Geospatial Platform for Urban Hazard & Disaster Management

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National Geospatial Information Authorities in Disaster and Risk Management (DRM)

- What is the Value of GIS in DRM & Where We Are Going?
- Geospatial Platform for DRM
- Speaking the Language of DRM - The Five Mission Areas
China 2013 YTD

• 1700 Lives Lost
• 376 Million People Affected
• 517 Billion Yuan ($84.5 Bn)

Examples:
- 13 October 2013 - Typhoon Fitow, Fujian Province, China - 6700 Buildings collapsed or severely damage
- 15 October 2013 - Earthquake – Cebu, Philippines – 144 dead
- 16 October 2013 – Typhoon Wipha, Tokyo, Japan – 17+ dead
Resident distribution map within 80 kilometers of epicenter of Wenchuan earthquake
Status of collapsed buildings in Dujiangyan in the Wenchuan earthquake
Wenchuan Earthquake – 18 May 2008
Sichuan Bureau of Surveying and Mapping - Sichuan Geomatics Center

Sichuan Spatial Information System and Website – Blood Collection Locations
Queensland, Australia – Flooding and Cyclone 2011
Queensland DNRM Spatial Information Group
Preliminary Flood Line Extent
Queensland - Flood Line Mapping
Cyclone Yasi – Category 5 – 3 February 2011
Queensland DNRM Spatial Information Group

New Products

• Produced 450 map products
  - Imagery
  - Town before & after maps
  - Catalogues & key maps
  - International Charter products
  - Basin inundation maps
  - Disaster relief arrangement maps
  - 2/3 state (river systems) has been mapped at 1:50,000 scale showing flood hazard lines

• All products available on web sites
Queensland DNRM Spatial Information Group

Benefits

• Imagery and Resultant Flood Lines are Critical to:
  - Relief claims
  - Insurance processing
  - Metrics for affected properties and infrastructure
  - Planning and reconstruction
  - Commission of Inquiry

• Set New Benchmarks for Spatial Information in Disasters:
  - Establishing spatial records of the events
  - On-line access & web service delivery
  - Seeking community feedback
  - Proactively releasing this above (CC-BY licensing)
Changing Government Business Models

- First Utilization of Cloud Computing
- Importance of Spatial Information & Foundation Data sets
- Spatial Information Group recognised as lead in support for surveying, mapping, GIS, imagery coordination & data acquisition services
- Easy Access to Data - All data and imagery available for State and Local government’s use
- SI Group has delivered web service feeds to Govnet
  - Cadastre
  - Flood lines
  - Post flood & cyclone imagery
- Single Point of Truth Concept Reinforced – One authoritative set of data across Government was critical for recovery
Best Practices: Geoinformation for DRM
Joint Board of GIS, UN-SPIDER and ISPRS

Geoinformation for Disaster and Risk Management
Examples and Best Practices
GIS Technology Provides a Modern Platform

Collect Once, Use Many Times

Production Workflows

Authoritative Database

Map and Analytic Information Products

Leveraging a Common Geo Database for Multiple Products and Services
GIS in Disaster and Risk Management

- **Fire**
  - Texas
  - California

- **Drought Status**
  - USACE

- **Flooding**
  - North Dakota

- **Severe Weather**
  - USACE

- **Fire Simulation**

- **Tsunami Forecast, Earthquake Damage Assessment**

- **Situational Awareness (COP)**

- **Quake Tracking**

- **Recovery Planning**
  - International Committee of the Red Cross

- **Tohoku, Japan**
Web GIS – Accessible from Any Client

Simple
Integrated
Open
Web GIS – Powered by Services

Simple
Integrated
Open

Desktop  Web  Device

Server  Online Content and Services
Web GIS Apps Empower Everyone
Focused and Easy to Use on Any Device

View / Query
Editing / Collection
Location Analytics
Office
Mapping
Analysis
Story Maps
Visualization
Awareness
Dashboard

Enabling You to Extend the Power of GIS
Web GIS Enables Spatial Analytics
Leverage Cloud Infrastructure

