



# The Pacific Disaster Center

Two decades of humanitarian technology innovation leveraging artificial intelligence to further the sustainable development goals (SDGs)

**NATIONAL  
DISASTER  
PREPAREDNESS**

**#AI4EARTH**

**Baseline  
Assessment**

**WORLD SUMMIT AI**

**09-10 OCTOBER 2019 | AMSTERDAM**

**World Summit AI**

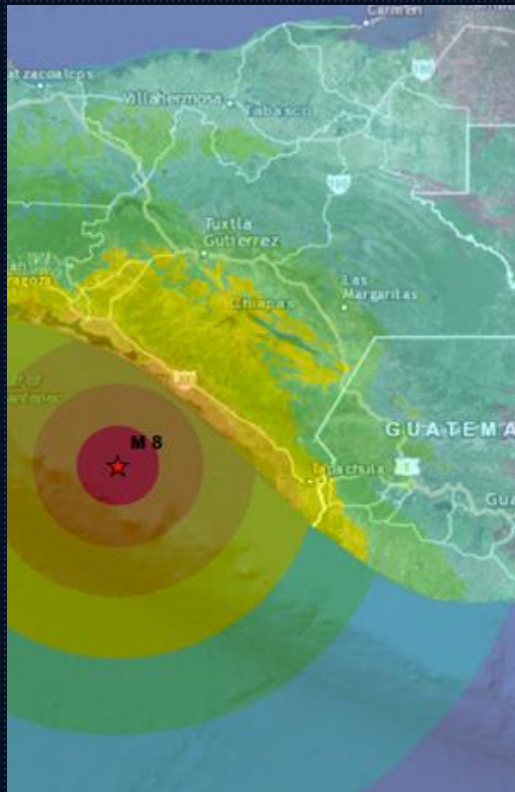
9 – 10 October 2019 Amsterdam  
<https://worldsummit.ai/>

**Joel Myhre**  
Pacific Disaster Center

<http://www.pdc.org>

# Fostering Resilience

**We use science and technology to help ...**



**executives and disaster managers worldwide make informed decisions to ...**



**reduce disaster risk and prepare for and respond to disasters**





# Who is using our systems?

## A glance at our partners

We're working hand-in-hand with partners around the globe to reduce disaster risk, prevent losses, and protect the lives and livelihoods of millions of people.

1.7 million mobile users

## Nations

- Indonesia
- Thailand
- Vietnam
- Philippines
- Bahamas
- Peru
- El Salvador
- Cambodia
- Myanmar
- Honduras
- Nicaragua
- Guatemala
- Dominican Republic
- Australia
- China
- Ecuador
- Brazil
- Fiji
- Palau
- Nepal
- Paraguay
- Japan
- Jamaica
- Bangladesh
- Haiti
- More...

