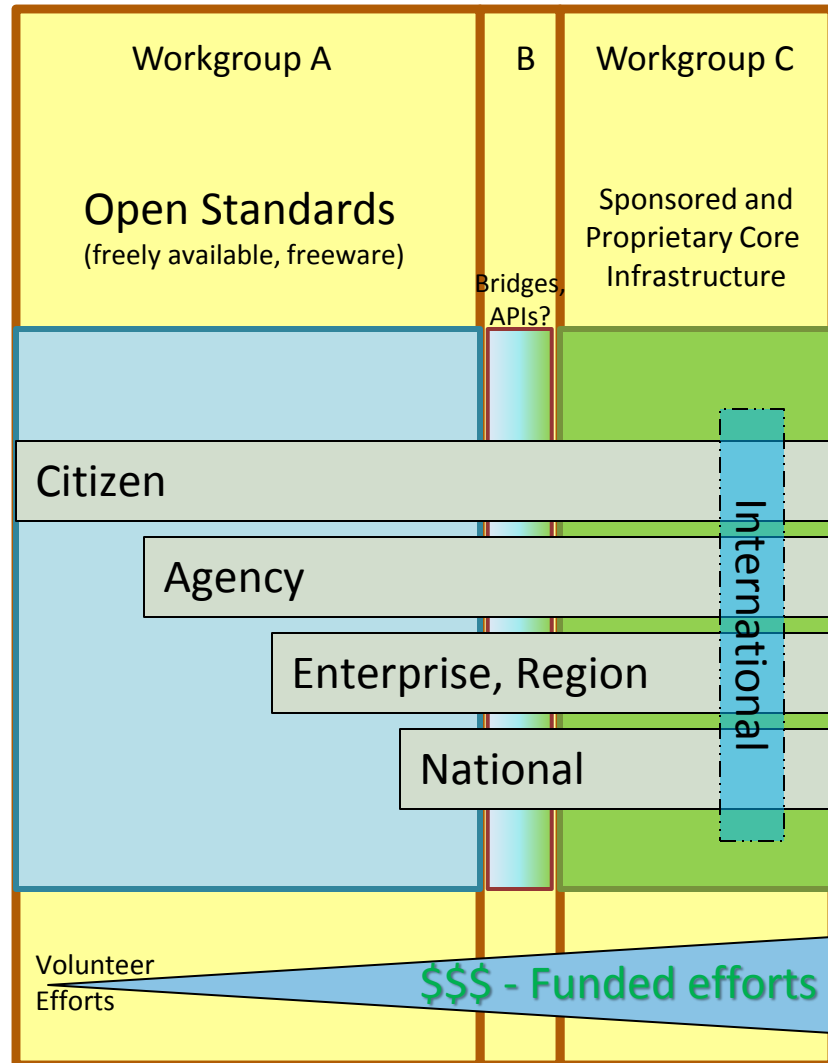
# Coordinating R&D for Common Operating Picture

This diagram presents a minimum framework to think about how perhaps to prioritize and align efforts across varying scales of organizational effort and infrastructure development needed to enable DM efforts to cohere, in an environment that will depend on an unpredictable mixture of volunteer/open source and proprietary approaches.

**Workgroup A** would organize end-to-end (citizen-through-nation scale) efforts around Open Source solutions that would be primarily volunteer/low-cost in nature, building on existing technologies, infrastructure, and organizational capabilities.

**Workgroup C** would focus on sponsored (foundations, FEMA, etc.) and proprietary solutions needed to address more complex, long-term, and mission-critical infrastructure requirements (for citizen-through-nation scale).

