Exploiting Maritime Spatial Data Infrastructure

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NIOC – Industry Day

21 March 2012, Colombo , Sri Lanka

Spatial Data Is Very Valuable to Government

and to everybody…

Port Management

Conservation

Science/Modeling

Land Management

Congestion

Crime

Defense/Security

Emergency Management

Pollution

Water

Agriculture/Forestry

Business Efficiency

Natural Resources

Economic Recovery

Biodiversity

Global Warming

Human Health

Energy

Oceans

Land Use

Population

Education

Logistics

Public Safety

Development

Facility Management

Humanitarian Relief

Urbanization

Law Enforcement

National Security

Environmental Protection

✓ ***Improving Planning, Management, and Decision Making . . .***

Marine SDI

Definition

- ***"MSDI is the component of an SDI that encompasses marine geographic and business information in its widest sense. This would typically include seabed topography (bathymetry), geology, marine infrastructure (e.g. wrecks, offshore installations, pipelines and cables), administrative and legal boundaries, and areas of conservation, marine habitats and oceanography."***

(IHO Pub. C-17, Spatial Data Infrastructures "The Marine Dimension". Guidance for Hydrographic Offices. Ed. 1.1 February 2011).

Maritime Systems Supporting Place-Based Policies

Increasing the Impact of Government Programs & Projects

- Targeting Priority Places
- Coordinating Projects & Programs
- Developing Coordinated Plans
- Supporting Integrated Decision Making

Using Geography & GIS as a Framework for Integrated Problem Solving

What Does it Take to Build a MSDI

- Core Data
- Data models
- Enterprise Geographic Information System
- People and Resources
- Governance and Standards

Broad Practice of Enterprise IT……

Common Marine Data Types

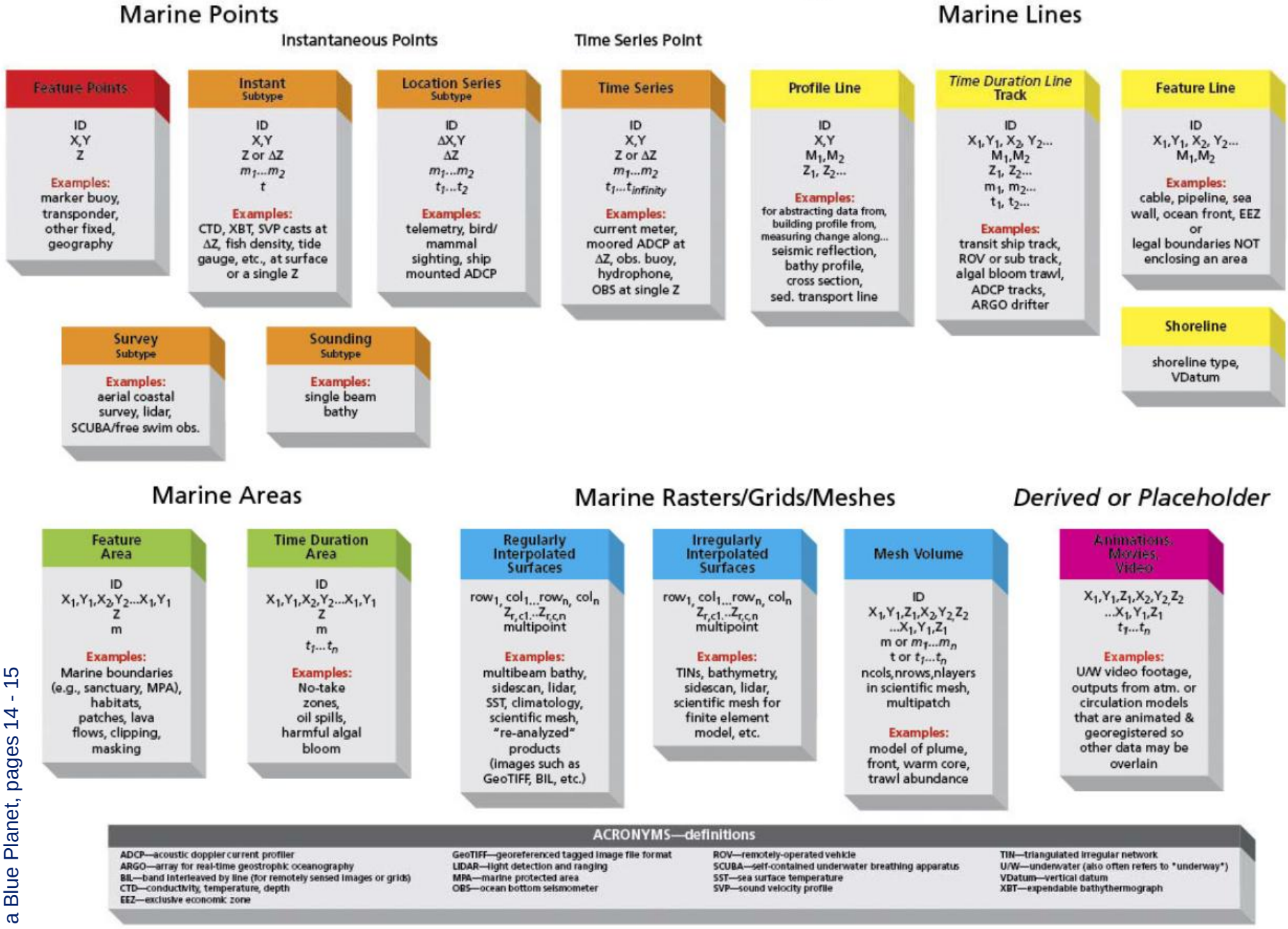
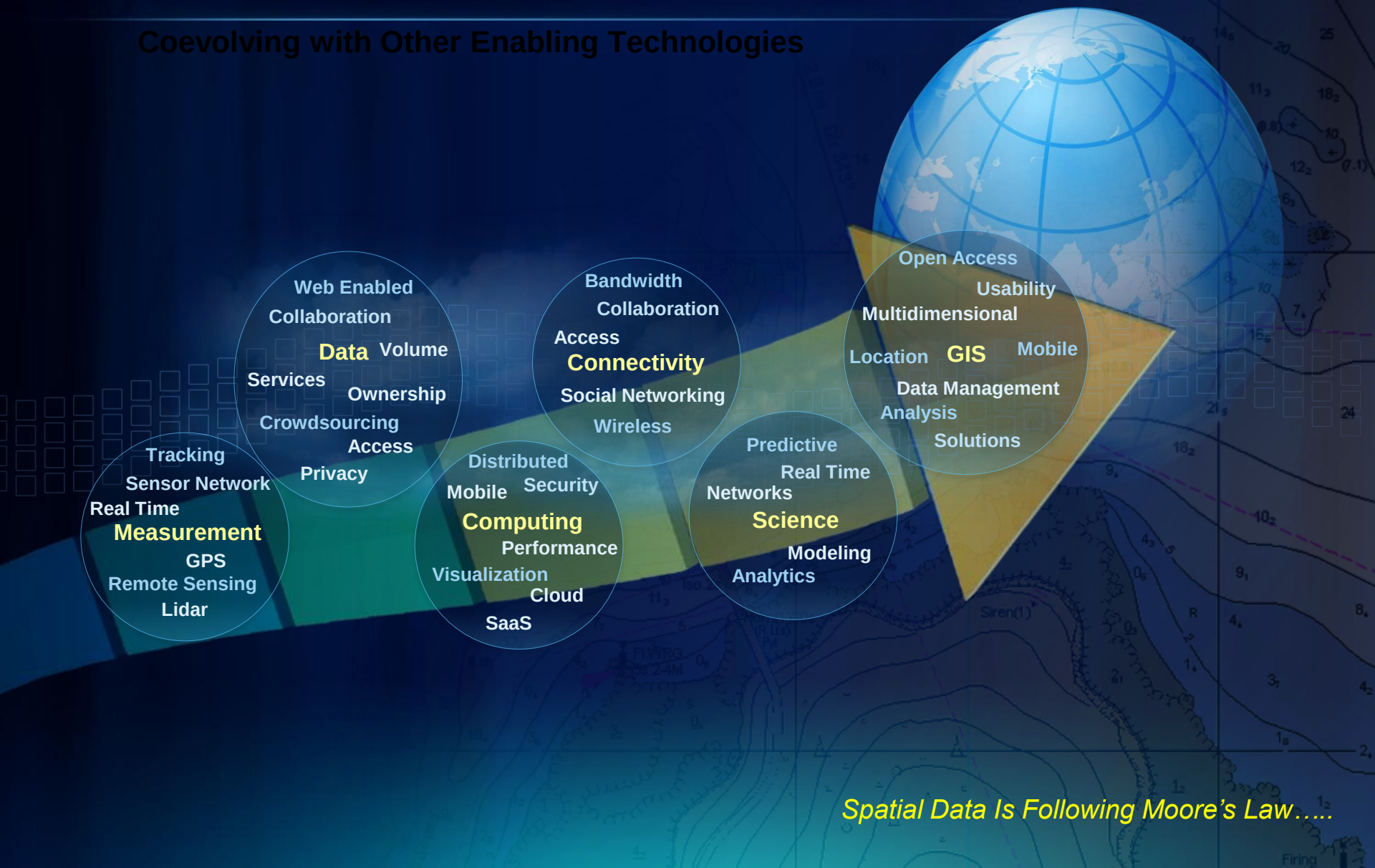


