Post Tropical Cyclone Sandy Geospatial Response

An Interagency Success Story and NOAA's Role

February 26, 2014

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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

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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

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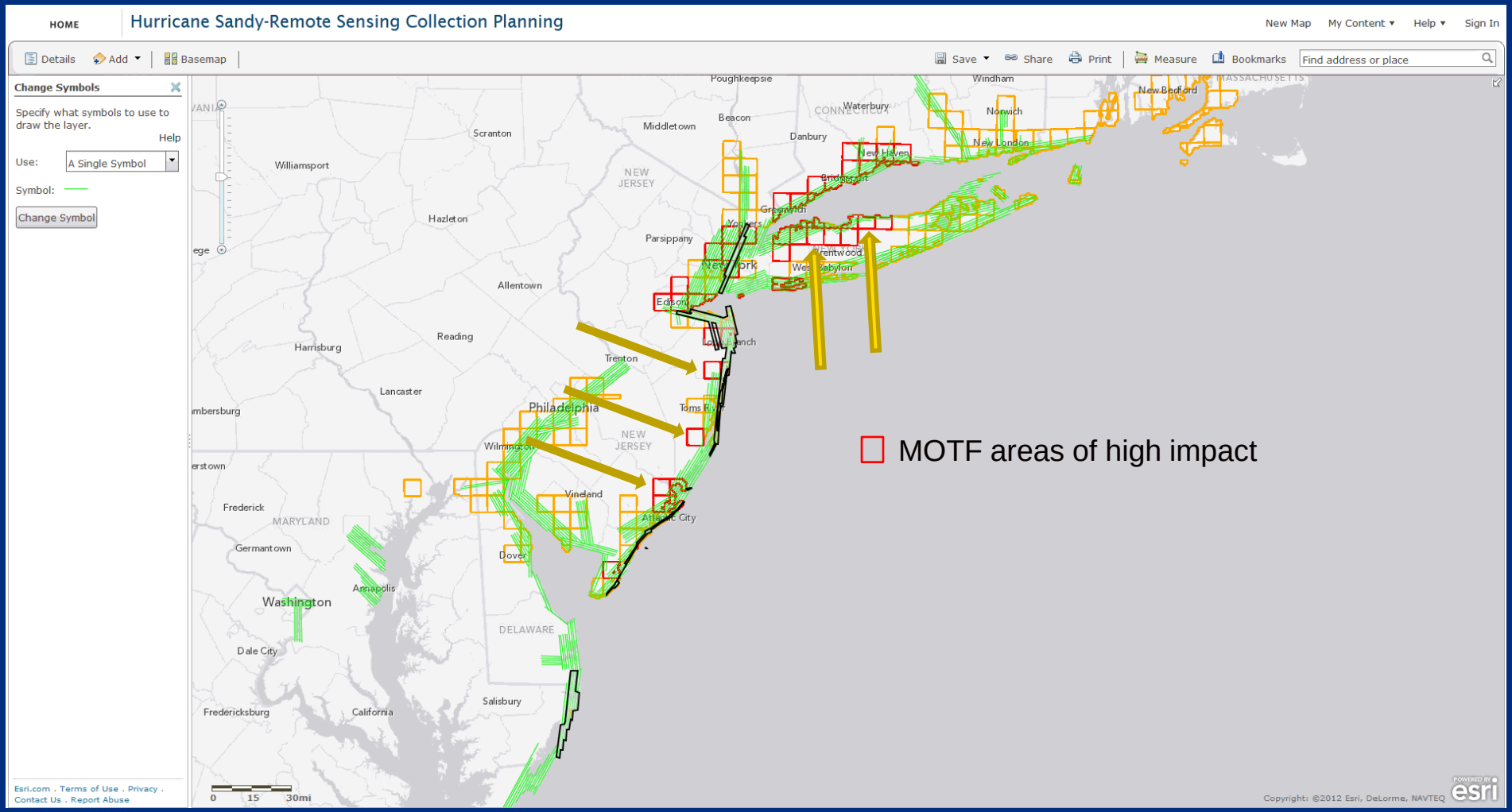
NOAA planned flight lines and collected data overlaid on MOTF Risk Matrix and Priority setting for 1-2 Nov