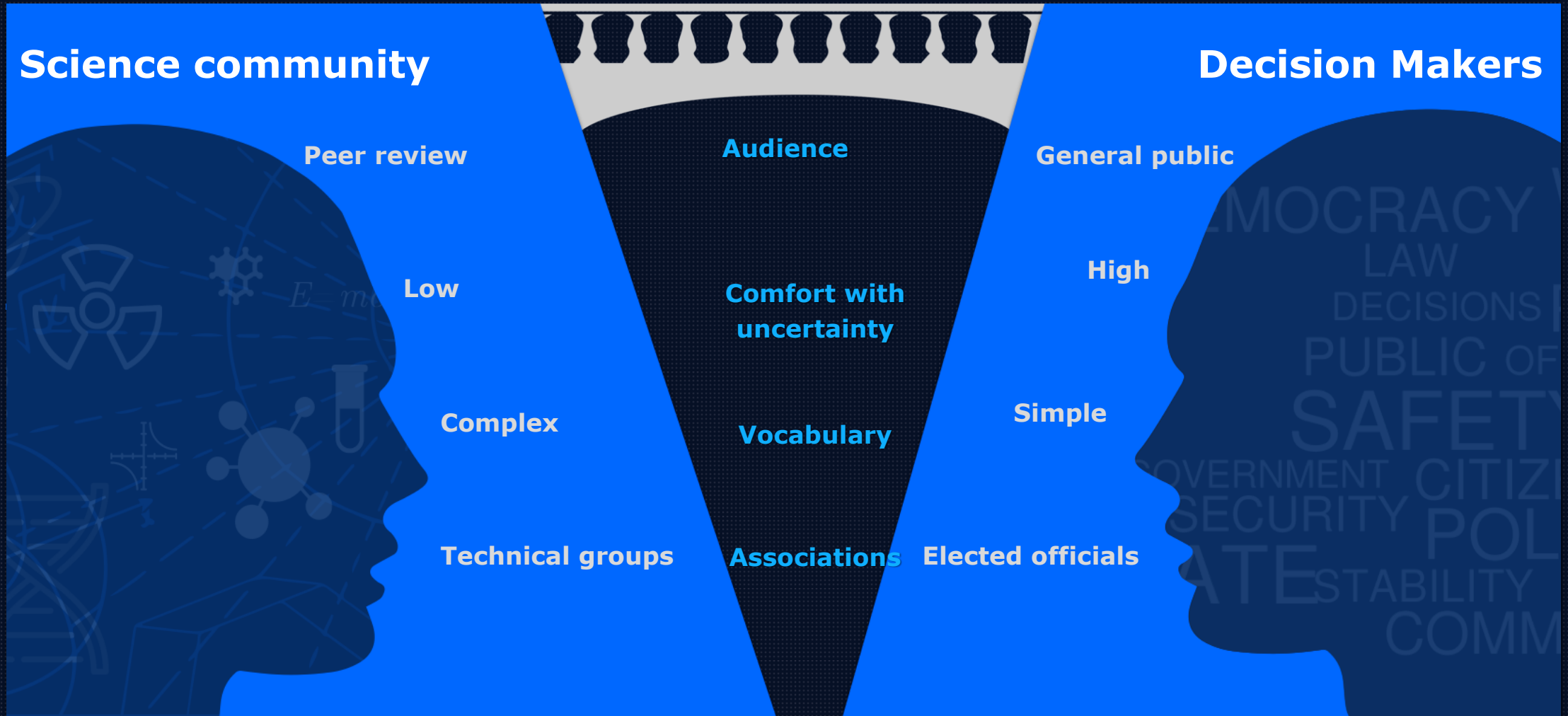
## International

- United Nations (IAEA, OCHA...)
- ASEAN (AHA Centre)
- CDEMA
- CEPREDENAC
- American Red Cross
- World Food Programme
- Salvation Army
- More...

## Public

- International community
- Friends, family, etc.

# Building a bridge

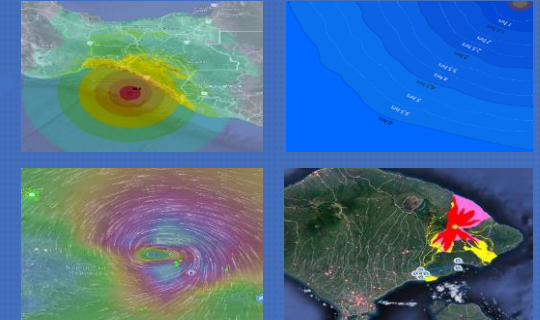


# PDC's integrated approach

Observational and collection



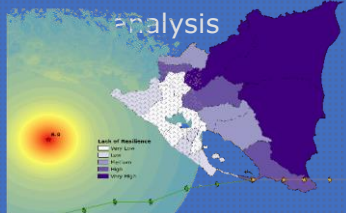
GIS and visualization systems



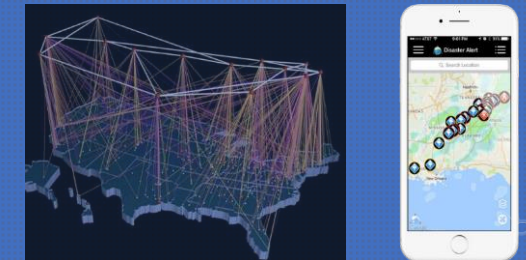
Improved  
decision support capabilities



