Planning for Catastrophe: Lessons Learned, Best Practices, Moving Forward

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ASPRS
May 2, 2006

Anne's and EarthData's Response History

1988-1994	Hugo, Fran, Gustav, Hortense, Bonnie and oil spills
1994-2004	Gordon, Bertha, Fran, Hortense, Bonnie, Danielle, Ivan, Mitch, Dennis, Floyd, Gert, 9/11 World Trade Center, California fires, oil spills,floods and tornados
2004	Charley, Frances, Ivan
2005	Katrina, Rita

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We'd been acquiring data for 50 years…

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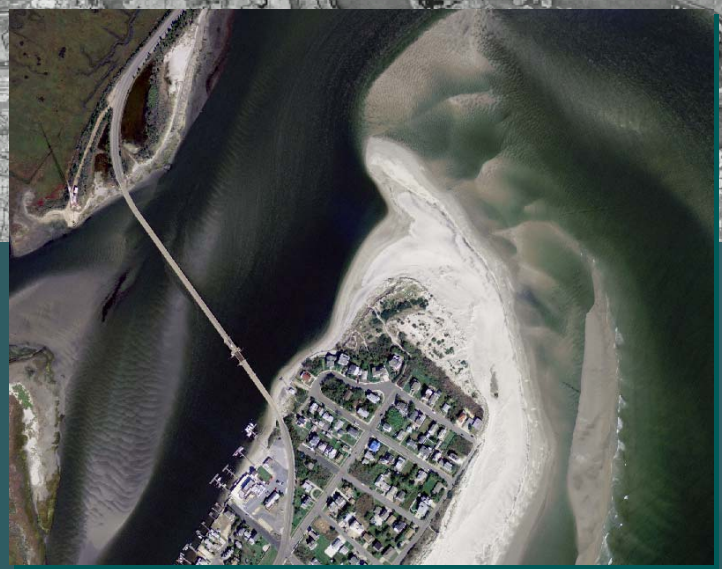
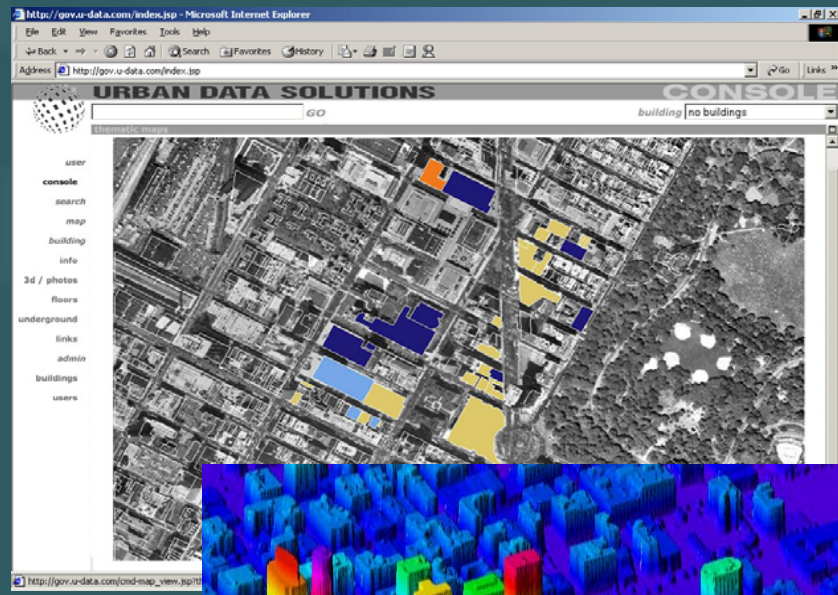
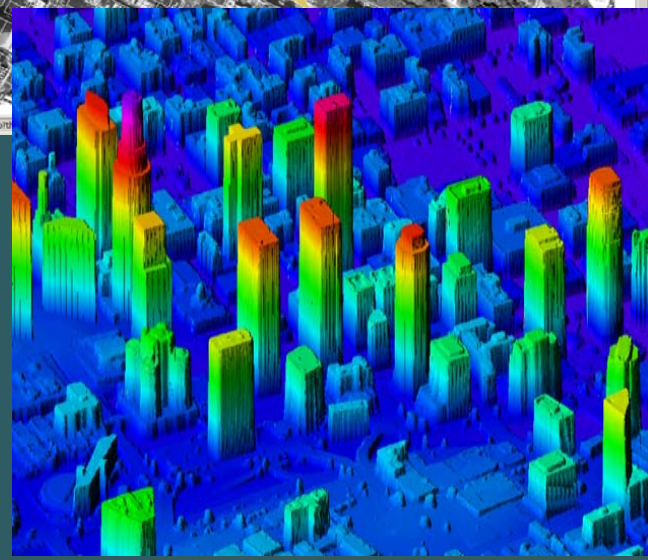
Making maps …

