

# ELECTRONIC NAVIGATIONAL CHARTS

Global Tools for Safety at Sea and Economic Benefit



Admiral Richard West

*Maritime Trade and Transport*

BENEFITS: **Economic**

- Global Dependence on Maritime Industry for:
  - Transportation
  - Trade Exports
  - Energy Delivery
  - Cost-effective Consumer Goods
- Shipping – cheapest, most environmentally friendly transportation



BENEFITS: **Economic**

- 2000 World Merchandise Export Volume grew by 11.9%
  - 9.9% in developed economies; 15.7% in developing economies
- World Container Port Traffic up 15.4%
  - E.g., U.S. maritime trade volume expected to double by 2020; Container traffic alone will triple
- Cruise/Large Passenger Ship Tourism Industry on Rise Globally
  - 8.7M cruise passengers worldwide in 2000; by 2010 projected at 13M



BENEFITS: **Economic Efficiencies**

- Safe Navigation → Economic Success
- Electronic Navigational Charts → Safer Navigation



Courtesy Port Authority of NY/NJ



NOAA



STATUS QUO: **Traditional Nautical Charts**

- Paper Charts
  - Static, Require Hand Corrections
  - Time Lag in Plotting Courses
- Raster Charts
  - **Computer Picture of Paper Chart**
  - **'Dumb' Data Lacking Advance Warning Capability**
- New Technologies Can Vastly Improve Navigation Safety



DEFINITION: **What is an ENC?**

- Far Superior to Paper/Raster Charts
- Vector Chart Database
- International Standard
- Displays Selected Layers and Features
- 'Intelligent' Charts with Electronic Navigation Systems



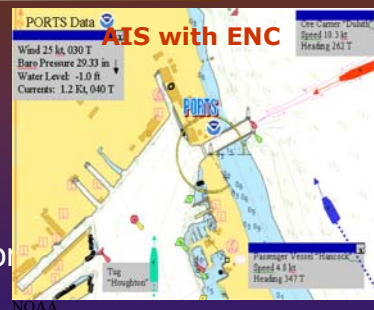
ADVANTAGES: **Real-time Data Integration**

- Increased Accuracy Demands of DGPS Navigation in 21<sup>st</sup> Century
- Real-Time Graphic Display of Ship's Position
- Tides/Water Levels, Weather Data
- Navigation Aids/Hazards Update Capability
- Ship Controls/Systems for National Security



BENEFITS: **Navigation Safety**

- Situational Awareness
- Accident Reduction
- Manage Ship Movements
  - ENCs with Automatic Identification and Port Transponder Control Systems
- Low Visibility Navigation
- Designed to Meet SOLAS Requirements for Chart C



NOAA

USCG

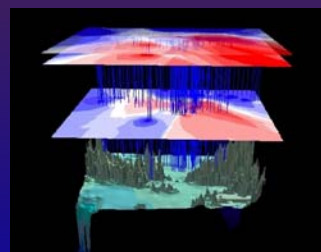
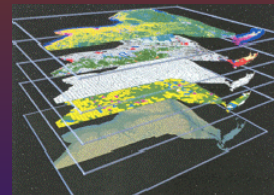
BENEFITS: **Environmental Protection**

- Grounding/Obstruction Avoidance -- Alarms Sound Near Dangerous Areas
- Precise Coordinates of Sensitive/Protected Areas
- Daily Transports of Oil and Chemicals = Risk
- Should Reduce Catastrophic Spills, Environmental Degradation



ADVANTAGES: **Multiple Applications**

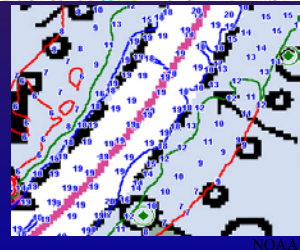
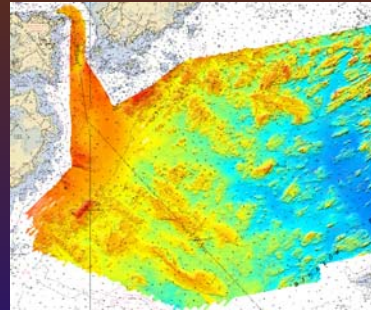
- ENC's can also be used in Geographic Information Systems for any number of applications, e.g.:
  - Coastal Zone Management
  - Fish Habitat Mapping
  - Emergency Planning
  - Ocean Jurisdictional Mapping
  - Homeland and Port Security





CHALLENGES: **Achieving Worldwide Coverage?**

- Building ENC is Complex
- Chart No Better Than Data on Which It Is Based
  - New Hydrographic Surveys = More Accurate ENCs
- Internationally Standardized Data Essential
- Training and Resources Necessary for Worldwide ENC Coverage



FUTURE: **Capacity-Building Programs**

- IHO Regional Hydrographic Commissions Facilitate Technical Cooperation, Collaboration among Member States
- Partnering with Hydro-Expert Nations
  - Some examples:
    - U.S. Naval Oceanographic Office Hydrographic Cooperative Survey Program
      - 25 International agreements leverage host-nation and U.S. Navy assets
    - UK Hydrographic Office Arrangements
    - Japan International Agency



# ELECTRONIC NAVIGATIONAL CHARTS:

## The Next Generation of Navigation Tools

NAVIGATION SAFETY



ENVIRONMENTAL PROTECTION



NOAA photos



A stronger future begins with greater ENC  
capacity for all Nations