Image modified from ArcMarine GIS for a Blue Planet, pages 14 - 15

Definition of Enterprise Is Always Moving Rapidly



Spatial Data Is Following Moore's Law…..

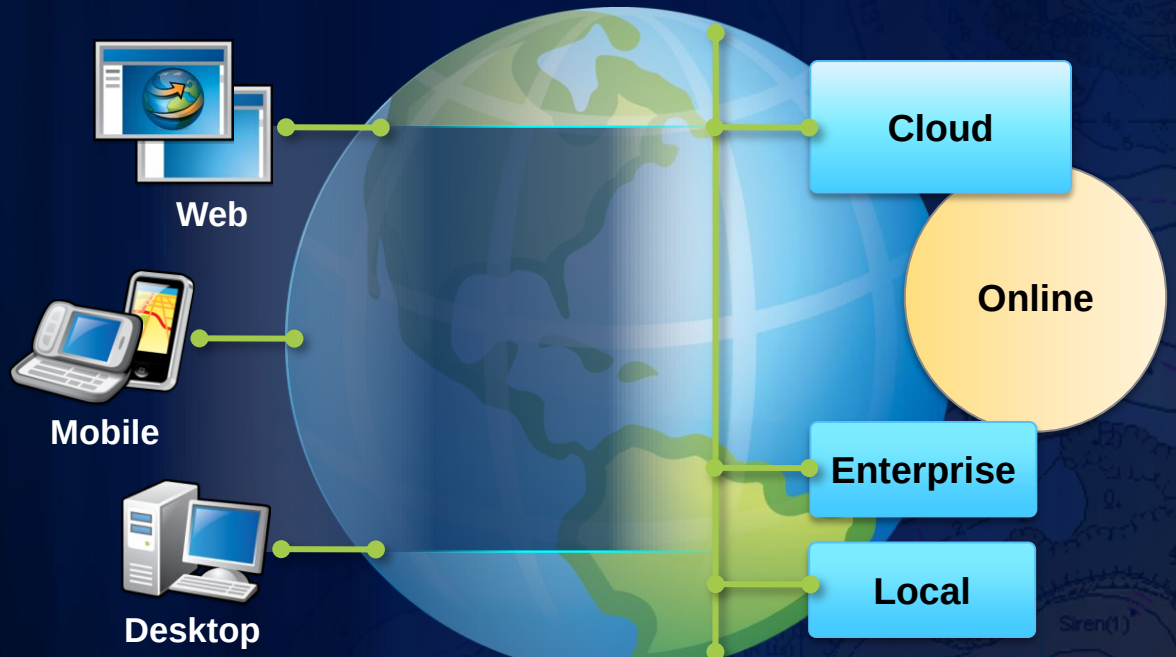
A New NSDI Engagement Pattern Is Emerging

Making GIS Accessible to Everyone

. . . Virtually Anywhere and on Any Device

MSDI Engagement through Information Systems

Three main levels in a System for Geographic Information

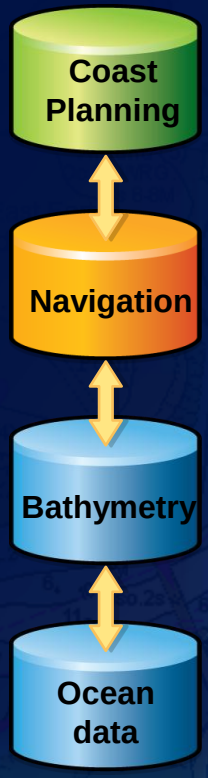


Convergence of Marine Spatial Data Infrastructure

Marine Data and Information System

Production System Inputs

- Hydrographic data
- Oceanographic data
- Mariners
- Other Agencies
- Other Countries
- Public

