Overview

- Introduction to NOAA’s Mission Goal, Commerce and Transportation
- NOAA Navigation Services before, during, and after a hazardous event
- Assessing NOAA’s Navigation Services response activities
- Planning for the future
The NOAA Big Picture

NOAA Headquarters

Oceanic and Atmospheric Research
National Environmental Satellite, Data and Information
National Ocean Service
National Weather Service
Program Planning and Integration
NOAA Marine and Aviation Operations
National Marine Fisheries Service

Ecosystem Goal Team
Climate Goal Team
Weather and Water Goal Team
Commerce and Transportation Goal Team
NOAA Commerce and Transportation

- Marine Transportation System (MTS)
- Geodesy
- Aviation Weather
- Marine Weather
- Surface Weather
- Emergency Response
C&T Overview

• NOAA has enhanced the American Public’s ability to:
  – Know where they are
  – Get where they are going safely and efficiently
  – Make appropriate decisions for a safe, secure, efficient, and environmentally sound transportation network.

• NOAA’s essential services are uninterrupted and available during emergencies and critical events.
NOAA & Hazards

During

Response

Before

Prepare

After

Rebuild
Prepare

Strong local partnerships ensure an integrated response to hazards
A NOAA Wide Approach

- National Response Plan
  - Emergency Support Function
    (e.g., #10 - Oil and Hazardous Materials Response)
- NOAA Incident Coordination Center
- Homeland Security Operations Center (HSOC)
NOAA’s support of the Marine Transportation System

- Nautical Charts
- Hydrographic Surveys
- Spatial Reference Network (Horizontal and Vertical)
- Water Level and Current Data, PORTS®
- Marine weather information and models
- Shoreline data
- Regional liaisons to the local community
Hurricanes Katrina and Rita

Two situations that highlight NOAA’s readiness and response abilities
<table>
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<th>Team NOAA</th>
<th>The Larger Team</th>
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<tr>
<td>NWS</td>
<td>USCG, USACE, USN, USAF</td>
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Navigation Services Response

- Surge Models
- Navigation Surveys
- Aerial Photography
- Water Levels and PORTS®
- National Spatial Reference System (CORS)
- Hazardous Materials Response
NOAA Hurricane Storm Tide

Storm Tide + Waves

DUNE

MLLW
National Hurricane Center Utilization of Real-Time Storm Tide data

Storm Surge Forecast

SLOSH Model
Navigation Surveys

- Surveys allowed critical ports and harbors to open to commercial and emergency vessel traffic sooner
- Navigation Response Teams, NOAA Ships Nancy Foster and Thomas Jefferson, and private sector contract survey companies surveyed rivers and ports to ensure waterways were clear of hazards
NOAA Hurricane Katrina and Rita Response: Emergency Hydrographic Surveys
In Support of Reopening Ports and Waterways
Office of Coast Survey and Office of Marine and Aviation Operations
Water Level Support of Hydrographic Surveying

The rapid restoration of water level gauges was essential to hydrographic survey operations by Coast Survey supporting restoration of shipping in damaged ports.
NOAA Hardened Tide Station
Dauphin Island, Alabama
Survives Hurricane Katrina
Obstructions and Salvage

NOAA coordinates closely with USACE and USN to identify and remove navigationally hazardous obstructions
Aerial Photography

- Collected 10,000 digital aerial images and partnered with private industry to make images available to the public

- Used for
  - damage assessments
  - public information
  - spill response prioritization
  - search & rescue
  - access routes for Navigation Response Teams
Aerial Coverage Map

9 Days
19 Flights
8327 images
40 Terabytes downloaded
PORTS® Operations Following Hurricane Rita

- Physical Oceanographic Real-Time Systems (PORTS®) was important to the rapid restoration of shipping operations in Houston and Galveston.
Water Levels and PORTS®

- Water level measurements, forecasts, and PORTS® data used
  - to support NWS storm surge models
  - to support NOAA Hydrographic Survey operations supporting restoration of shipping in damaged ports
  - U.S. Army Corps of Engineers plans to rebuild New Orleans levees
Hazardous Materials