Advanced modeling and risk  
analysis



Computing and communication technologies



Informed decision making

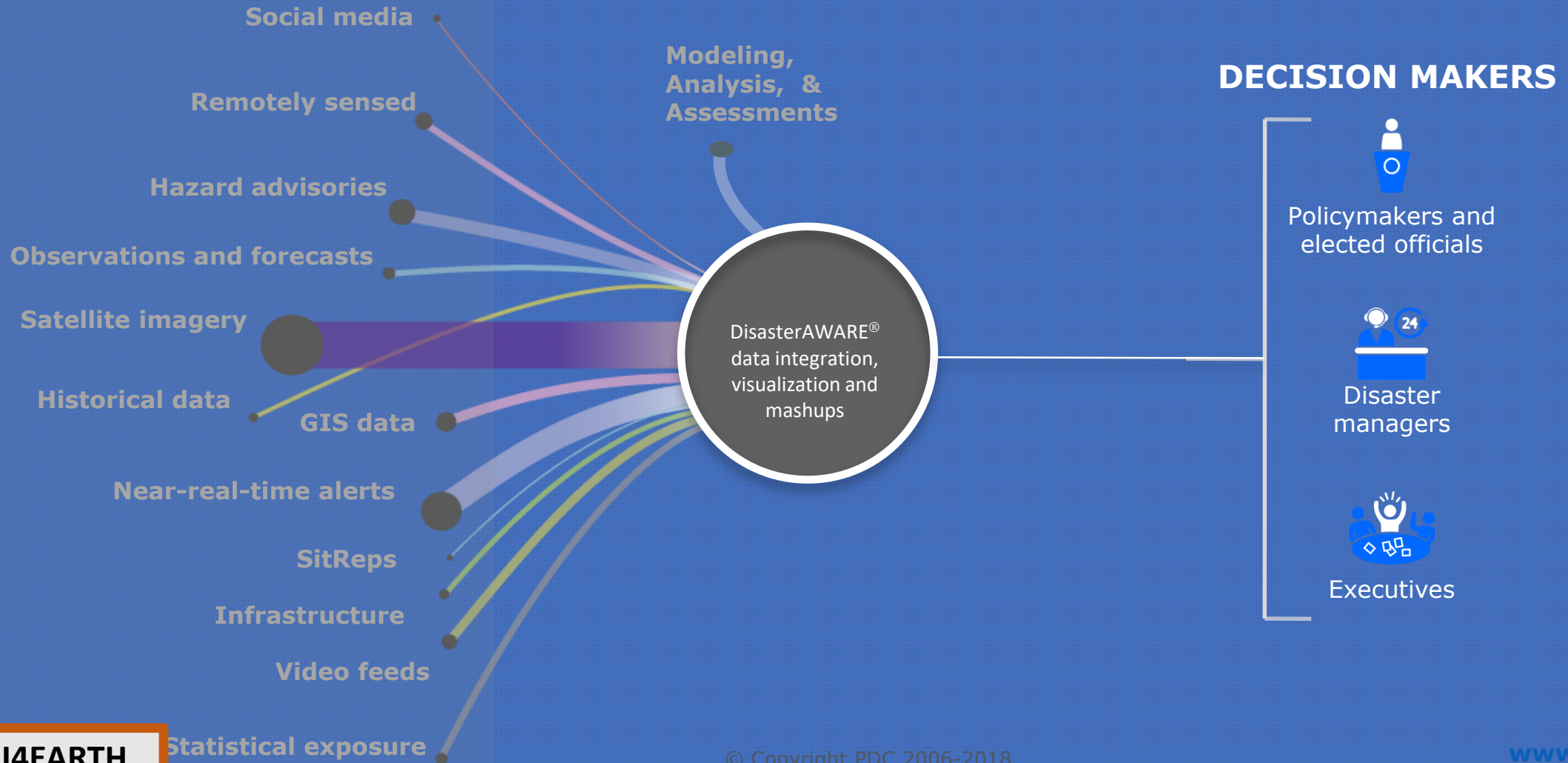


# Making Information Meaningful

Unparalleled access to data

Information and Insight

Actionable Risk Intelligence





# Disaster Management Headaches

## Risk & Spatial Intelligence

- What, where, how bad? (Prepare)
- What to do? (Event horizon)

## Logistics & Temporal Intelligence!

- Mobilization! (Response)
- Transparency & tracking! (Recovery)





Data  
(fact bits)

Big data (& smart devices)  
IoT (& nanotech sensors)  
UAV (drones)



Information  
(related data)

Social media (collection)  
Artificial Intel (reasoning)  
Block-chain



Communication

Connectivity (wireless/ mobile)  
Artificial Intel (V/A) reality  
Social media (peer-to-peer)



Robotics

3-D printing  
Artificial Intel (neural nets)  
Automation

# Technology Revolutions



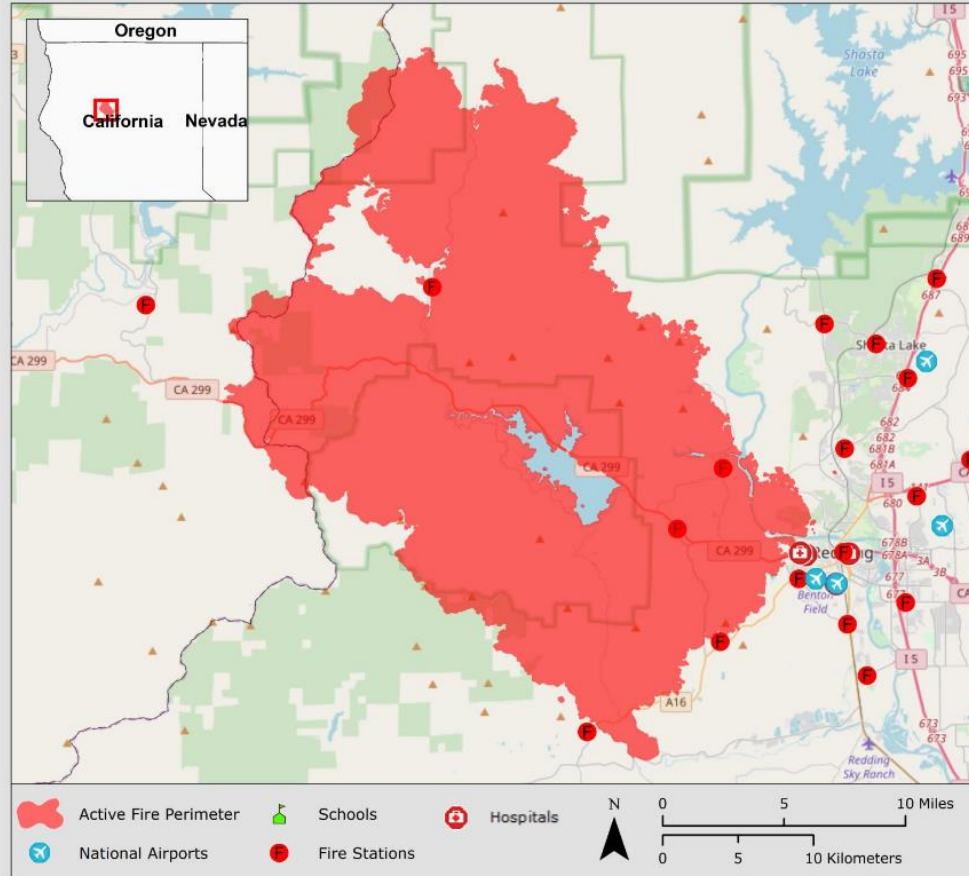
## Disaster Management

# What's Here Already?

Case #1 – Exposure Analytics  
 Addressing “what, where, and how bad?” before an event occurs, or within seconds of occurrence.