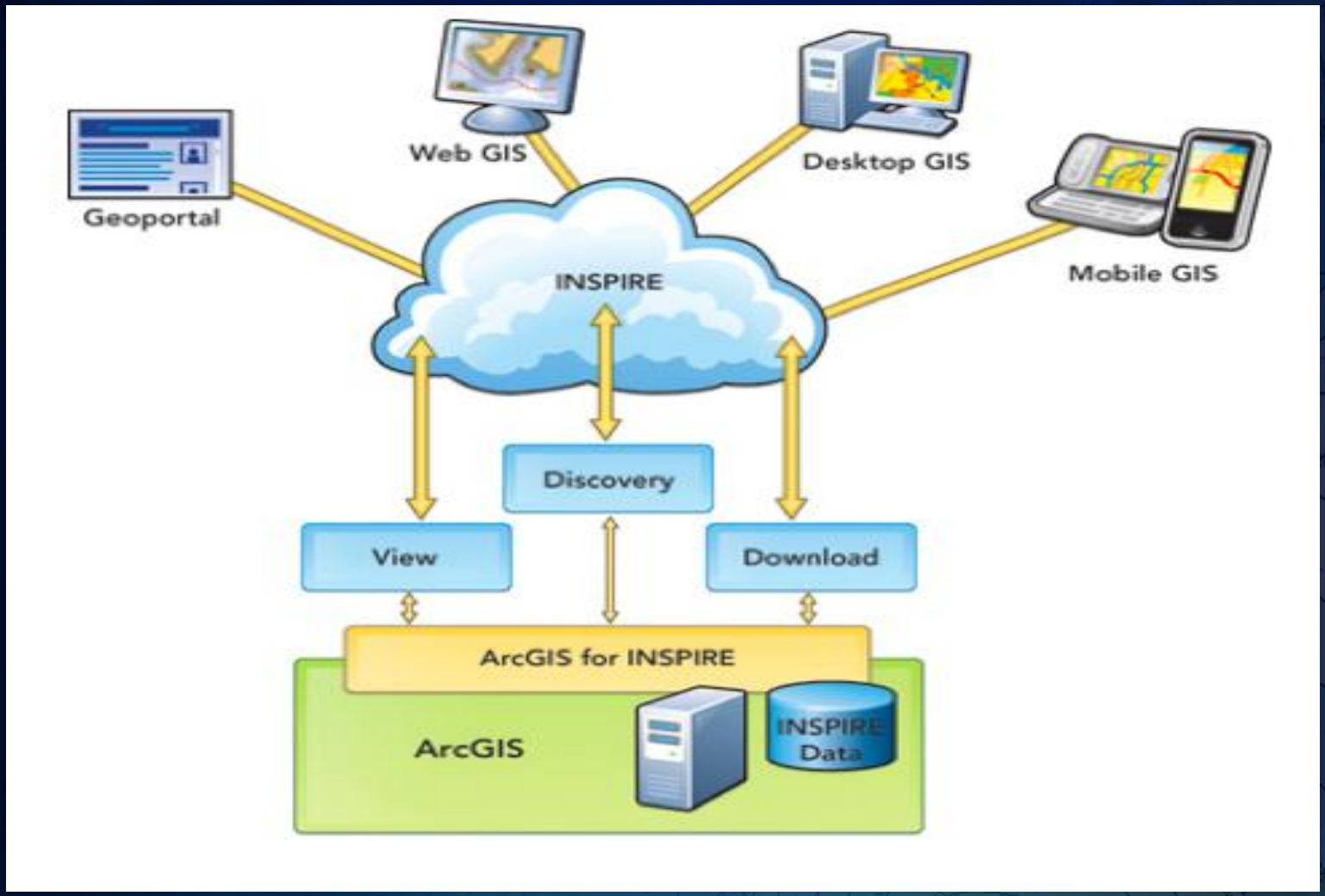


Production System Outputs

- Navy Users
- Marines
- Mariners
- Armed Forces
- Government Agencies
- Scientists
- Mobile Applications
- Server Based Analysis

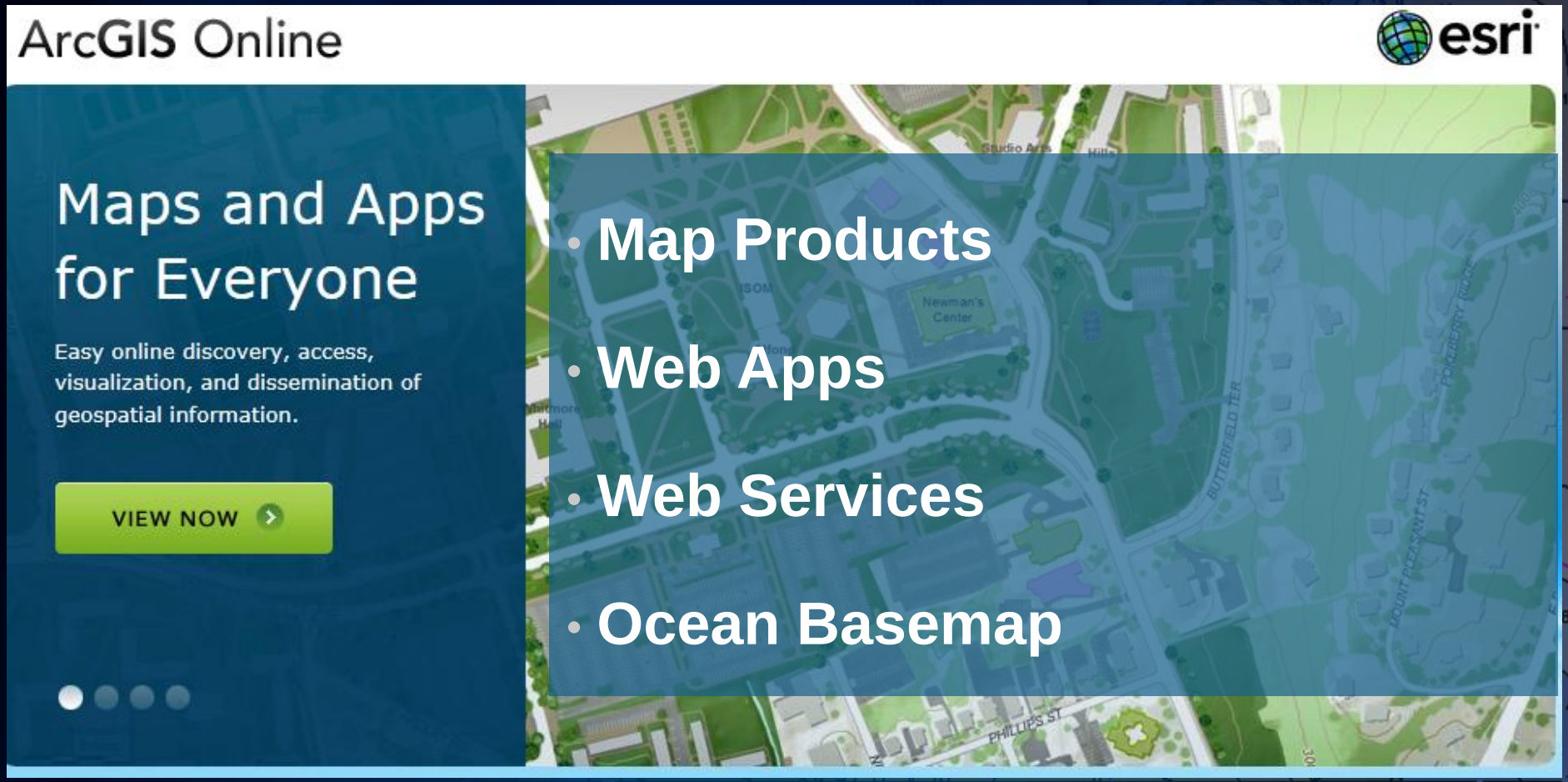
…Interoperability, flexibility and scalability