- NOAA information products used for planning and response operations throughout impact region
- Working with Federal, State, and local agencies to identify, assess, prioritize, and mitigate oil and hazardous material spills
- Providing guidance on vessel salvage, conducting shoreline cleanup assessments, and collecting information to assess impacts to natural resource from spills
Contaminants Survey

Figure 1: Katrina Response ECD and REUT Stations 12-16 September 2005

Legend
Depth (m)

Sampling stations

27-Sept 2005

Nautical Miles
NOAA Private Sector Partnerships

- Private contract support allows NGS, OCS, CO-OOPS to accomplish the missions
  - Survey Support
  - Aerial Photography
  - Observations Infrastructure Support (e.g., PORTS®)
Rebuild

• Critical Issues
  – Navigation Chart Updates
  – Spatial Reference System
  – Water levels and PORTS®
  – Critical data for accurate surge models
Nautical Chart Updates

• Priorities
  – Critical Areas (Ports, Waterways)
  – Requested Surveys (FEMA, USACE)

• 500K of Square Nautical Miles
  – 70,000 Gulf of Mexico
  – 300,000 Alaska
Stars indicate local Continuously Operating Reference Stations (CORS) sites, which accurately track the aircraft that obtain aerial imagery.

Dots indicate locations whose positions were computed by the On-line Positioning User Service following hurricane landfalls.
Performance Evaluation Plan and Interim Status, Report 1 of a Series
Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System
by Interagency Performance Evaluation Task Force
10 January 2006

NOAA is Providing Water Level and Elevation Data to support the rebuilding of the hurricane protection systems and the transportation infrastructure
Critical Storm Surge Data

Elevation and Bathymetric Data
Next Steps

- Initial Assessment
- Assessment Activities
- Improvements Needed
- Future challenges
Initial Assessment

- Strong pre-existing relationships improve response effectiveness
- Flexibility and collaboration is essential
- NOAA needs to increase the depth of our essential capabilities
Assessment Activities

• Conducting a NOAA-wide Review of Operations and Services during Hurricanes Katrina and Rita
  – Review activities before, during, and after events
  – Emphasize perspective of customers and partners
  – Focus on readiness, communication, coordination, continuity of operations, and recovery
Accomplishments

The federal response "moved quickly and effectively to help save lives, restore services and keep supplies and commerce moving. Without the help of the public port authorities and agencies such as the Coast Guard and the Corps, NOAA and MARAD, the crucial services needed in times of crisis and the goods we depend on in our everyday lives may not be available with the timeliness that consumers and manufacturers require."

– Kurt Nagle, President/CEO of American Association of Port Authorities
September 13, 2005

“Less than two weeks after Katrina made landfall, ports along the Gulf coast and channels on the Mississippi River are once again navigational and safe for ship traffic. The National Oceanic and Atmospheric Administration, the federal agency responsible for providing the nation’s nautical charts, has played a key role in a major interagency effort to ensure that navigational areas affected by Hurricane Katrina are clear of obstructions and debris.”

– MarineLink.com, September 26, 2005
Improvements Needed

• Improving Capabilities
  – NRT 7 & 8
  – Hardening of Tide Gauges

• Storm Surge Forecast Models
  – VDatum Tool
  – Near Shore Bathymetry
  – Vertical Datum improvements (Height Modernization)
  – Water level measurements
  – Topographic data

• Fleet
  – Construction and Delivery of SWATH vessel not assured
Improvements Needed cont.

- Survey Technology Improvements
  - Multibeam Sonars
  - Light weight high resolution side scan sonar
  - Navigation Systems
  - Satellite Data Transmission

- Data Access
  - Alternate systems for disruption of land-based communications
  - Additional "bandwidth" to enhance NOAA's Internet delivery of imagery
Future Challenges

- Address Survey Backlog
- Complete and maintain Electronic Navigation Charts suite
- Increasing demand for PORTS® stations
- Densification of water level stations
- Complete the National height modernization effort
- Ability to respond to two simultaneous spills of national significance (SONS)
Conclusion

Hurricane 2006 Season starts in less than five months

• Partnerships were critical in helping NOAA respond to the Hurricane 2005 Season

• In the future, NOAA’s success will depend upon its ability to prepare, respond, and rebuild