Linking IOOS and Marine Transportation System
Josie Quintrell
Two interlinked components:

Coastal  Global

7 Goals - 1 System

- Improve predictions of climate change and weather
- **Improve the safety and efficiency of maritime operations**
- Improve forecasts of natural hazards
- Improve homeland security
- Minimize public health risks
- Protect and restore healthy coastal ecosystems
- Sustain living marine resources
Coastal Component

- Geographic extent: EEZ to the head of the tide
- Regional/Federal Partnership
- Data Management and Communications (DMAC) connects regional and national scales

Why Regional Approach?
Connection to users
Tailored products
Ties to regional experts
Facilitate regional needs
Testbeds for new technologies
Flexibility
Regional Association Activities Supporting Marine Operations: Multiple Responses - Navigation, Safety and Efficiency

- Real Time Sea State Conditions
- Customized Products
  - Integrating observations and model forecasts
- Emergency Response
- Beach Safety
- Ship Tracking

IOOS

AOSOS Gulf of Maine
Massachusetts Bay
24 Jan - 29 Jan
- Observation: 11/10 11:30 AM EST

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Wind Speed</td>
<td>22 knots (41 mph, 41 kph)</td>
</tr>
<tr>
<td>Wind Direction</td>
<td>NE (27°)</td>
</tr>
<tr>
<td>Sea Height</td>
<td>15.7 ft (4.8 m)</td>
</tr>
<tr>
<td>Wave Period</td>
<td>10.7 s</td>
</tr>
<tr>
<td>Temp</td>
<td>60.7°F (16.5°C)</td>
</tr>
<tr>
<td>Dens</td>
<td>1.028 g/cm³</td>
</tr>
<tr>
<td>Salinity</td>
<td>33.4 psu</td>
</tr>
<tr>
<td>Latitude</td>
<td>41.44°N</td>
</tr>
<tr>
<td>Longitude</td>
<td>-73.78°W</td>
</tr>
<tr>
<td>Depth</td>
<td>195.2 m</td>
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</table>

NYC
Long Beach
Oahu
San Francisco
Hudson
Operational Partnerships Integrating IOOS Data: Multiple Delivery Methods

National Data Buoy Center

- Serving non-federal data from RAs
- Over 50% of data served by NDBC is from external partners, enabled by IOOS DMAC

Integrating IOOS data into NOAA’s PORTS

- Waves: Chesapeake, San Francisco, Long Beach/Los Angeles and Mouth of Columbia River (through MOU with USACE/CDIP & PORTS)
- Currents: underway for NY/NJ Harbor
- Methodology established that allows for other sites to be incorporated
Commonalities Across Regions: Waves and Surface Currents

- Developed with community support from academia, regions, and federal agencies (ACT facilitated plans)

- Identified critical gaps, technical needs and data management requirements

- Includes estimated cost based on decades of experience

- Framework to facilitate leveraging
Regional Build Out Plans: Common Marine Op Products

Safe and efficient operations
• Wind, wave, current conditions, nowcasts and forecasts
• Integrated visualizations
• High resolution observations and models for ports, harbors, passages

Search and Rescue
• Wind, wave, current nowcasts and forecasts for SAR

Spill Response
• RT winds, waves, currents and forecasts/hindcasts for responders
• Surface and subsurface conditions

Offshore energy
• Wind, wave, and current climatologies
• Maximize efficiency and safety of energy operations
• Real time and forecast winds, waves, currents
San Francisco

Safety, Economics, Environment

CDIP Point Reyes Buoy

CDIP San Francisco Bar Buoy

USACE disposal site

USACE Project Site (Regional Sediment Management)

Long Period Swell

Short Period Seas

NOAA 46026
San Francisco
Wave Map Browser
Safety, Efficiency

Understanding of Management Issues
San Francisco - SAFETY

Marine Incidents (rescues) near SF Bar

<table>
<thead>
<tr>
<th>Fiscal Year (FY)</th>
<th>Surf Cases</th>
<th>IVO of SF Bar</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>FY03</td>
<td>32</td>
<td>98</td>
<td>130</td>
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<tr>
<td>FY04</td>
<td>28</td>
<td>75</td>
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<td>FY05</td>
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<td>19</td>
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<tr>
<td>FY09</td>
<td>11</td>
<td>14</td>
<td>25</td>
</tr>
</tbody>
</table>

Data supplied by the Coast Guard. Assimilated and Disseminated by the SF NWS Office.
“This buoy allows for safer transits, safer pilot boat operations, and efficiency for the shippers that call at San Francisco Bay.”
Captain Bill Greig

“The valuable information available from this weather buoy plays a very crucial roll in my decision that relates to safe navigation of ships across the bar.” Captain Carl Martin, Jr.

“This station has been a great benefit to me as a San Francisco Bar Pilot in route planning and risk assessment.” Captain H.W. Kenyon
U.S. Coast Guard: Search And Rescue Optimal Planning System

National HF Radar Network – 151 Sites

Mid-Atlantic Operational Data Flow to SAROPS

SAROPS 96-Hour Search Area: **HYCOM = 36,000 km²**  
SAROPS 96-Hour Search Area: **HF Radar = 12,000 km²**
Annual Coverage Changes:
2008 to 2009 – Increase due to a focus on resiliency
2009 to 2010 – Decrease due to a lack of spares

USCG Coverage Target:
80% Spatial Coverage
80% of the Time

Staffing Requirements:
MAB HFR Network = 14 LR HFRs + 14 SR HFRs.
National HFR Plan Recommends 8 Technicians.
IOOS Currently Supports 3 Technicians.
IOOS Coordinated Rapid Response: *Deepwater Horizon Oil Spill*

**Contributed Assets:**

- HF Radar Networks
  - USF, USM
- Gliders
  - iRobot, Mote, Rutgers, SIO/WHOI, UDel, USF
- Drifters & Profilers
  - Horizon Marine, Navy
- Satellite Imagery
  - CSTARS, UDel
- Ocean Forecasts
  - Navy, NCSU
- Data/Web Services
  - ASA, Rutgers, SIO

**Tropical Storm Bonnie crosses the Gulf of Mexico**

USM HFR validation of SABGOM Forecast in region with satellite detected oil slicks

HFR used for Oil Slick Forecasts by NOAA/NOS/OR&R
Changing Arctic Conditions

Arctic Asset Map

Port of Anchorage
Cook Inlet
Bering Strait

- Marine Exchange and WWF using AIS to track vessels in Bering Strait

- AOOS received ocean planning funding from NOAA to develop data integration and visualization tool for shipping, oil and gas and commercial fisheries
Disseminating Weather Info over AIS

Current Situation
• Most vessels in AK receive real time weather data over VHF radio but coverage is limited and inefficient.
• AK has an existing network of 80+ AIS receiving stations.
• Many vessels have AIS transceivers already connected to this network.

AOOS Plan:
• Develop pilot program to enhance existing AIS receiving stations to collect and broadcast real-time weather conditions and forecasts.
• Allow captains to see real-time ocean conditions on their AIS screens.
• Incrementally expand the number of AIS broadcast/WX stations.
Next Steps

• Regional Build Out Plans
  – 10 Year Vision and Needs
• IOOS Blue Print and Cost Estimate
• Build federal/regional partnerships
  – Build on relationships developed at regional level
  – Complete National Surface Current Mapping Plan
  – Continue to link and leverage assets