European Inspire NSDI



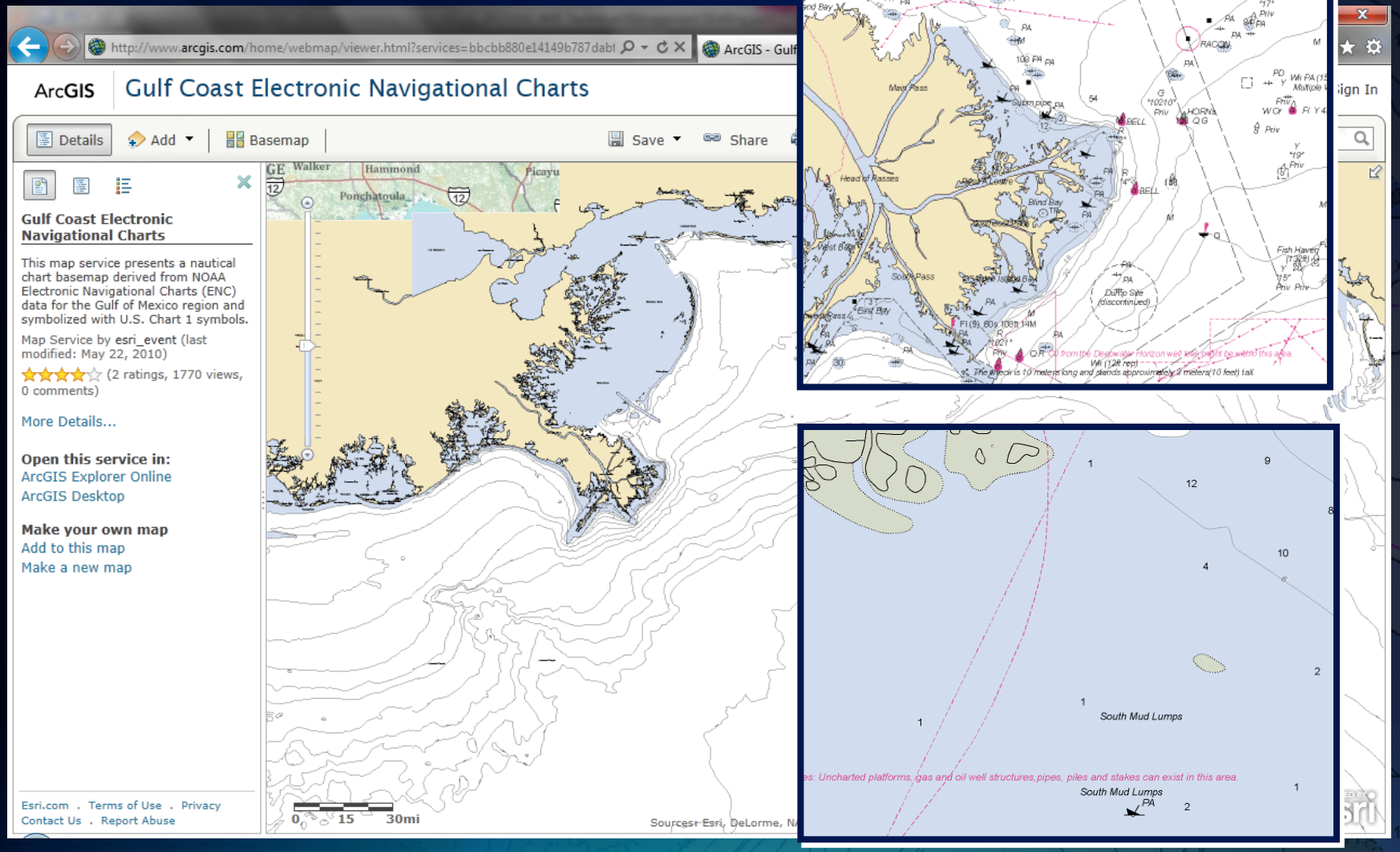
Standardizing GIS System to Support Government NSDI

ArcGIS Online: Cloud computing



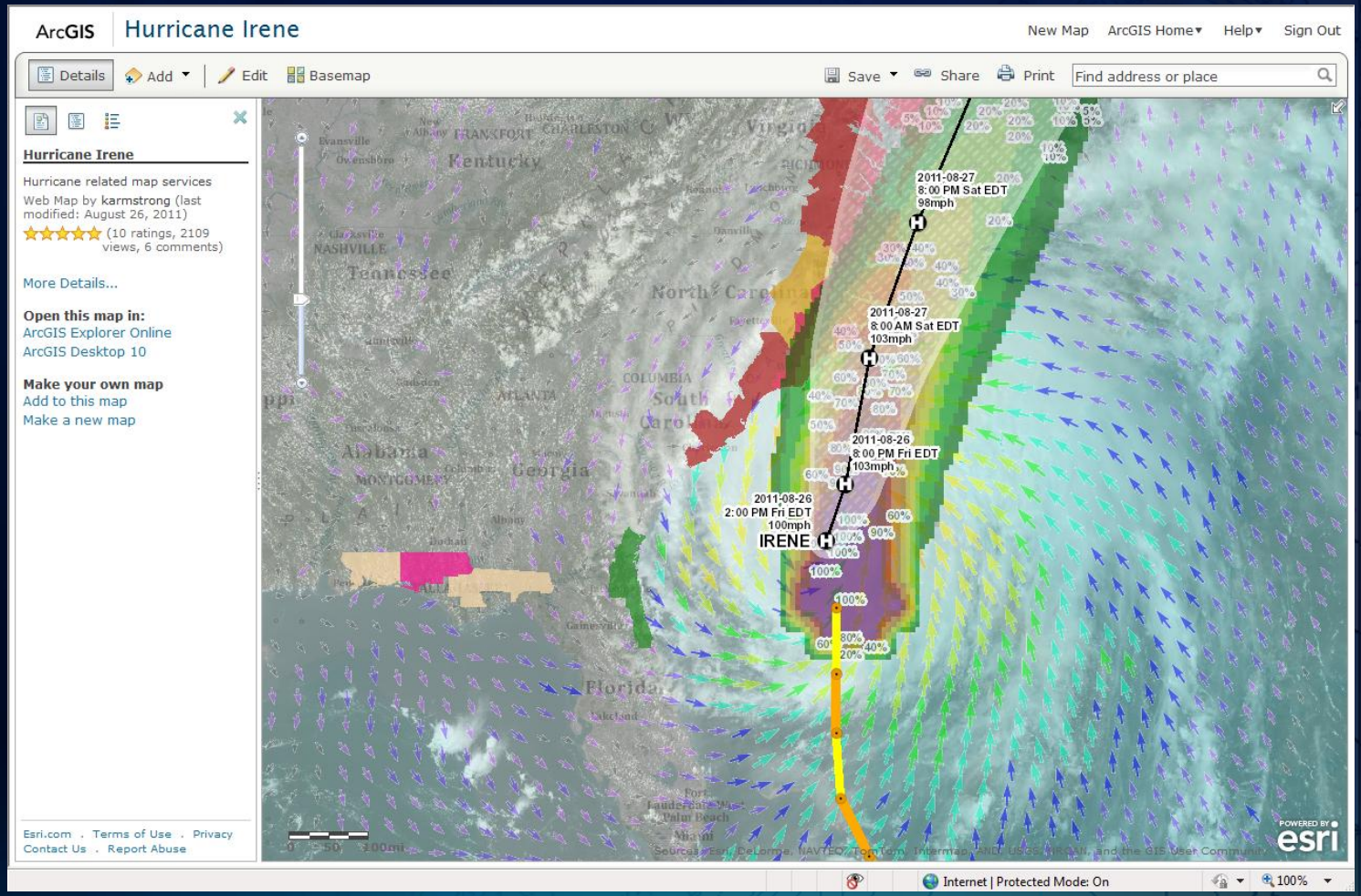
Volunteer Geographic Information and Crowd Sourcing…..