From coastlines…







…To the urban canyons

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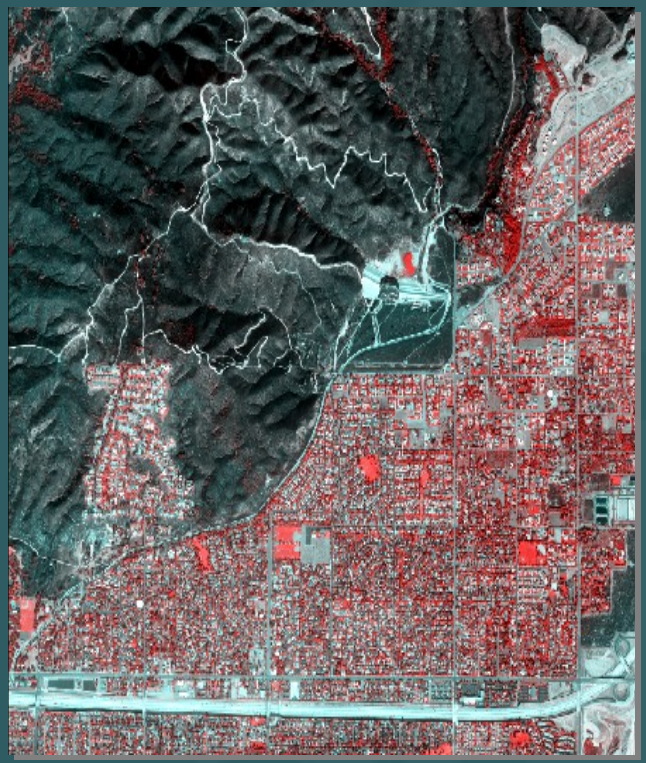
*…Supporting **urgent needs** for imaging, mapping, and GIS*

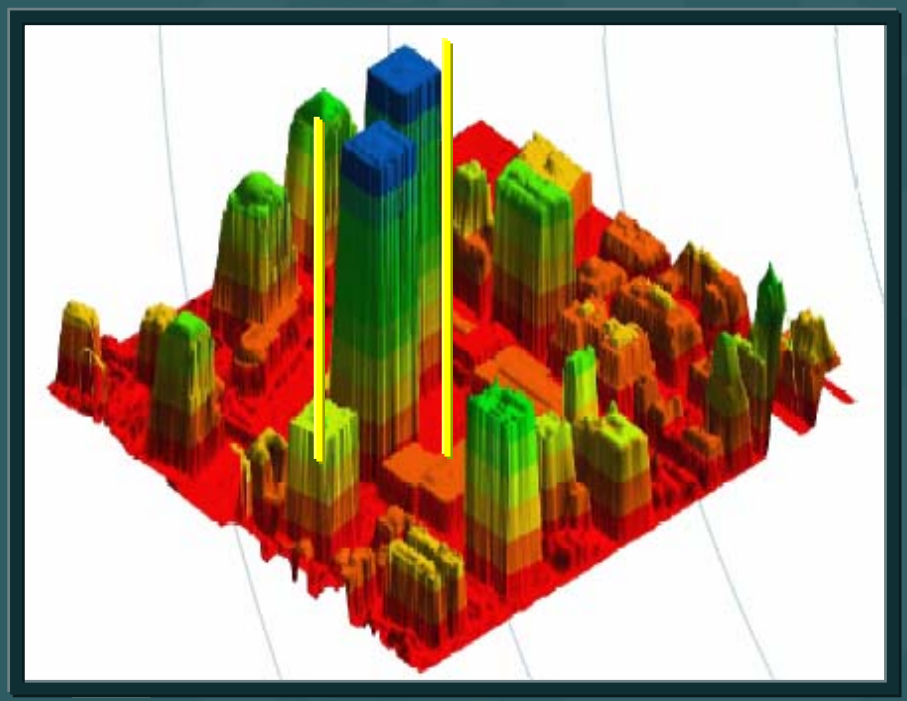
Hurricanes (Charlie)

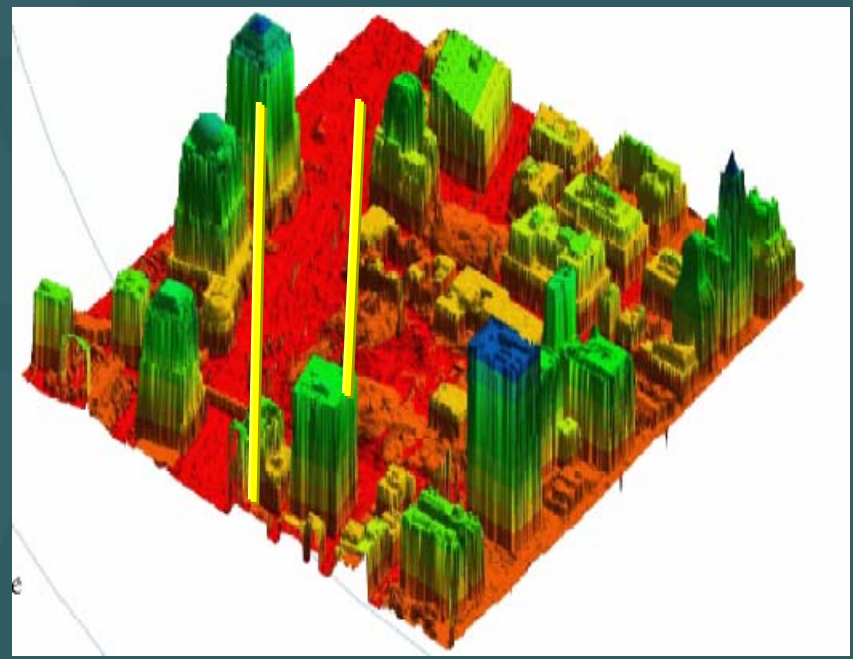
California Wildfires



Tornadoes (La Plata)

