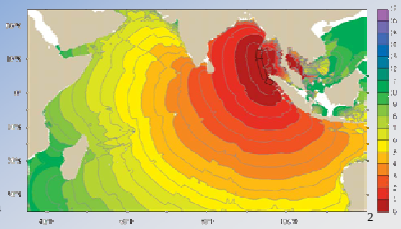
Earth Observations: Bringing Together Critical Information for Disaster Preparedness and Response

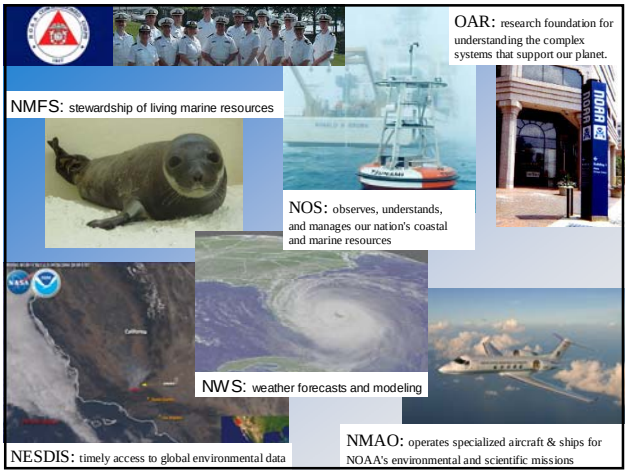
David B. Zilkoski
XXIII International FIG Congress
October 10, 2006

Menu Items

- Importance of Accurate Positions
- Linking Information Systems



Tsunami Travel Times, December 26, 2004, Sumatra, Indonesia



NMFS: stewardship of living marine resources

OAR: research foundation for understanding the complex systems that support our planet.

NOS: observes, understands, and manages our nation's coastal and marine resources

NWS: weather forecasts and modeling

NESDIS: timely access to global environmental data

NMAO: operates specialized aircraft & ships for NOAA's environmental and scientific missions

Dave Zilkoski

Director, National Geodetic Survey
NOS' NGS defines and manages the US National Spatial Reference System: CORS, OPUS, Height Modernization, Coastal Mapping and other shoreline information.

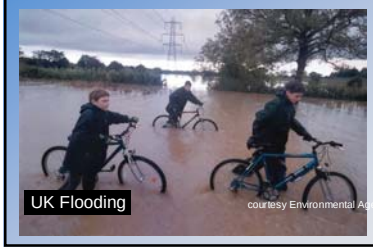
NOAA's Project Manager for IOOS - the Integrated Ocean Observing System (IOOS), a component of the Global Earth Observation System of Systems (GEOSS)

1807-2007 NOAA is celebrating 200 Years of Science, Service, & Stewardship

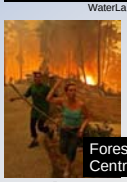
Who cares about Earth Observation Data?

- We Must Promote Societal Benefits of Integrated Observations

North Sea Barriers
WaterLand Neeltje Jans Mu



UK Flooding
courtesy Environmental Agency

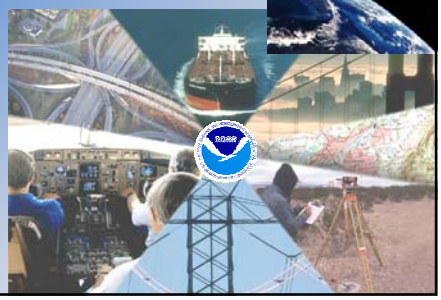


Forest Fire Central Portugal
courtesy Reuters

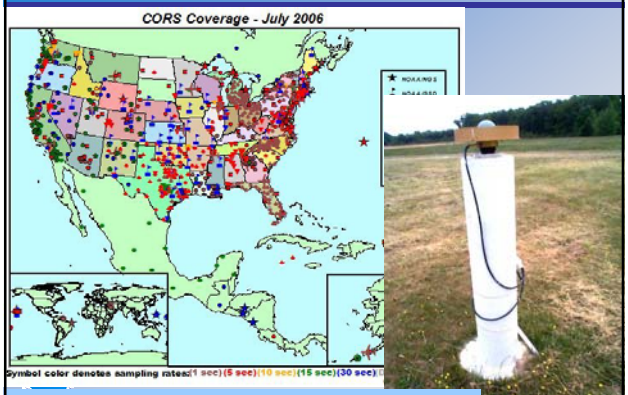
Positioning : Foundation for All Products and Services