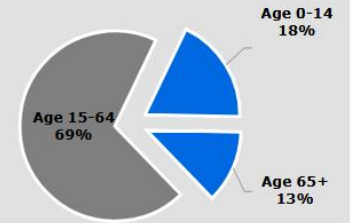
\* This is now possible with development of global exposure database (Big Data), and the exposure modeling (Expert).

### Wildfire Exposure Based on Active Fire Extents West of Redding, California (Carr Fire) as of 1 August, 2018

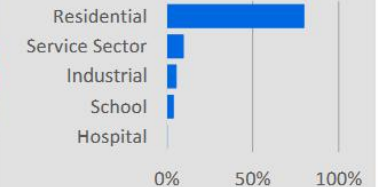


**4,444**  
 Total Population Exposed

**1,708**  
 Total Households Exposed



**\$646 Million**  
 Total Capital Exposure



Capital exposure estimated using PDC's All-Hazards Impact Model (AIM) (Experimental).

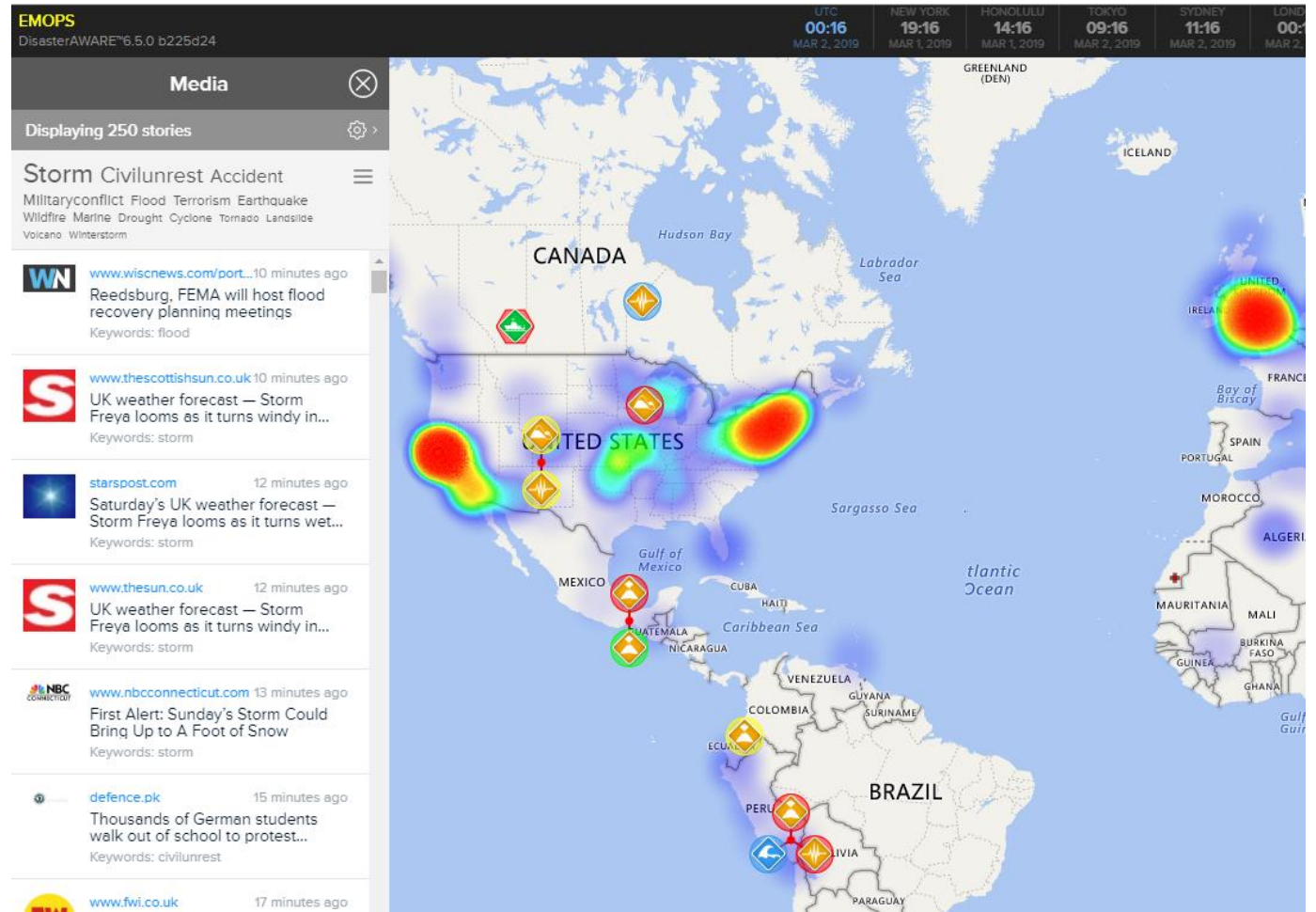
Pacific Disaster Center | 8/1/2018 | <http://www.pdc.org> | [response@pdc.org](mailto:response@pdc.org) |  
 Data:USGS GeoMAC Wildland Fire Support, HIFLD, OSM, and PDC's All-Hazards Impact Model (Experimental).