Maritime Online – Nautical Chart Service (coming soon)



Hurricane Irene (Aug-26-2011)

METOC Observations and Forecast Models



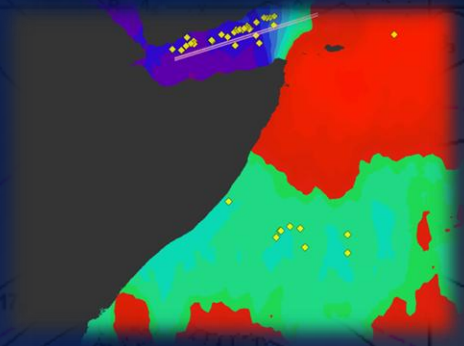
Maritime Online – St. John BIOMapper

Biogeography **I**ntegrated **O**nline **M**apper

Benthic Habitat Mapping off St. John, U.S. Virgin Islands National Park and Virgin Islands Reef National Monument

Solving Problems with Unified MSDI

Solving Piracy with MSDI

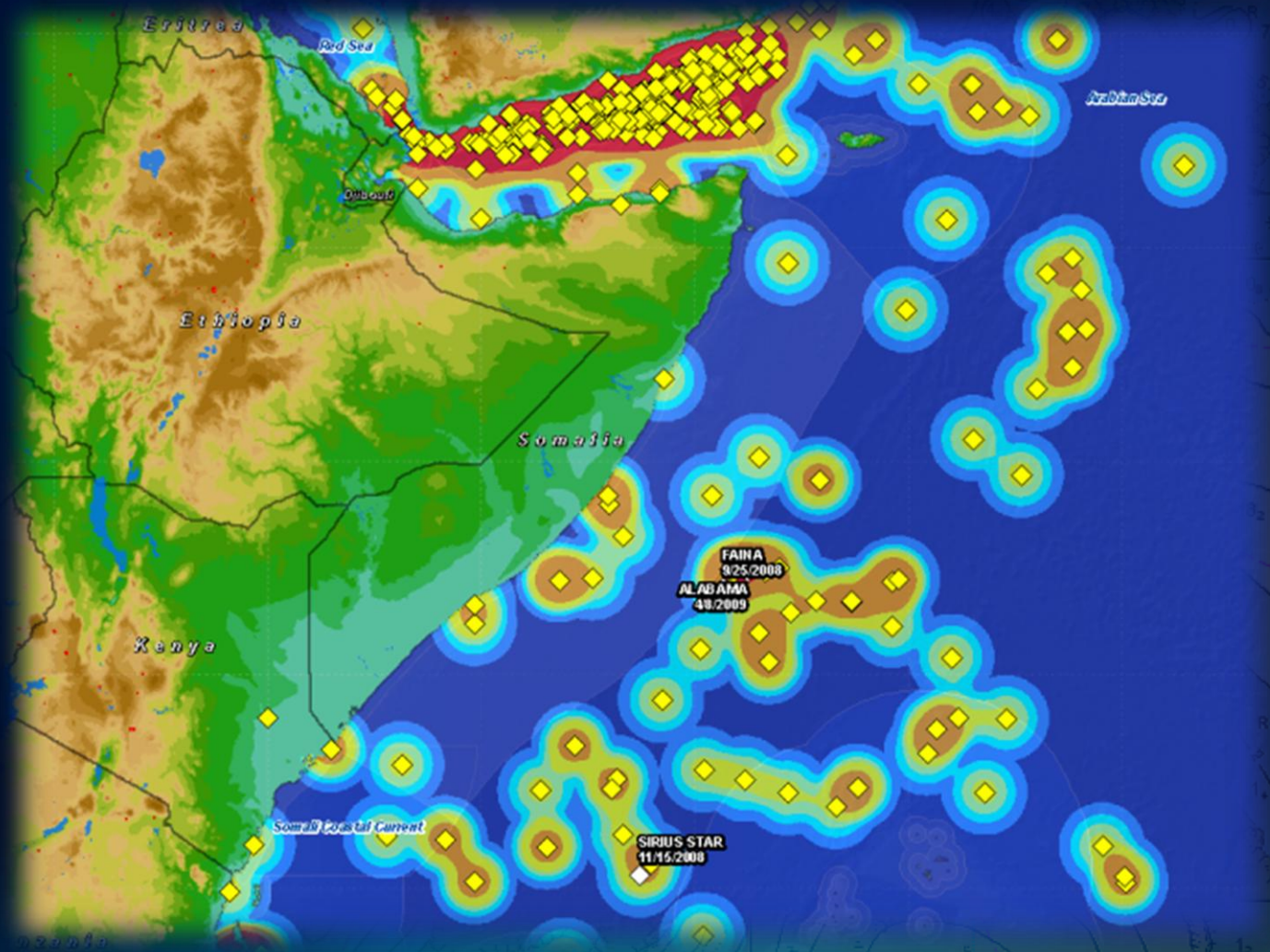


Briefing – 30 Years of Piracy

Making Sense of in Chaos of data

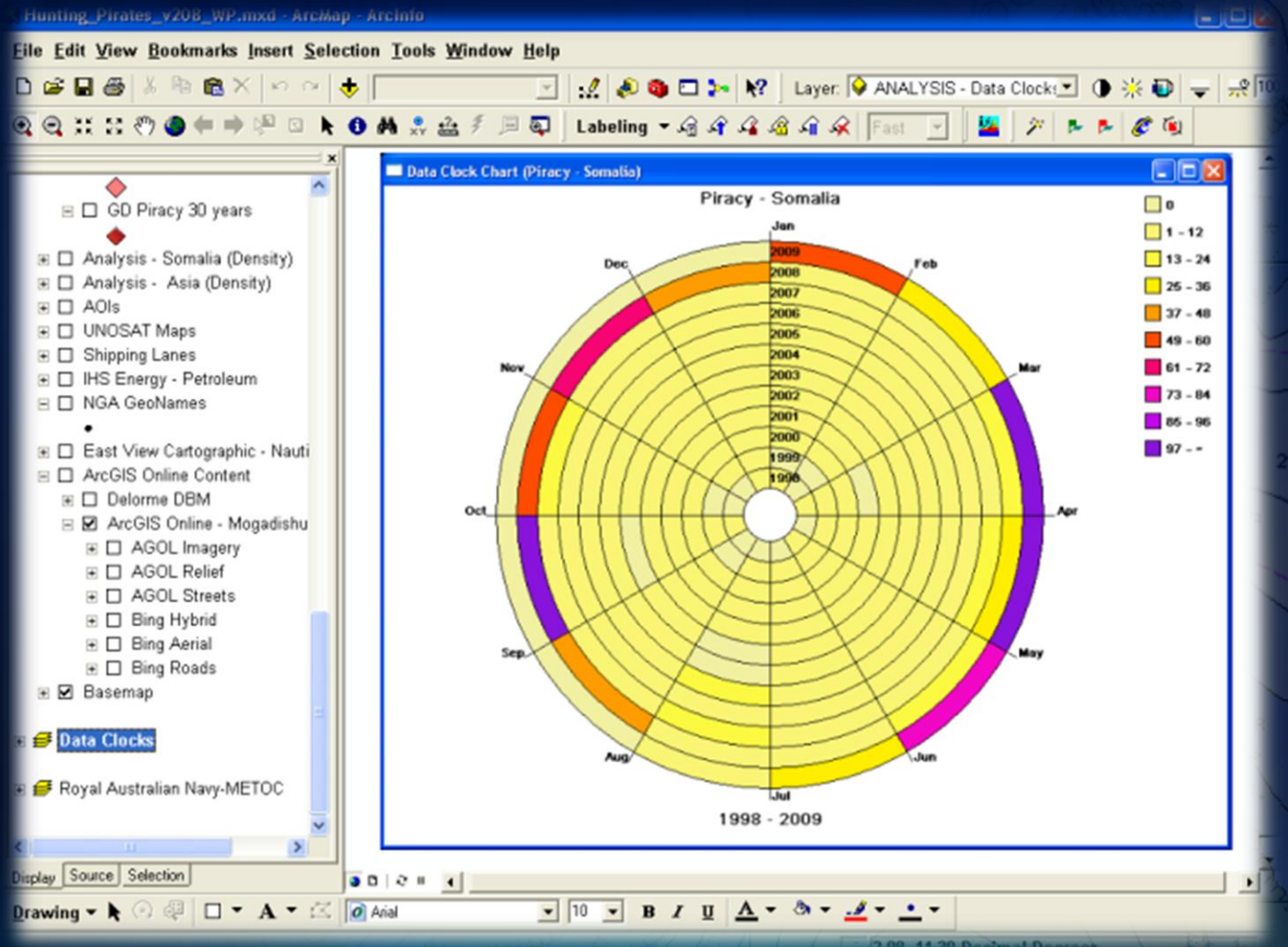
2008 - 2009 Pirate Attacks

Density Analysis & High Profile Attacks

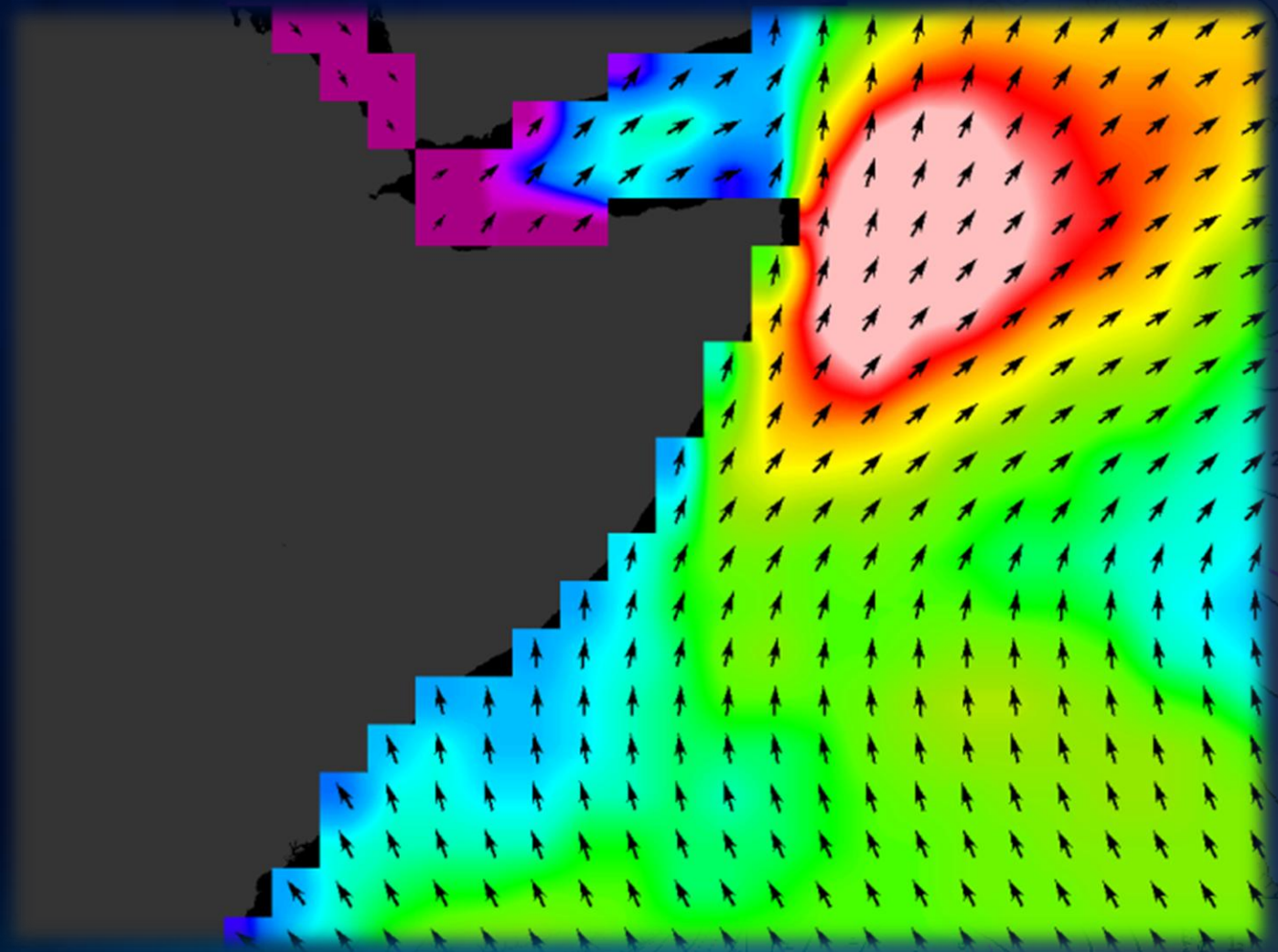


Attacks by Month and Year (Seasonal Patterns)