**Workgroup B** would focus on integration requirements between A and C.



# Emergency Electronic Medical Record

**Vitals**

Sex: ☐ F ☐ M ☐ O

Age: 56

Height: 70" / 177cm

Weight: 189lbs / 85.9kg

Blood Type: B-

Normal Blood Pressure: 135 / 90

Normal Heart Rate: 70

**Warnings**

EMS Alert: Hepatitis - B

Medical Alert: Additions

Medications: Hydrocortisone

Medication Allergies: Penicillin, Latex

Other Allergies: Bee Sting

Directives: No CPR

Document Location: Glovebox, Fridge

**Conditions**

Medical Condition: Hypertension

Medical Procedures: Gall bladder removed, 9/08

Test Results: ECG: A-fib

Medical devices: Defibrillator (ICD)

Family History: Father cardiac

Smoking Yrs / Amt: 23 / .5 pack

**Vitals describes the basic physical information that EMTs need.**

**Normal blood pressure and normal heart rate are important. Aches, for instance, may have normally low heart rates.**

**Contagious disease warning**

**Disease that may affect immediate treatment. Associated medication alert.**

**Warnings describes diseases, allergies, medical test results that EMTs need to know immediately to treat you appropriately & avoid harm.**

**History describes chronic medical conditions, associated medications, any medical procedures or devices.**

**Important Test Results**

**Parental heart history (or other pertinent, genetic history) and personal habits that affect health are important.**

## Protect Yourself & Your Loved Ones in a Crisis with Life-Saving E-emergency Medical Records



E-emergency is the complete emergency medical records system that is designed for one important purpose - to help save lives by providing Emergency Medical Technicians (EMTs) with the immediate, vital information they need to correctly treat you or your loved ones, and avoid medical errors, in the first crucial minutes - while it notifies your contacts with your GPS location.

Designed with the help of Doctors & EMTs, E-emergency instantly gets your up-to-date medical information - including medical conditions, allergies, medications - to EMTs on your iPhone, Android phone, Internet-enabled phone, or your E-emergency website that EMTs quickly view on their own phones or laptops. So they can make informed treatment decisions and avoid medical errors. While EMTs are doing their job, E-emergency notifies your loved ones with your GPS location - so they can find you, or you can find them, fast. (If you don't have a GPS phone, EMTs add a quick destination message.)

<http://www.mye-emergency.com/>

[https://www.aamc.org/download/273740/data/248\\_resource.pdf](https://www.aamc.org/download/273740/data/248_resource.pdf)

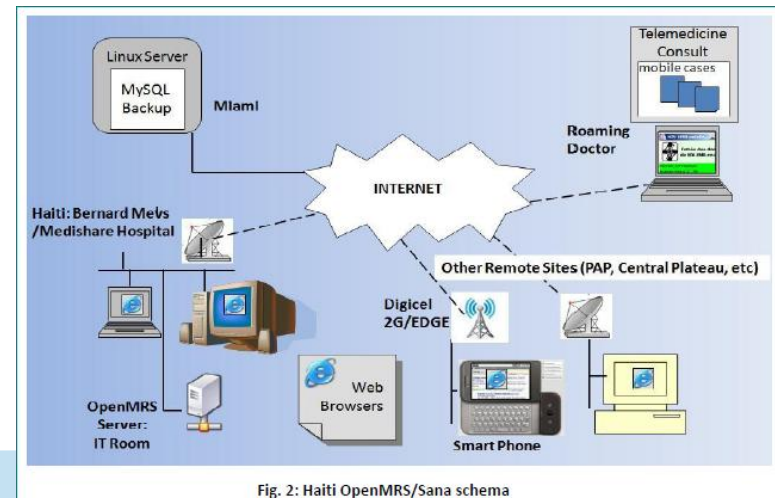


Fig. 2: Haiti OpenMRS/Sana schema



## SANA TELEMEDICINE WORKFLOW

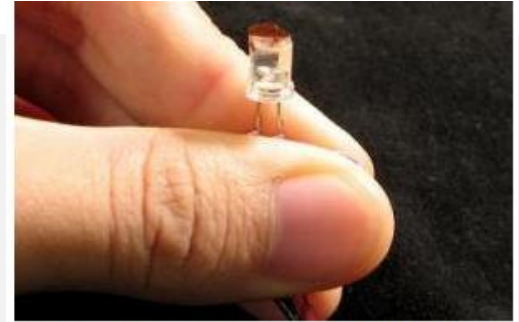
Sean Murphy

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No endorsement or recommendation is implied.