# Disaster Management

## Close Possibilities?

Case #2: News Media Analytics  
Extract reliable data (e.g., killed, injured, etc.) from credible news coverage.

\* This is possible with digital news (Big Data), and Natural Language Process (Expert).







# Data Revolution & Spatial Awareness

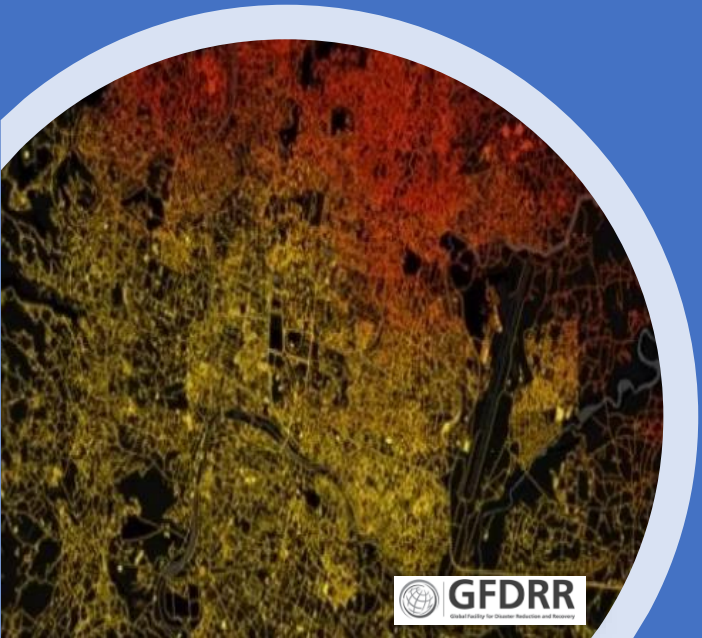
## Crowd sourcing

Open Street Mapping, GFDRR, PetaBencana (id)

- Smart devices
- Drones
- Apps

### Mapping

- Population
- Assets
- Hazard risks
- Resilience





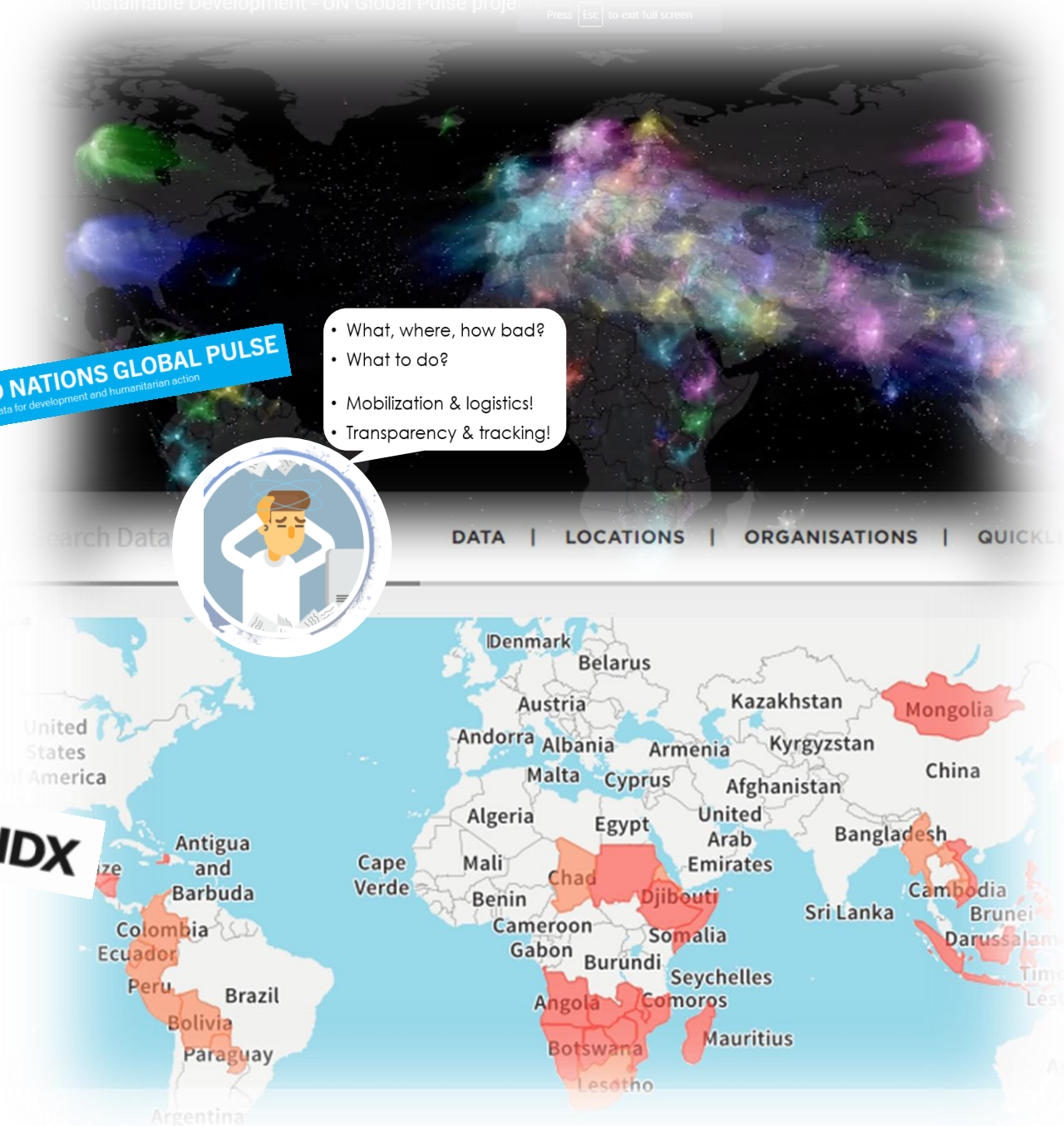
## AI is being leveraged across the UN and NGO community