International GNSS Coverage provides safety, security, and efficiency to the sciences and industry:

- Surface, rail, air and maritime transportation
- Agriculture
- Environment
- GIS Users/Analysts



Positioning using GPS



The Critical Continuously Operating Reference Station System

Accurate Maps and Models

GPS observations at Fort McHenry in Baltimore, MD contribute to restoration of the marsh

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Common Reference Frames are Critical

Height Matters:
Integrating Reference Frames for Land and Sea

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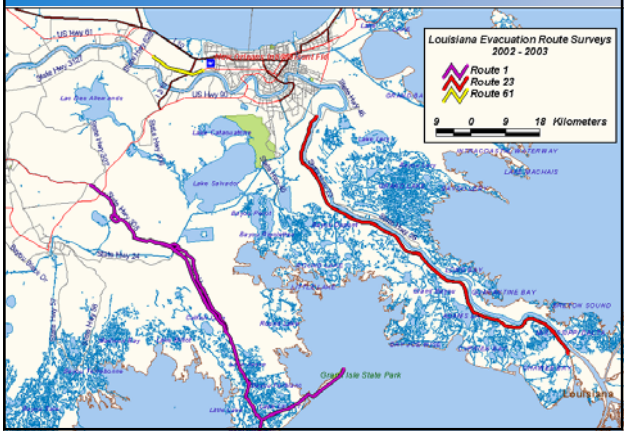
Disaster Preparedness - Mapping Evacuation Routes Before Emergencies



Accurate, Up-to-date Information is Required for Disaster Response

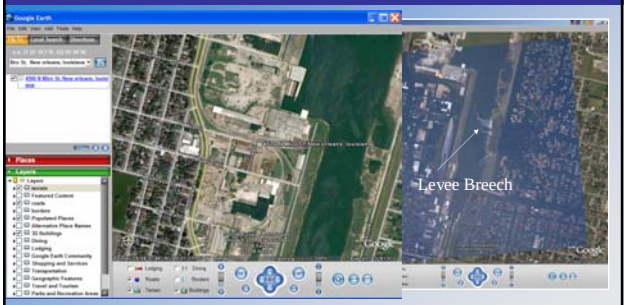
Arrows show common points of reference

Post Ivan, 2004

Dauphin Island, Alabama

Post Katrina, 2005

Delivery of Critical Information is Necessary for Speedy Response



Google Earth incorporates NGS imagery in New Orleans, Louisiana as flooding shortly after Hurricane Katrina's landfall.

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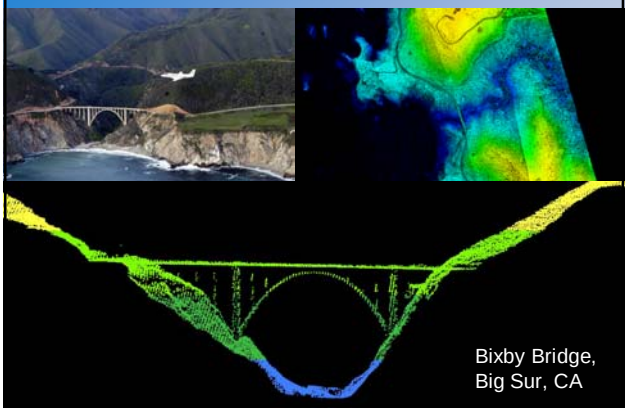
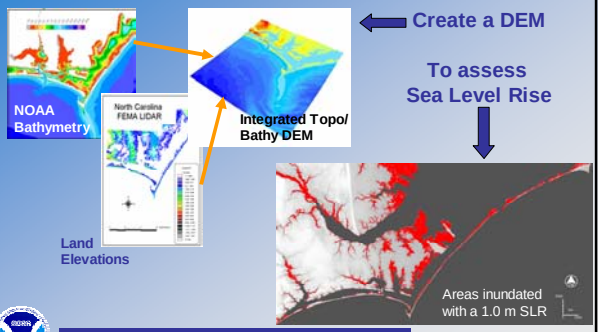
Linking Systems to Produce Products