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

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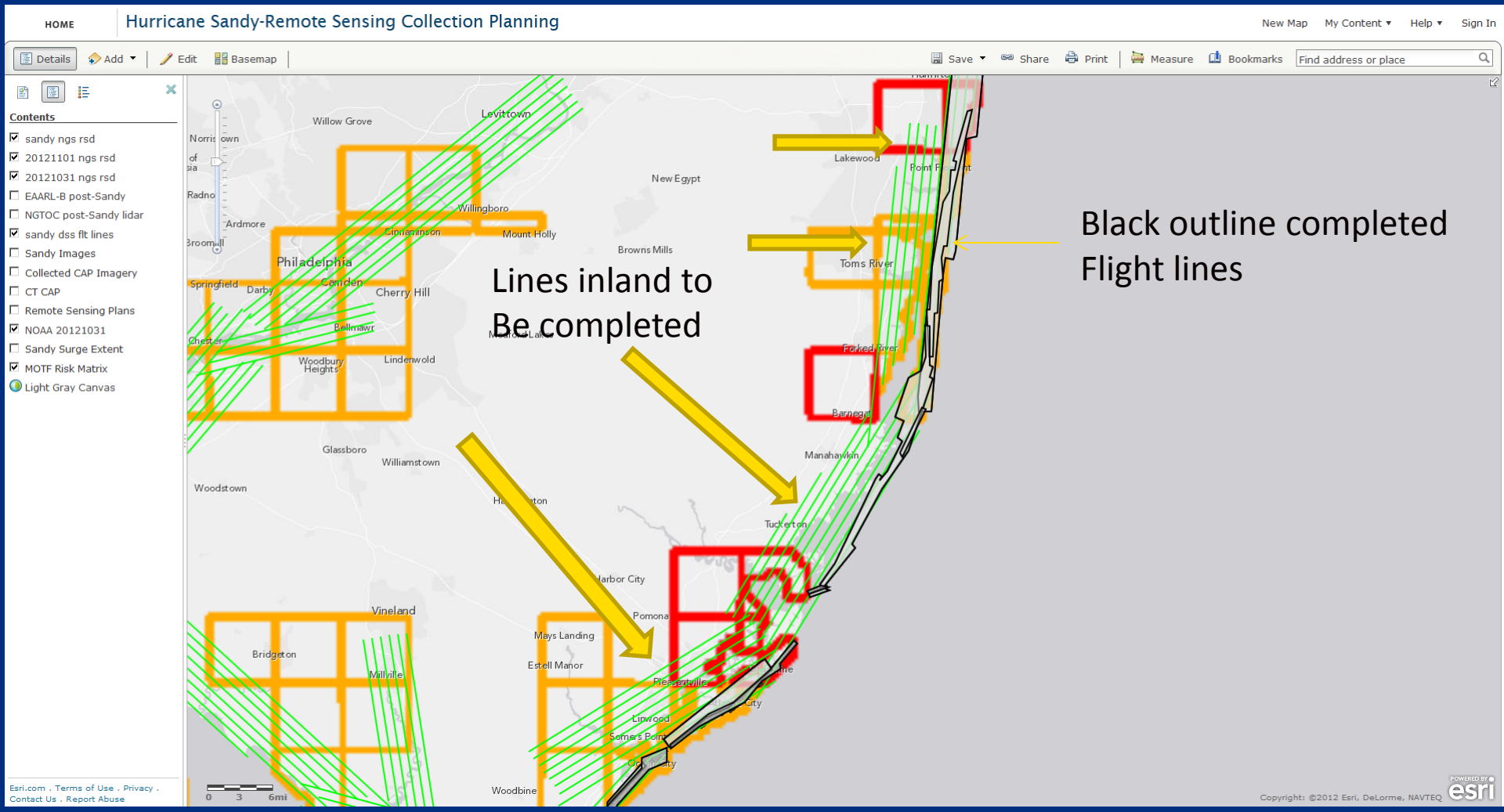
Julia W. O'Brien February 26, 2014