Tracking Analyst Data Clock

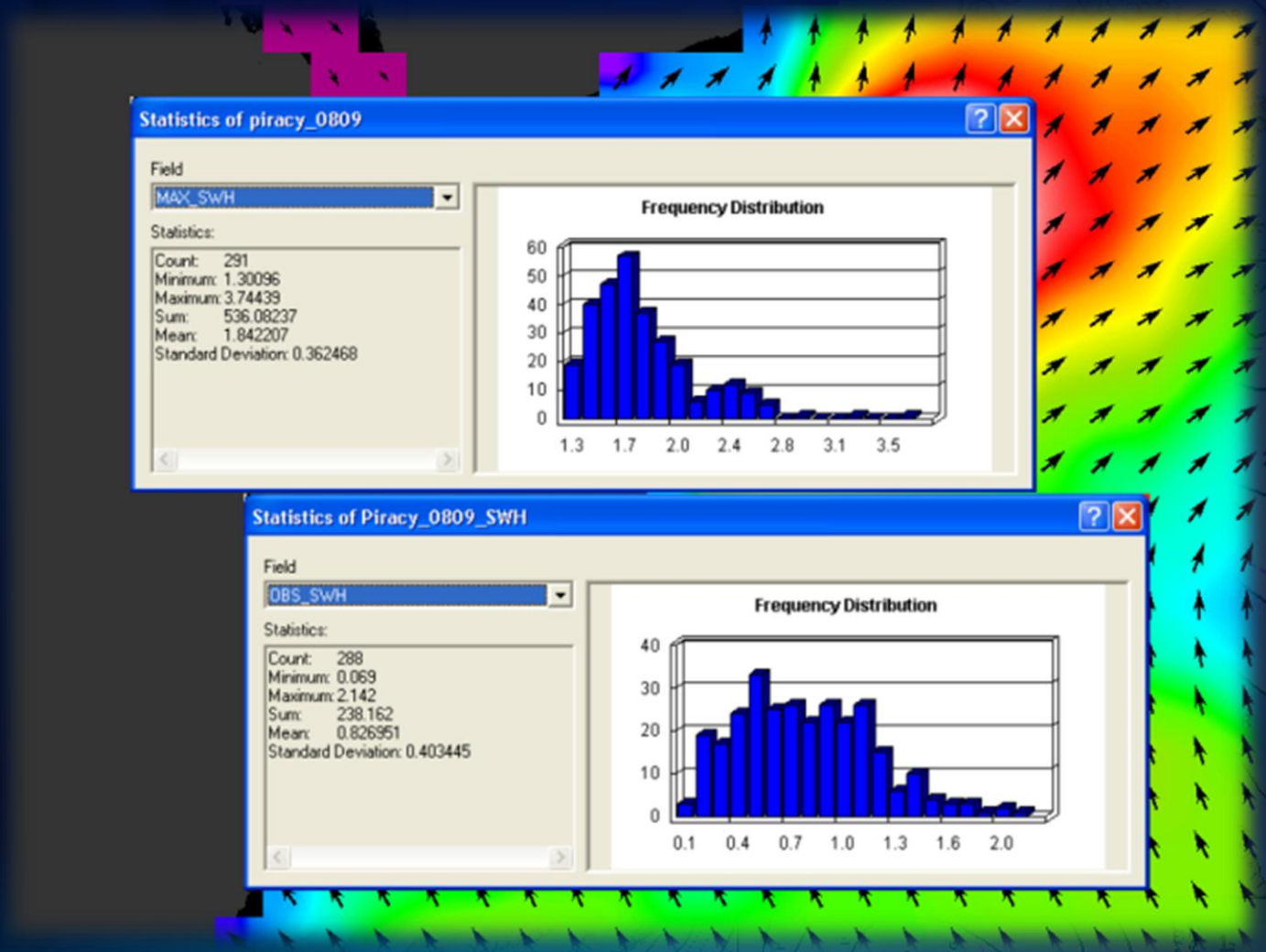


Royal Australian Navy METOC Collaboration



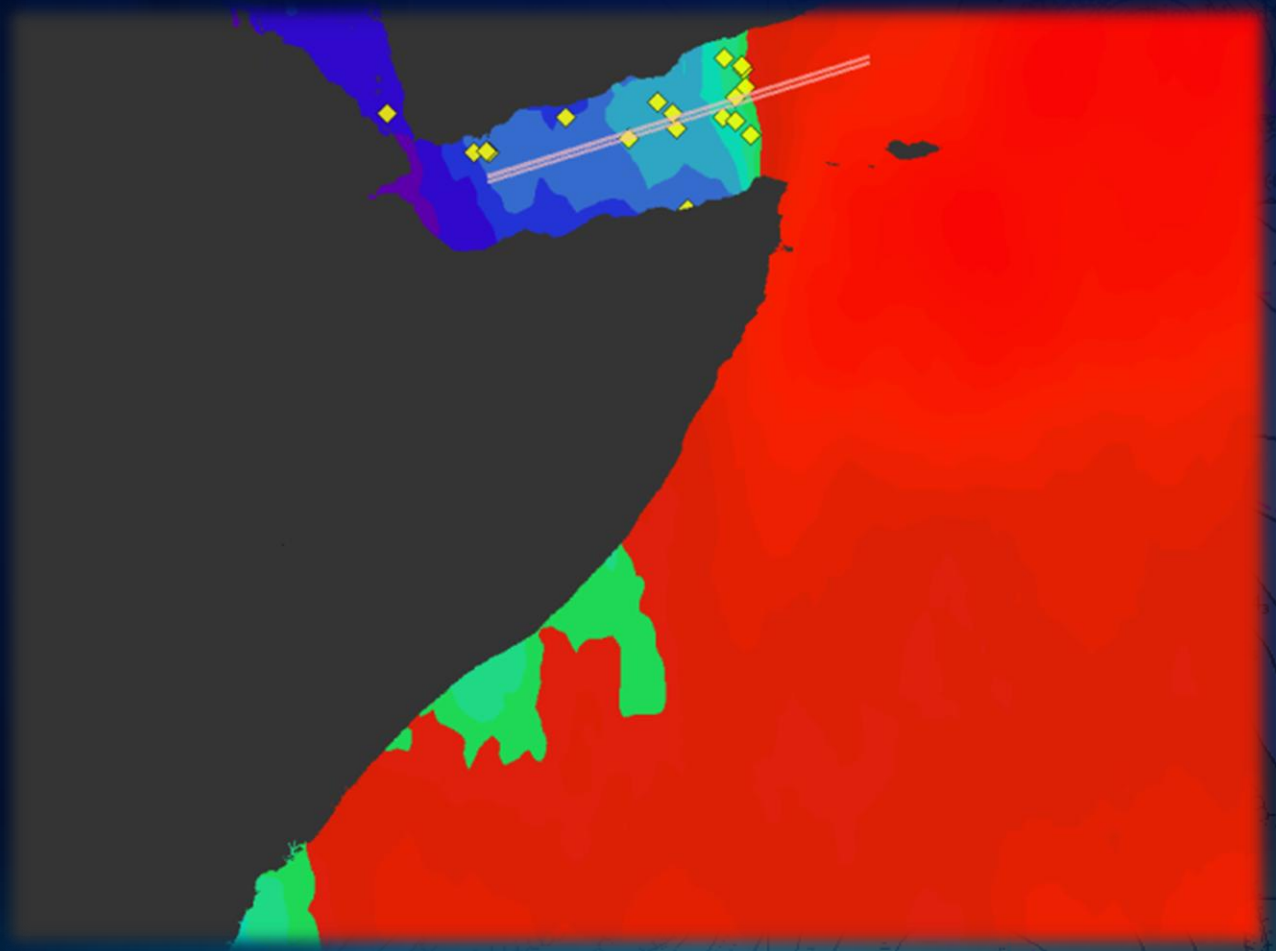
Analysis of Wave Conditions

Overlay of Pirate Attacks with Maximum and Observed Wave Heights



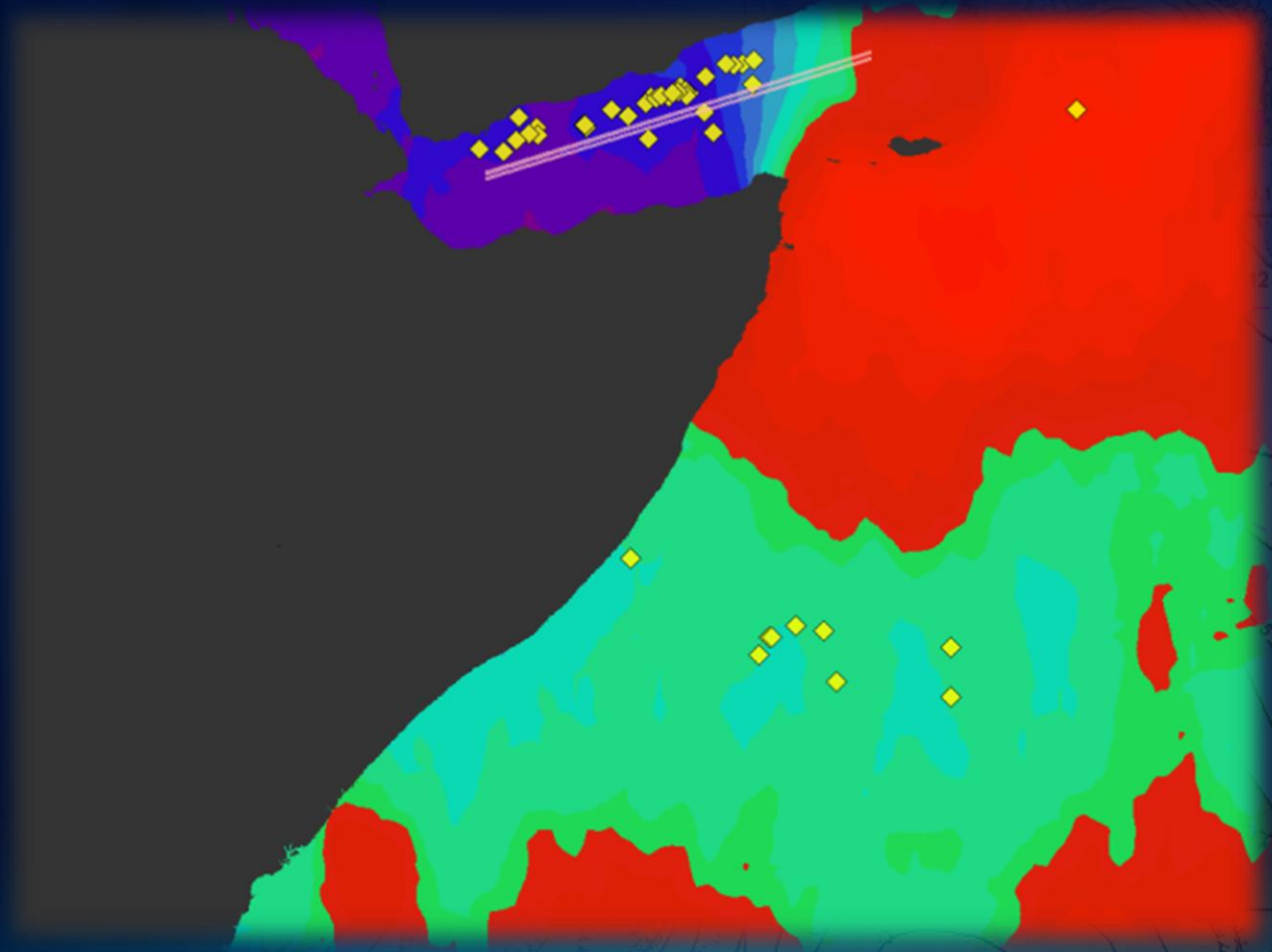