UN Pulse Labs use social media and AI/ML to analyze logistics after disaster strikes &

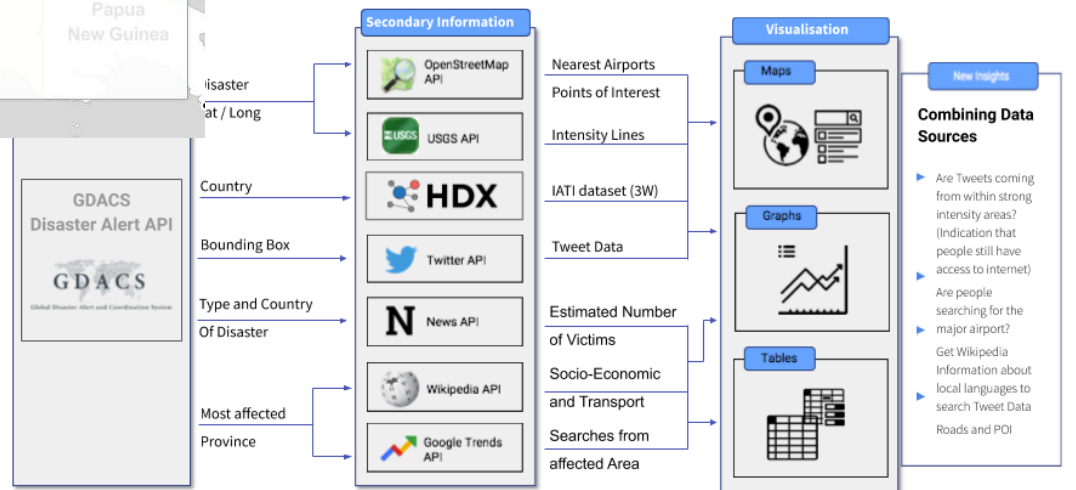
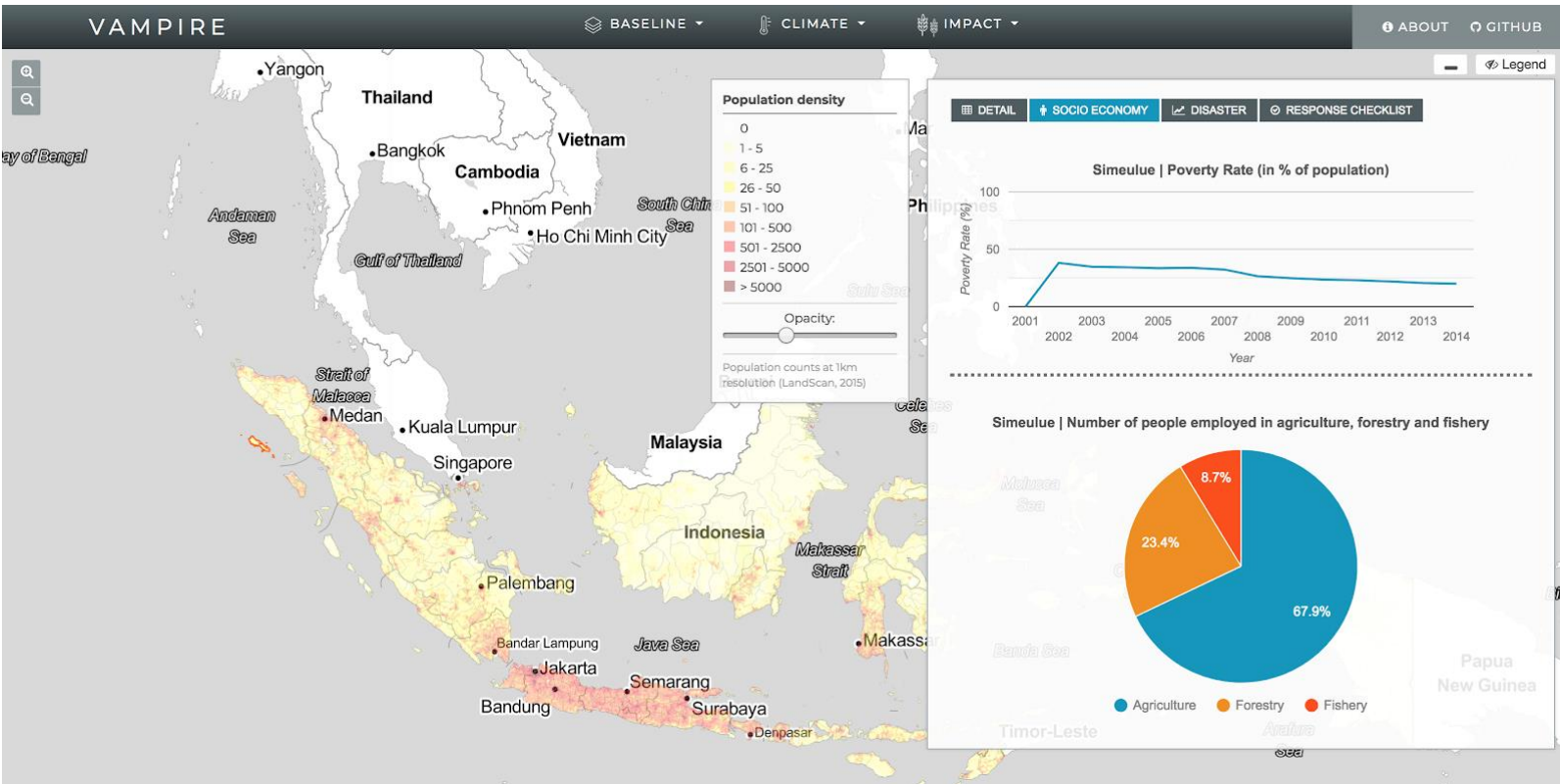
The Humanitarian Data Exchange visualizes risks of El Nino to nations