HOME
Hurricane Sandy-Remote Sensing Collection Planning
New Map
My Content
Help
Sign In
Details
Add
Edit
Basemap
Save
Share
Print
Measure
Bookmarks
Find address or place
Contents
sandy ngs rsd
20121101 ngs rsd
20121031 ngs rsd
EAARL-B post-Sandy
NGTOC post-Sandy lidar
sandy dss flt lines
Sandy Images
Collected CAP Imagery
CT CAP
Remote Sensing Plans
NOAA 20121031
Sandy Surge Extent
MOTF Risk Matrix
Light Gray Canvas
Lines inland to
Be completed
Black outline completed
Flight lines
Willow Grove
Levittown
Lakewood
New Egypt
Willingboro
Mount Holly
Browns Mills
Toms River
Philadelphia
Camden
Cherry Hill
Springfield
Darby
Chester
Bellmawr
Woodbury Heights
Lindenwold
Forked River
Barnegat
Glassboro
Williamstown
Manahawkin
Woodstown
Tuckerton
Vineland
Pomona
Mays Landing
Bridgeton
Millville
Estell Manor
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Linwood
Woodbine
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Sandy Response

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

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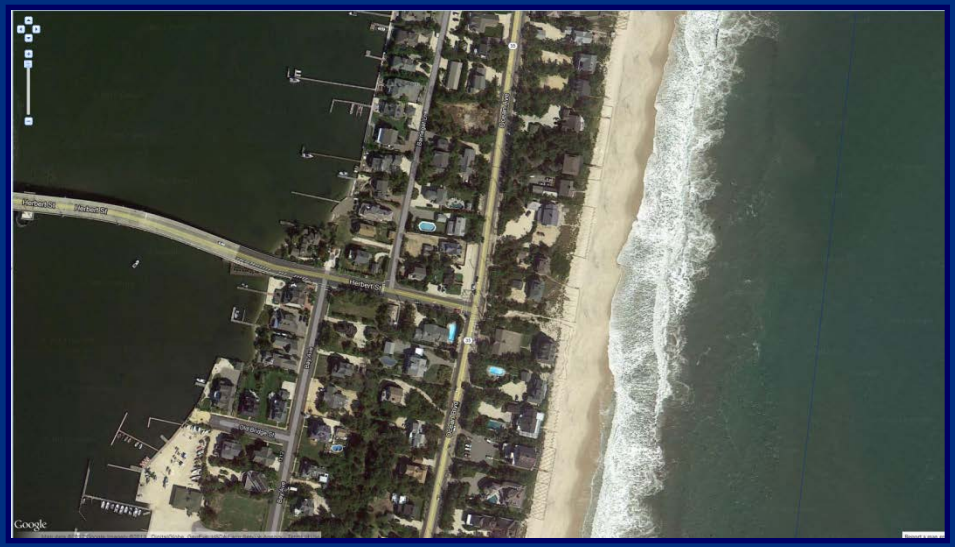
Storm Impacts

Before



Post-Storm

- **Mantoloking, NJ**
- **Barrier Island Breach**

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Storm Impacts

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Storm Impacts

Before

Post-Storm

- **Mantoloking, NJ**
- **Barrier Island Breach**

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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