Product Development Through Data Integration

Sea Level Rise Project: A VDatum Application



Create a DEM

To assess Sea Level Rise

Mapping and modeling are critical for emergency planning and response

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GEOSS

National Delegations at the Earth Observation Summit on July 31, 2003

Another example of International cooperation

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Networking Systems

Integrated Ocean Observing System

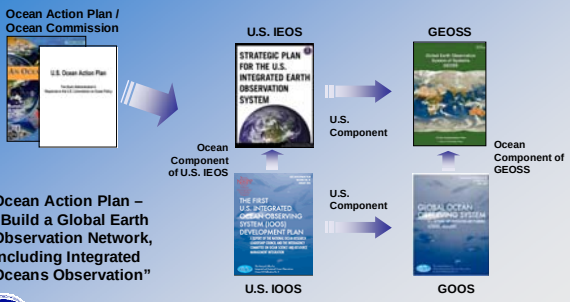
"The IOOS is a coordinated national and international network of observations and data transmission, data management and communications (DMAC), and data analyses and modeling that systematically and efficiently acquires and disseminates data and information on past, present and future states of the oceans and U.S. coastal waters to the head of tide."

- From the IOOS Development Plan

[Approved by the Interagency Committee on Ocean Science and Resource Management Integration (ICOSRMI)]

Joint Subcommittee on Ocean Science & Technology (JSOST) Agencies

IOOS



Ocean Action Plan – "Build a Global Earth Observation Network, Including Integrated Oceans Observation"

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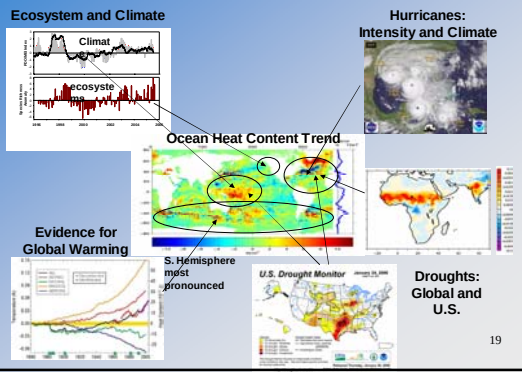
Reasons for Global Ocean Observing System



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Observing Subsystem: Global Component

- Designed to meet climate requirements but also supports:
  - Weather prediction
  - Global and coastal ocean prediction
  - Marine hazards warning
  - Transportation
  - Marine environment and ecosystem monitoring
  - Naval applications
  - Homeland security
- Objectives are well defined with performance measures.
- Well coordinated nationally and internationally – the ocean baseline of Global Earth Observing System of Systems (GEOSS).
- System 55% complete.
- NOAA capacities:
  - $43.5 million
  - 19 centers of expertise
  - Office of Climate Observation - a demonstration project directly applicable to the IOOS Project.

- IOOS Tide gauge stations
- IOOS Drifting Buoys
- IOOS Tropical Moored Buoys
- IOOS Argo Profiling Floats
- IOOS Ships of Opportunity
- IOOS Ocean Reference Stations
- IOOS Ocean Carbon Networks
- IOOS Arctic Observing System
- Dedicated Ship Support
- Data & Assimilation Subsystems
- Management and Product Delivery
- Satellites (managed outside of IOOS)

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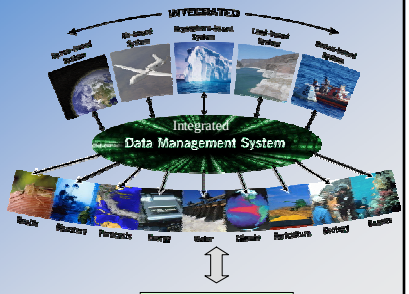
Integrated Ocean Observing System

Observation System Target Architecture

Target Architecture Principles:

- Utility
  - Focus on societal benefits
  - Requirements-based
  - All data archived and accessible
- Interoperability
  - Full and open data sharing
  - Standards-based
- Flexibility
  - Leverages new technology
- Sustainability
  - Build on existing systems
- Affordability
  - Effectively use diverse systems



Partnerships
National International

Interoperability of Products…
One-Stop Shopping
…Communicating Its Availability !