### Cell-All Smart Phones for Hazard Detection

“Homeland Security's Science and Technology Directorate (S&T)'s Cell-All is such an initiative. Cell-All aims to equip cell phones with a sensor capable of detecting deadly chemicals. The technology is ingenious. A chip costing less than a dollar is embedded in a cell phone and programmed to either alert the cell phone carrier to the presence of toxic chemicals in the air, and/or a central station that can monitor how many alerts in an area are being received. One might be a false positive. Hundreds might indicate the need for evacuation.”



*Hundreds of separate spots on this flake of silicon can be engineered to change color in response to many different chemicals. By capturing the pattern of color changes using a new kind of supermacro lens, researchers plan to create a versatile sensor small enough to fit into a cell phone that can recognize a wide variety of chemical hazards. (Credit: Sailor Lab/UCSD.)*

<http://www.sciencedaily.com/releases/2010/04/100409162722.htm>

The Cell-All initiative was “spearheaded by the Department of Homeland Security’s Science and Technology Directorate (S&T), Cell-All aims to equip your cell phone with a sensor capable of detecting deadly chemicals at minimal cost—to the manufacturer (a buck a sensor) and to your phone’s battery life. “Our goal is to create a lightweight, cost-effective, power-efficient solution,” says Stephen Dennis, Cell-All’s program manager.

How would this wizardry work? Just as antivirus software bides its time in the background and springs to life when it spies suspicious activity, so Cell-All regularly sniffs the surrounding air for certain volatile chemical compounds.

When a threat is sensed, a virtual ah-choo! ensues in one of two ways. For personal safety issues such as a chlorine gas leak, a warning is sounded; the user can choose a vibration, noise, text message, or phone call. For catastrophes such as a sarin gas attack, details—including time, location, and the compound—are phoned home to an emergency operations center.

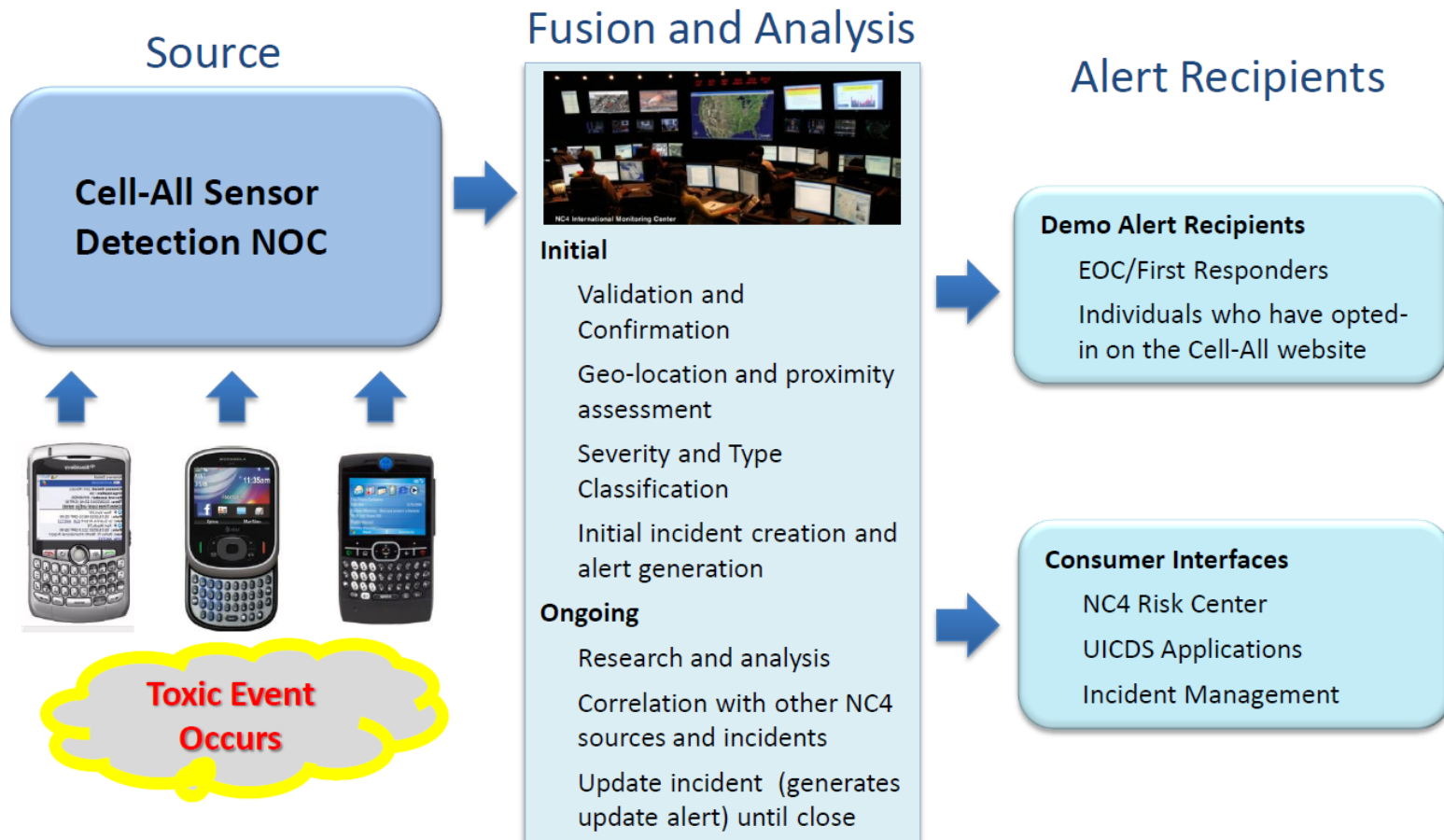
While the first warning is beamed to individuals—a grandmother taking a siesta or a teenager hiking through the woods—the second warning works best with crowds. And that’s where the genius of Cell-All lies—in crowdsourcing human safety.