But we never imagined this…





Nor this…

770 square miles mapped

2,000 frames ortho-rectified within 48 hours

Full image mosaic delivered to NOAA within 4 days

Post-WTC (and Post-Katrina!) Mission Analyses

- Geospatial data is valuable for search, rescue, recovery, and clean-up in most crises
  - Hurricanes, floods, fires, earthquakes, toxic spills
- First-responders need near real-time turnaround of geospatial information
- The data processing center must be located near crisis
- Dissemination to decision makers, first responders, and public affairs has to be faster and more efficient
- Coordination among federal, state, and local agencies must improve
- We need a better and faster regulatory approval process

Post-WTC (and Post-Katrina!) Mission Analysis...this is what we were saying 5 years ago after 9/11!!

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Observations of Response/Recovery Involving Remote Sensing and GIS Services

- Clear communication…
- Discrete role definition, responsibility, and authority…
- Accurate and consistent requirements and specifications…
- Clear purpose and understanding of end-user needs…

…DO NOT EXIST!

Why?

- Unclear mandate about who is responsible for geospatial support for rapid response – FEMA? NGA? USGS?
- Poor coordination among federal, state, local governments, and the private sector on geospatial response and recovery activities
- Lack of education about value of geospatial information in support of emergency response

Like politics, all disasters are local

- Locals should set the requirements
- If it is good enough for them, it is good enough for the federal agencies and most other users
- They should know that their needs will be met, by whom, and exactly what and when to expect it.

Federal agencies need to clarify their roles and the roles of industry

- Example – DHS? NGA? USGS? Corps of Engineers?
- Example -- aerial imaging -- federal or private sector?
- Communicate the answer within government and industry

We need pre-negotiated contracts to expedite mobilization

- FEMA should put in place pre-negotiated, regional, qualification-based selection contracts, with known requirements that meet response and recovery needs.
- Florida has several contracts in place to procure rapid response geospatial support
  - Florida Power & Light
  - Florida State Term Contract

Decision to acquire geospatial data should be made in the FEMA ROC or DFO as soon as possible

- Clear requirements
- Clear tasking
- Timely decision making
- Clear chain of custody for the data

So where is EarthData in all of this?

h1

- For the *2006 hurricane season*, EarthData is ready to:
  - Forward deploy, if necessary and appropriate, a large capacity production system to produce high resolution geospatial information over wide areas.
  - Begin collecting and processing data within hours of a hurricane clearing the coast.
  - Begin delivering geo-rectified image mosaics within 24 hours of first data collection.
- For future emergencies, EarthData can be ready to:
  - Provide real-time data downlink from aircraft to provide data direct to first-responders for focused areas collections. (ARIES follow-on program).

Slide 16

h1 Anne -- The next 4 slides go into more detail about our deployment and delivery concept. This may be more information than you want to share with the crowd. You could just leave it at this slide and then speak to any specifics rather than show them on slides. This is what i would recommend.

hiatt, 4/25/2006

Deployment Package

- Aircraft
- 4 ADS40 Cameras, 2 ALS50 LIDAR, 2 DSS Cameras
  - Other sensors are available as needed: thermal, IFSAR, hyper-spectral
- Mobile PIXEL Factory Processor
- Deployable processing shelter (if necessary)
- Data servers
- Staff

Data Products

- First Response Product (Produced on-site)
  - Wide-Area Digital Image Mosaic (L1 Processed ADS40 Images)
    - Identify areas of destruction;
    - Initial Update for GIS users;
    - Usable for GPS navigation for first responders.
  - Select-Area LIDAR DEM and Digital Images
- Product of Record (Produced off-site)
  - Wide-Area Triangulated, Controlled Orthophoto Mosaic;
  - Wide-Area Digital Elevation Model.

Data Dissemination

- Multi-tiered data serving
- In-field server for imagery access
  - Limited to key staff due to band width
  - Accessible as soon as L1 images processed
- Full scope server from office environment
  - High bandwidth access to authorized personnel
- Server based on US Government specified technology

We can do better as a community, and we must do better. Our families, neighborhoods, and nation deserve better!

Operations Concept

- 1 lifts per day per aircraft: up to 7 aircraft and sensors on-call
  - Wide area mapping with ADS40 Digital Camera
  - Selected area collect with LIDAR, DSS, or other sensor
- 24/7 parallel data processing
  - Wide area lift processed within 24 hour
  - Selected area lift processed within 10 hours
- Data dissemination
  - Digital data served out using government specified server technologies and formats

NO WAR STORIES, ONLY RECOMMENDATIONS.