Post Tropical Cyclone Sandy Geospatial Response
An Interagency Success Story and NOAA’s Role
February 26, 2014
Pre-Storm Coordination

- FEMA
- USGS
- NOAA
- Civil Air Patrol (DoD)
- National Geospatial-Intelligence Agency (NGA)
Pre-Storm Preparation

- FEMA Modeling Task Force (MOTF) ran predicted surge models (SLOSH)

- USGS
  - Deployed hundreds of storm surge sensors to measure depth of water at structural level
  - Included real-time surge, rapid-deployment gages
  - These sensors provided a real-time assessment as the storm made landfall

- NOAA and NGA prepared to collect imagery after storm

- CAP had aircraft and crews ready to fly
Sandy Response

- NOAA overflights
  - Used surge models to target high-priority areas
  - Geospatially referenced, GIS-ready imagery
  - High resolution
  - Priorities:
    - Impacts to nautical charting and the marine transportation system
    - Impacts to the coastal zone
    - MOTF priorities
  - First flight was posted and available within 48 hours

Imagery collected by NOAA
NOAA planned flight lines and collected data overlaid on MOTF Risk Matrix and Priority setting for 1-2 Nov

Black outline = data collected  Green lines = planned collection  Blue Boxes = priority areas for 1-2 Nov
Black outline completed
Flight lines

Lines inland to Be completed
Sandy Response

- Hind-cast SLOSH - models were refined using:
  - Sensor Data
  - 850 High Water Marks collected by USGS
Storm Impacts

- Mantoloking, NJ
- Barrier Island Breach
Storm Impacts

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Sandy Response

- CAP Flights
  - Oblique, geo-tagged aerial of most impacted areas
  - Used surge model to prioritize flights
  - In air within 24 hours of storm
  - Over 157,000 geo-tagged images captured
  - Over 650 sorties flown
  - Over 250 personnel, including headquarters staff, were in support
Sandy Response

- Structural Assessments by ImageCAT, using NOAA and CAP imagery and surge model
  - 44,000 assessments delivered within 72 hours notice to proceed
  - 147,000 individual structural assessments in total

- Geospatial Structural Assessments were used to:
  - Deliver expedited assistance to >44,000 applicants for temporary shelter assistance
  - Determine priorities for Housing Inspection teams
  - Direct operational forces to be concentrated on most impacted areas allowing a stretched response effort to maneuver without wasting man-hours or effort
  - Determine potential long-term housing requirement priority areas to support IA Housing planning efforts in NJ/NY
FEMA use of NOAA Imagery for Damage Assessment of Individual Homes
Sandy Response

- Image Assessments posted to FEMA GeoPlatform for use by States and other Agencies
  - Damage Assessments compiled by US National Grid
  - Imagery-based Preliminary Damage Assessments
Sandy Response

- Application Developed within 48 hours of request
- Leveraged NOAA imagery, BING base maps and CAP imagery
- Developed so people who could not go to their homes could see them
- Typing in address marks NOAA image (with underlying map)
- Click on green CAP image dot to see thumbnail image
- Click on thumbnail to see larger image
- Over 16,000 visits the first day
Sandy Response

- Post-Sandy LiDAR surveys (both topographic and topobathy) were taken of open coast sandy beaches from Cape Hatteras, NC to Montauk, NY

- Was done cooperatively:
  - USACE assets and contracts
  - USGS assets and contracts
  - Covered New York to Virginia
  - NOAA will follow up with coverage from South Carolina to New York using supplemental funding
Sandy Response

- Day 3: Fuel flow into NY area was a top priority
  - Barge deliveries were hampered by partial closure of the port
  - Waterborne obstructions along Arthur Kill and other off-load facilities also a problem

- DHS requested maps of fuel depots and details of New York Harbor
  - HSIP has locations of fuel depots
  - EPA has capacity of fuel depots
  - NOAA has nautical charts (but not GIS-compatible)

- NOAA had survey vessels in the area, which were used to identify obstructions (using sonar technology) and clear areas for vessel movement
In Memoriam: Chris Barnard

In tribute to Chris Barnard, Remote Sensing Advisor for the Department of Homeland Security and a champion of geospatial coordination and innovation in disaster response.