Currently, if a person suspects that something is amiss, he might dial 9-1-1, though behavioral science tells us that it’s easier to do nothing. If he does do something, it may be at a risk to his own life. And as is often the case when someone phones in an emergency, the caller may be frantic and difficult to understand, diminishing the quality of information that’s relayed to first responders. An even worse scenario: the person may not even be aware of the danger, like the South Carolina woman who last year drove into a colorless, odorless, and poisonous ammonia cloud.

In contrast, anywhere a chemical threat breaks out—a mall, a bus, subway, or office—Cell-All will alert the authorities automatically. Detection, identification, and notification all take place in less than 60 seconds. Because the data are delivered digitally, Cell-All reduces the chance of human error. And by activating alerts from many people at once, Cell-All cleverly avoids the longstanding problem of false positives. The end result: emergency responders can get to the scene sooner and cover a larger area—essentially anywhere people are—casting a wider net than stationary sensors can.

[http://www.dhs.gov/files/programs/gc\\_1268073038372.shtm](http://www.dhs.gov/files/programs/gc_1268073038372.shtm)

## NC4 Reporting Process for Cell-All



Developed in partnership with the  
U.S. Department of Homeland Security  
Science & Technology Directorate



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No endorsement or recommendation is implied.

# ORGANIZATIONAL RESOURCES



NC4 International Monitoring Center

Developed in partnership with the  
U.S. Department of Homeland Security  
Science & Technology Directorate

Select a Category

- ☐ Advisory
- ☐ Aviation
- ☐ Fire
- ☐ Geophysical
- ☐ Hazmat
- ☐ Health
- ☐ Infrastructure
- ☐ Meteorological
- ☐ Other
- ☐ Security
- ☐ Structural
- ☐ Terrorism
- ☐ Transportation