- Find Hot Spots
- Summarize Nearby
- Aggregate Points
- Summarize Within
- Create Buffers
- Enrich Layer
- Drive-Time Areas
- Find Nearest
- Merge Layers
- Extract Data
- Overlay Layers
- Dissolve Boundaries

Enabling New Approaches
Web GIS Connects Everyone

Knowledge Workers

Executive Access

Public Engagement

Work Anywhere

Enterprise Integration

Geospatial Professionals

Making GIS Available Across Organizations and Society
More than a Picture…

We need a Platform.
Geospatial Platform

Technology Infrastructure

Cloud

Server

Infrastructure Flexible. Scalable.
Geospatial Platform

Technology Infrastructure
- Cloud
- Server

Content

Content Yours. Partners. Open Data.
Geospatial Platform

Technology Infrastructure
- Cloud
- Server

Content

Applications
- Desktop
- Web
- Mobile

Applications
Indonesia – NSDI and One Map

President Susilo Bambang Yudhoyono Cabinet Meeting
Geospatial Platform

Welcome to the Geospatial Platform

The Geospatial Platform provides shared and trusted geospatial data, services, and applications for use by government agencies, their partners, and the public.

Featured Map:
EPA Cleanup sites

Featured Maps
Explore featured maps and apps from all levels of government.

Collaborate in Groups
Work in public and private groups with others who share your interests and ideas.

Build Your Own Map
Create a map you can view anywhere on any device and share with anyone.

About the Geospatial Platform
Federal agencies and their partners collect and manage large amounts of geospatial data—but these data are often not easily found when needed or accessible in useful forms. The Geospatial Platform provides ready access to federally maintained geospatial data, services and applications. The content of all datasets and services democratized with the Data.gov globe have been verified by the Agency to be consistent with Federal privacy, national security, and information quality policies. As an additional service to our users, we also provide access to data from our partners across State, Tribal, Regional and local governments as well as non-governmental organizations.
Geospatial Platform
Five Mission Areas
Disaster and Risk Management

- Prevention
- Protection
- Mitigation
- Response
- Recovery
“A secure and resilient nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk.”

- The National Preparedness Goal (PPD-8)
Planning

- Modeling and Risk Assessment
- Special Events
- Training and Exercises
- Aligning with your Plans
Big Bay Boom

2-5 July 2013
Significant Activity: July 4th, 2013

Firework Barge Locations
300 yard safety zone
Field Operations
Operations

- Situational Awareness
- Incident Management
  - Damage Assessment
  - Search and Rescue
- Shelter Management
- Emergency Support Functions (ESF)
Maryland Governor O’Malley on NBC Nightly News (7/2) Standing in front of OSPREY, their Flex COP
Maryland EMA Public Dashboard on Power Status
Maryland Power Outages by Zip Code
Logistics

- Catalogue and Management of Resources
- Ordering and Routing Supplies and Equipment
- Food and Aid Distribution
- Mutual Aid Request
Gulf of Mexico Oil Spill
Mission Specific Access

Emergency COP

Economic Impacts

Crowd Sourcing
Command

- Public Information Briefings
- Elected Official Internal Briefings
- Multi-level Government Coordination

Briefing Book

Hurricane Sandy

Hurricane Sandy was a hurricane that devastated portions of the Caribbean and the Northeastern United States during October 2012, with severe impacts in the Southeastern and Midwestern states and Eastern Canada. Sandy, classified as the eighteenth named storm and tenth hurricane of the 2012 Atlantic hurricane season, was a Category 2 storm at its peak intensity. Unlike it was a Category 5 storm off the coast of the Northeastern United States, the storm became the largest Atlantic hurricane on record, measured by diameter, with winds spanning 1,100 miles (1,800 km). Preliminary estimates of damage due to damage and business interruption are estimated at $65 billion (2012 USD), which would make it the second-costliest Atlantic hurricane, behind only Hurricane Katrina. At least 283 people were killed along the path of the storm in seven countries.