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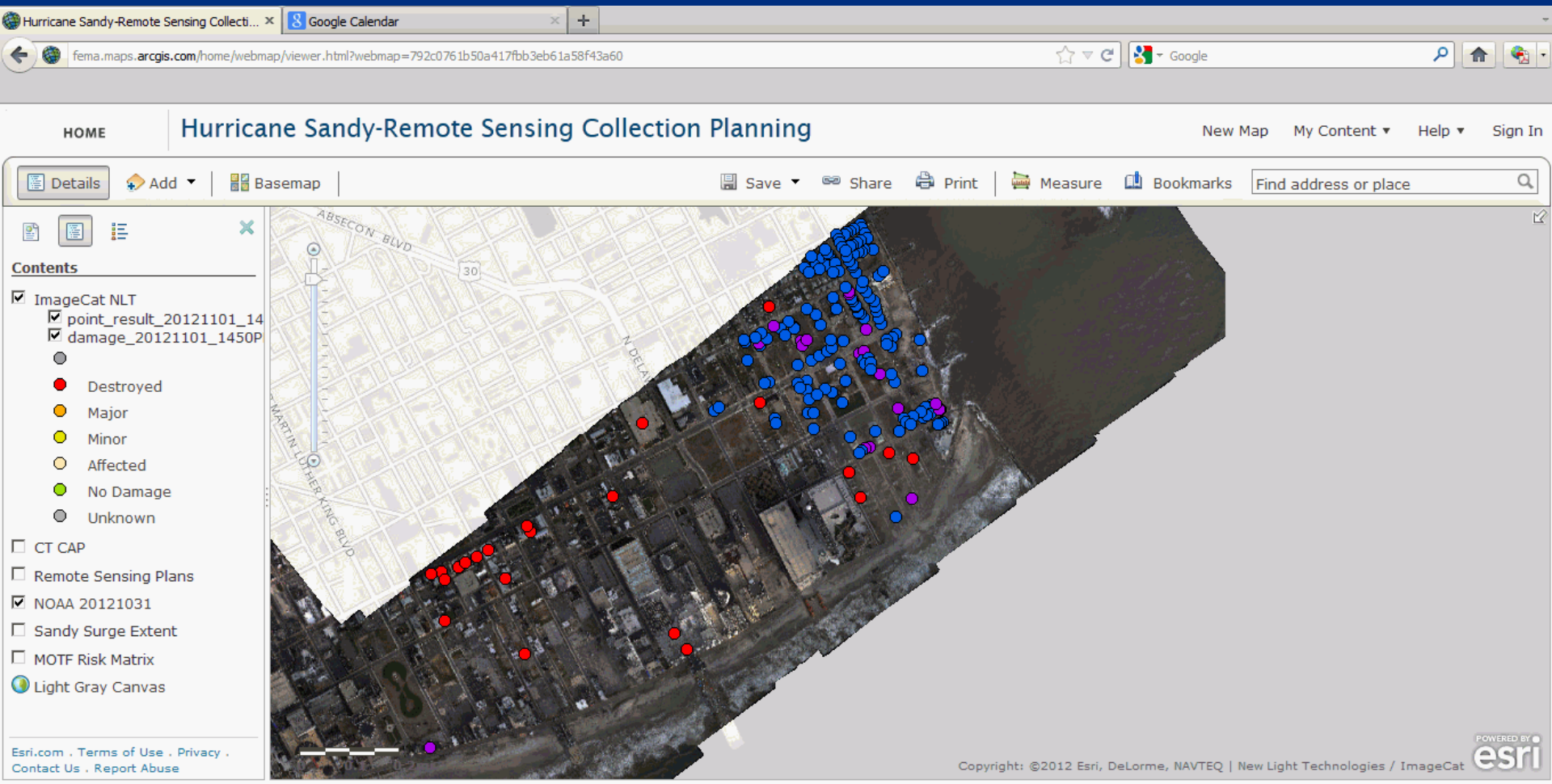
Sandy Response