# Fail-safe Communications

## Walkie Talkie with Bluetooth Adapter



## Evaluate Radio Options:

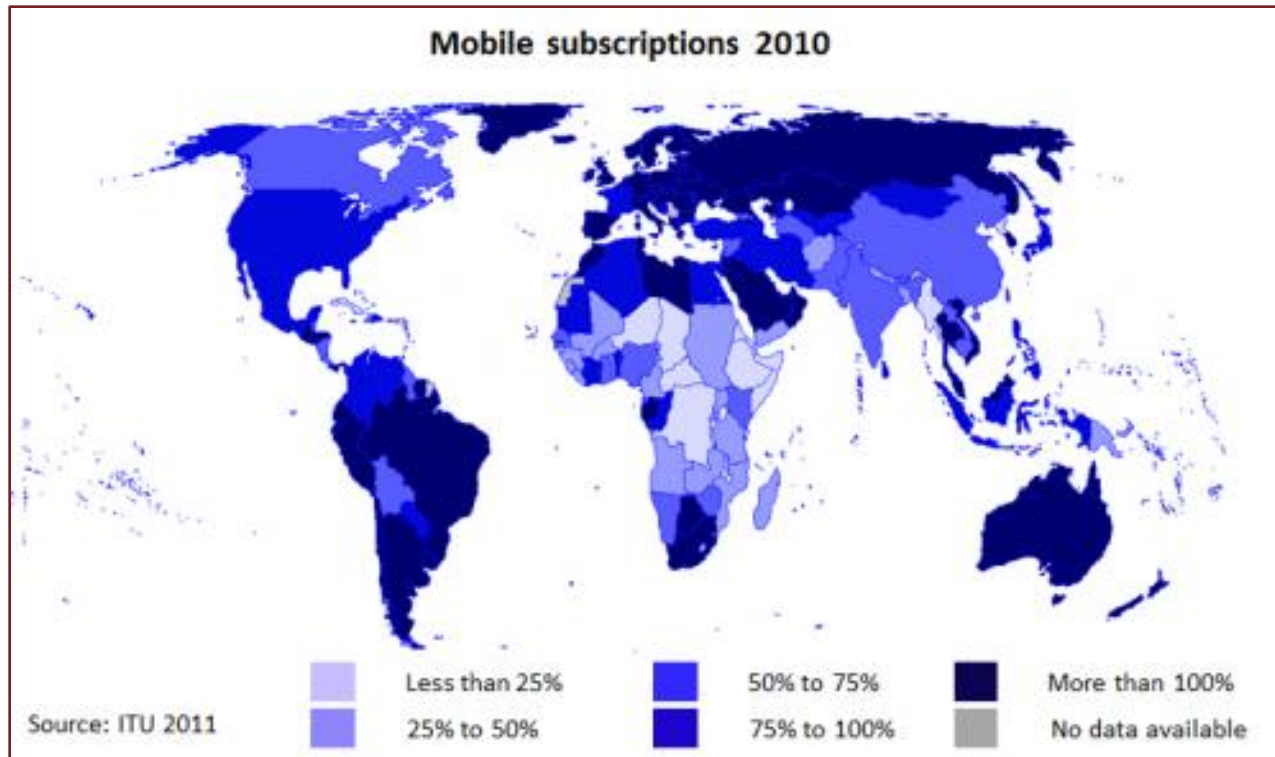
<http://www.techwholesale.com/two-way-radio-guide.html>

## Ham Radio



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You may want to use SMS where it is economically preferable and more reliable



How to Set up an SMS System

<http://www.mobileactive.org/howtos/how-set-sms-system>

<http://mobileactive.org/areaofpractice/Disaster%20%2526%20Humanitarian%20Relief>

Thank you for your kind attention,

and

*Good Luck to us all*  
with our Disaster Management plans!



<http://sam-azar.com/?p=93>



### Contact Information

#### **Fred Hosea, Ph.D.**

Program Director, Research and Innovation  
Clinical Technology, Kaiser Permanente

(for identification purposes only; materials presented do  
not represent any official positions of Kaiser Permanente)

1800 Harrison Street  
Berkeley, California USA

Cell: 510-684-6925  
Email: [fred.w.hosea@kp.org](mailto:fred.w.hosea@kp.org)  
Email: [tangofred@gmail.com](mailto:tangofred@gmail.com)  
Skype: tangofred  
Googletalk: tangofred