In the United States, Hurricane Sandy affected 24 states, including the entire eastern seaboard from Florida to Maine and west across the Appalachian Mountains to Michigan and Wisconsin, with particularly severe damage in New Jersey and New York. Its storm surged New York City on October 30, flooding streets, tunnels and subway lines and cutting power to almost the entire city. Damage in the US is estimated at over $65 billion (2012 USD). Hurricane Sandy was a major storm that impacted an area the size of Europe. The Red Cross mobilized more than 14,000 trained disaster workers to date – 90 percent of them volunteers – to help people affected by the storm. Today, nearly 3,000 workers are still on the job, providing food, water, shelter and relief supplies. The Red Cross has also deployed more than 300 of its emergency responder vehicles and is also working with local, state and international relief organizations to help.

Contents
1. Hurricane Sandy Background
2. Impact Analysis
3. Response and Assistance
4. Damage Assessment
5. Damage in New Jersey
US - Gulf of Mexico Oil Spill
Data Management and the Cloud

• Response tracking/time series
• Shoreline cleanup
• Environmental sampling
• Boom retrieval
• Field observations
• Before and after photos
• Overflight photos
• Wildlife
Christchurch, New Zealand Earthquake

Field Mobility

Social Media

Damage Assessment

Shake Map
Public Information

- Public Information Briefings
- Public Web Notifications
- Story Telling
Craig Fugate
@CraigFEMA

FEMA Maps Ohio Valley and Mid-Atlantic Storm - JUN 2012
fema.maps.arcgis.com/home/webmap/viewer/derecho

Don't miss any updates from Craig Fugate
Join Twitter today and follow what interests you

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Public Information - Derecho Storm Reports

ArcGIS
Ohio Valley and Mid-Atlantic Storm - JUN 2012

Contents:
- Cooling Centers 03JUL12
- Hospitals
- Ohio FEMA 3346 EM
- FEMA/State Response Resources
- Temperature (Obs)
- IEM WMS Service
- Snapshot - Tornado LSRs (29-30 JUN)
- Snapshot - Wind LSRs (29-30 JUN)
- Snapshot - Hail LSRs (29-30 JUN)
- WV - Boil Water Notices
- Power Outages
- FEMA NWS - Open Shelters
- Dominion Power Outages
- State of MD Power Outages
- NWS Watches/Warnings
- Light Gray Canvas
Public Information - Excessive Heat Warnings
• Dashboard / Situational Awareness
• Mobile Data Collection / Field Support
• Briefings
• Planning
• Crowdsourcing
• Social Media Integration
• Paper Map Production
• Public Information
Hurricane Sandy
Lessons Learned
Key Trends During Hurricane Sandy

• Collaboration and Information Sharing
• Delivering Focused Maps and Apps
• Social Media and the Crowd
• Storytelling with Maps
Collaboration & Information Sharing
Delivering Focused Maps & Apps
Hurricane Shelter Map

Use the following map to identify emergency shelters in your jurisdiction and areas that are currently under mandatory evacuation.
City of Baltimore: Storm Maps

City of Baltimore: Storm Maps is a collection of storm related web maps for the community of City of Baltimore. Find out more about Storm related events in the City of Baltimore by viewing the gallery below.

EGIS Maps
For more maps, web map applications, and GIS data visit the City of Baltimore EGIS Website, Open Baltimore, or CityView.

Also, you can stay up to date by following us on Facebook and Twitter.

Email us for additional maps and comments: gis@baltimorecity.gov
Hurricane Sandy storm tracker and forecast maps

Storm Tracker

Track the very latest hurricane models, weather maps and storm surge forecasts. Powered by National Hurricane Center (NOAA) and Telvent.
Social Media & the Crowd
Debris Cleanup Map

You can use the wheel on your mouse or the plus and minus signs on the map to zoom in and out. You can pan the map by left clicking and holding the left mouse button down and then moving the mouse in the direction you want to pan the map. You can use the search feature on the map to find an address. Enter the street address, comma, space, zip code (ex: 1234ANYTOWN LA., 11743).