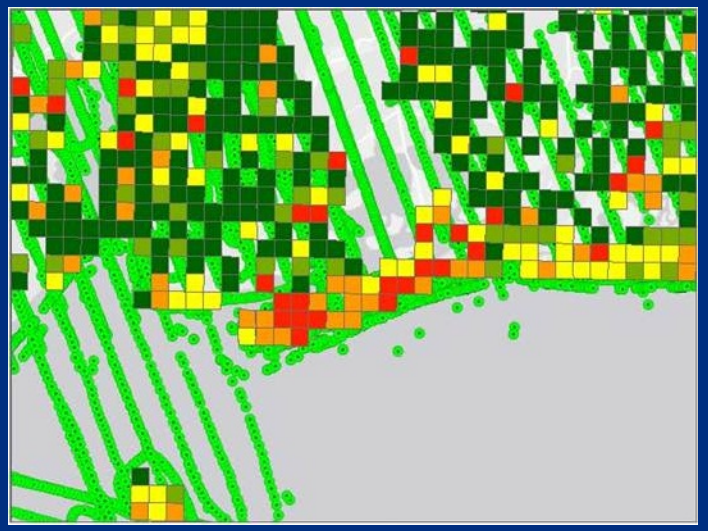
- Structural Assessments by ImageCAT, using NOAA and CAP imagery and surge model
  - 44,000 assessments delivered within 72 hours notice to proceed
  - 147,000 individual structural assessments in total
- Geospatial Structural Assessments were used to:
  - Deliver expedited assistance to >44,000 applicants 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



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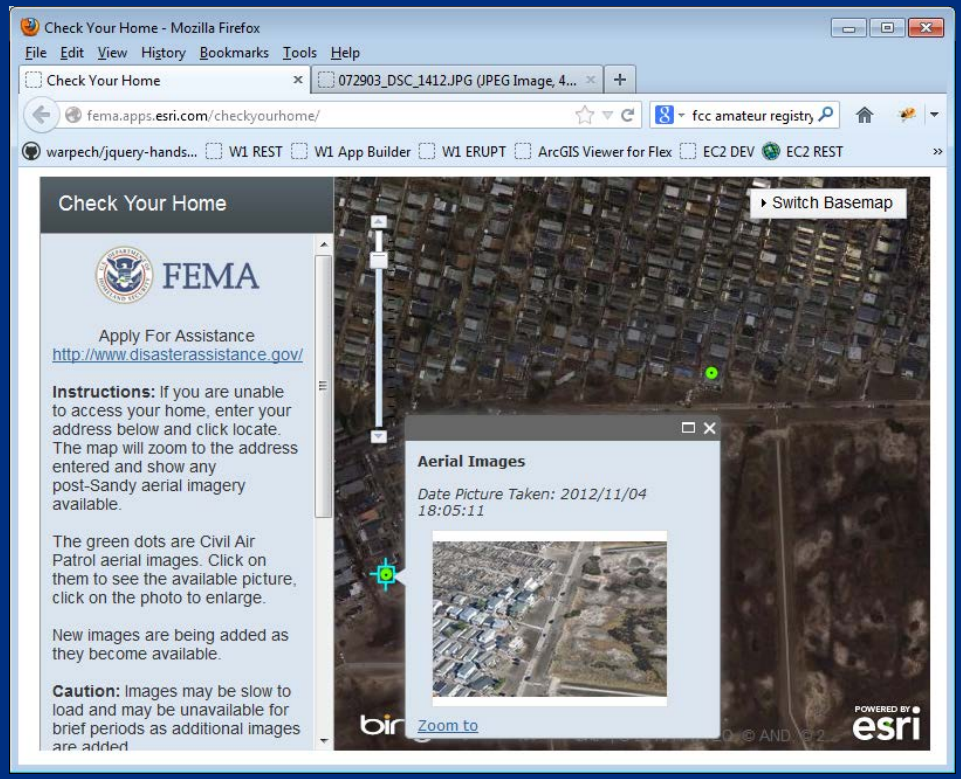
Sandy Response

- 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



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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.

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