- What, where, how bad?
- What to do?
- Mobilization & logistics!
- Transparency & tracking!



# PDC Pulse Lab Jakarta and UN Global Pulse use #AI4EARTH for Disaster Risk Reduction



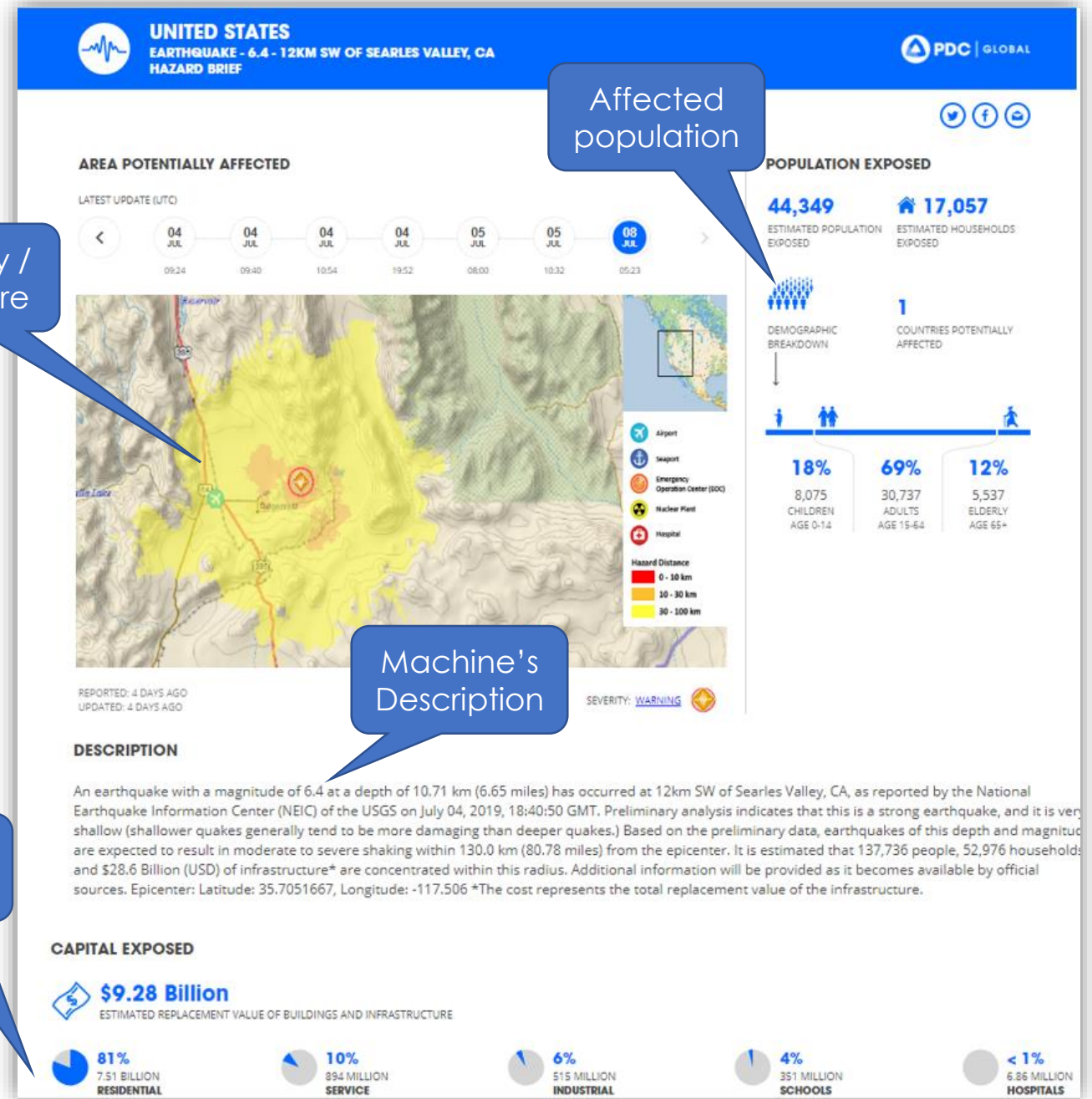


Early assessment on demand

What used to take a team of analysts and experts hours/days is now produced instantly

Technology

- Realtime data (IoT & sensors)
- Big data + exposure analysis
- Asset inventory (IoT)
- AI (expert system) analytics



Severity / Exposure

Affected population

Machine's Description

Capital exposure



Social Media and Big Data can be processed using AI algorithms

## Facebook Disaster Maps

- Where people are moving from/to
- Where they check in safe
- Where are the power outages



## [A] Intelligent Advisors

### Not too Far ...

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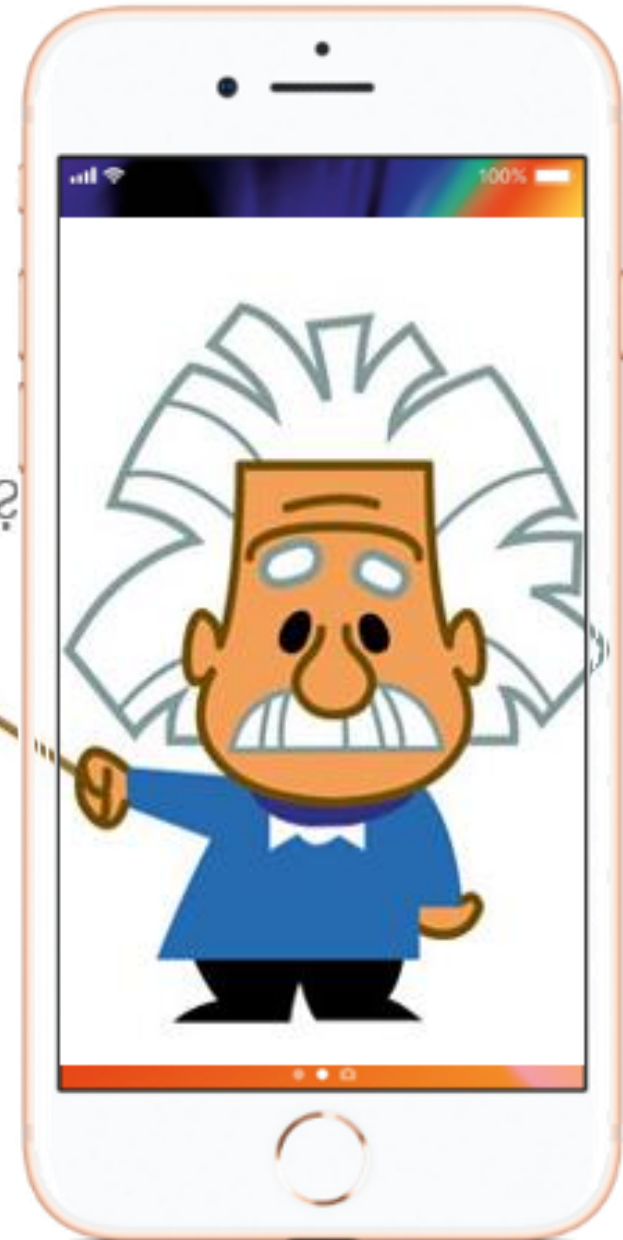
Machine Experts advising on “What are possible courses of action?” before/after events, within seconds

\* This is possible with combining “Exposure Analytics” on hazards and geography (**Big Data**), and an **Expert** action database

## Pocket Experts


What to do?

- Shelters
- Food
- Medicine
- Evacuations
  
- Helicopters
- ...



# An S&T example from California ...

- Chat-bots
- Augmented / Virtual Reality
- AI + Expert Systems to
  - Perform Hazard modeling + Exposure analytics
  - Match needs
  - Track delivery
- Smart devices for delivery
- IoT for tracking & transparency



This is Beacon. It looks like you may be experiencing flooding in your area.

Yes! Water in the house & rising

Okay! 3 ft. of flooding is expected over the next 6 hrs. We're working on an evacuation plan for you now. Stand by!





Better solutions.

# Safer, more resilient world.



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User Taps on Assistance

Connecting with AI Bot

AI Discussion + Actions

# Mahalo! (Thank You)

Questions?

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