Blue shaded areas are the incorporated Villages (they do their own debris clearing) and the green lines on the roads represent streets that we have done the first debris clearing on. We hope to update this map every two days. These maps are created using cached tiles so you may need to clear the cache in your browser in order to see an updated map. We would like to thank ESRI, Inc. for their unselfish support of this effort.

Map updated 11-09-12 at 8:30 am. Next expected update will be in the AM on 12-
Intro

Enter New Report

In addition to official damage assessment survey efforts, the State of Rhode Island is soliciting public help in reporting precise geographic locations of all storm-related structural damage.

This website does not link to relief efforts or emergency services for our citizens. The need of Disaster Assistance can be registered with FEMA at http://www.disasterassistance.gov or by calling 800-621-FEMA (3362).

- If you have a life-threatening situation, please contact your emergency service provider.
- If you haven’t already, contact your provider.

Location

120 Houston Ave, Narragansett
Use GPS

Attributes

Damage - select all that apply

- Major Structural Damage
- Minor Structural Damage
- Debris blocking road
- Downed Power Lines
- Fuel Spillage
- Broken Gas Line

Follow-up

Thank you, your request has been submitted.

If you would like follow-up correspondence, please provide your name, phone number or email address:

- Full Name: Enter full name
- Phone Number: Enter phone number
- Email Address: Enter email address

Uploading of pictures can take several
Storytelling with Maps
Top Ten most damaging U.S. hurricanes of all time

What were the worst hurricanes ever? What would happen if they hit today? A NOAA study examined these questions, and came up with this rogue’s gallery of mega-storms.

The Great Miami Hurricane - 1926

Most damaging hurricane

Category: 4
Damage in 1926: $105 million
Estimated damage today: $157 billion
Deaths: 372

The Great Miami Hurricane was a category 4 storm when it struck Miami on September 18th of 1926, virtually destroying the city. Storm tides in Miami ranged from 7.5 to 11.7 feet. At Miami Beach the tides ranged from 10.6 feet on the ocean side and 6.4 feet on the bay side. The hurricane also caused significant damage in the Florida panhandle, Alabama, and the Bahamas. Deaths from the hurricane totaled 372, with damage estimated at $105 million.

What would happen if this storm hit today? The National Oceanic and Atmospheric Administration has rated the Great Miami storm as the most damaging U.S. Atlantic hurricane of all time. If an identical storm
Esri Impact Map for Superstorm Sandy

A collection of dynamic maps showing impacted counties provided by FEMA with Esri demographic data. Select a demographic map using the tabs. Click any county to view demographic information.

**Local impact & Population Older Than 64**

Click the map to see which percentage of the population is over 64 years old and explore age breakdowns in the affected area.

For more information about this data click here.

**LEGEND**

Impact Analysis
Impact Area
- Very High
- High
- Moderate
- Low

2010 Population, Age 65-69 Years: 85,334
Geospatial Platform

- Technology infrastructure
- Relevant content
- Through simple & focused apps
- Aligned to common workflows
- Supporting any mission, anytime, to anyone, on any device
• Global Response
• Corporate Citizenship
• Support Affected Organizations

esri.com/disaster
Our Purpose and Mission

Provide support for our...

- Users
- Partners
- Esri Personnel

...helping them Prepare, Respond, Recover
Key Messages about the Disaster Response Program

• Many of our users don’t know we are here to help
• Make requests through the portal
  - This is monitored 24/7/365
• Can be for replacement software, new software, 24/7 tech support (through Premium Support)
• Can also assist (in a limited way for free) with project work
Indian Ocean Tsunami
Operationalize Data and the Web

Supporting the Pacific Disaster Center

Collected, Processed and Provided Data and Imagery

Supporting USGS
Hurricane Katrina

Collaboration and Planning

Katrina Viewer

Damage Assessment

Onsite Support
Haiti Earthquake

Social Media and the Crowd
Japan Quake and Tsunami
Public Engagement and Analysis

Crowd Sourcing

Situational Awareness

Debris Removal
Understanding our world.