Likelihood of Attack – August

Areas Greater than 2.8m Monthly Significant Wave Heights (Red) = Unlikely Attacks



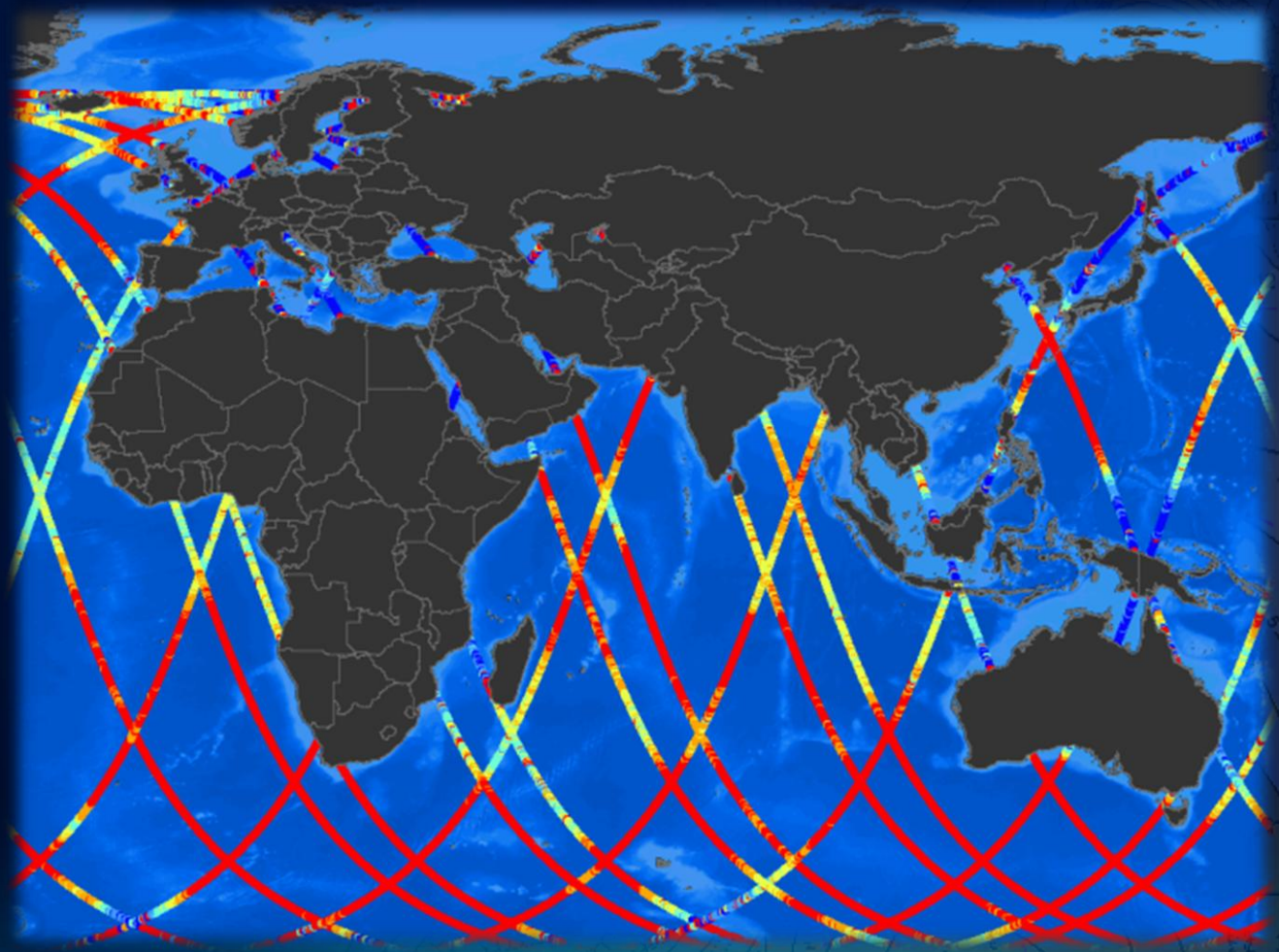
Likelihood of Attack – September

Areas Greater than 2.8m Monthly Significant Wave Heights (Red) = Unlikely Attacks



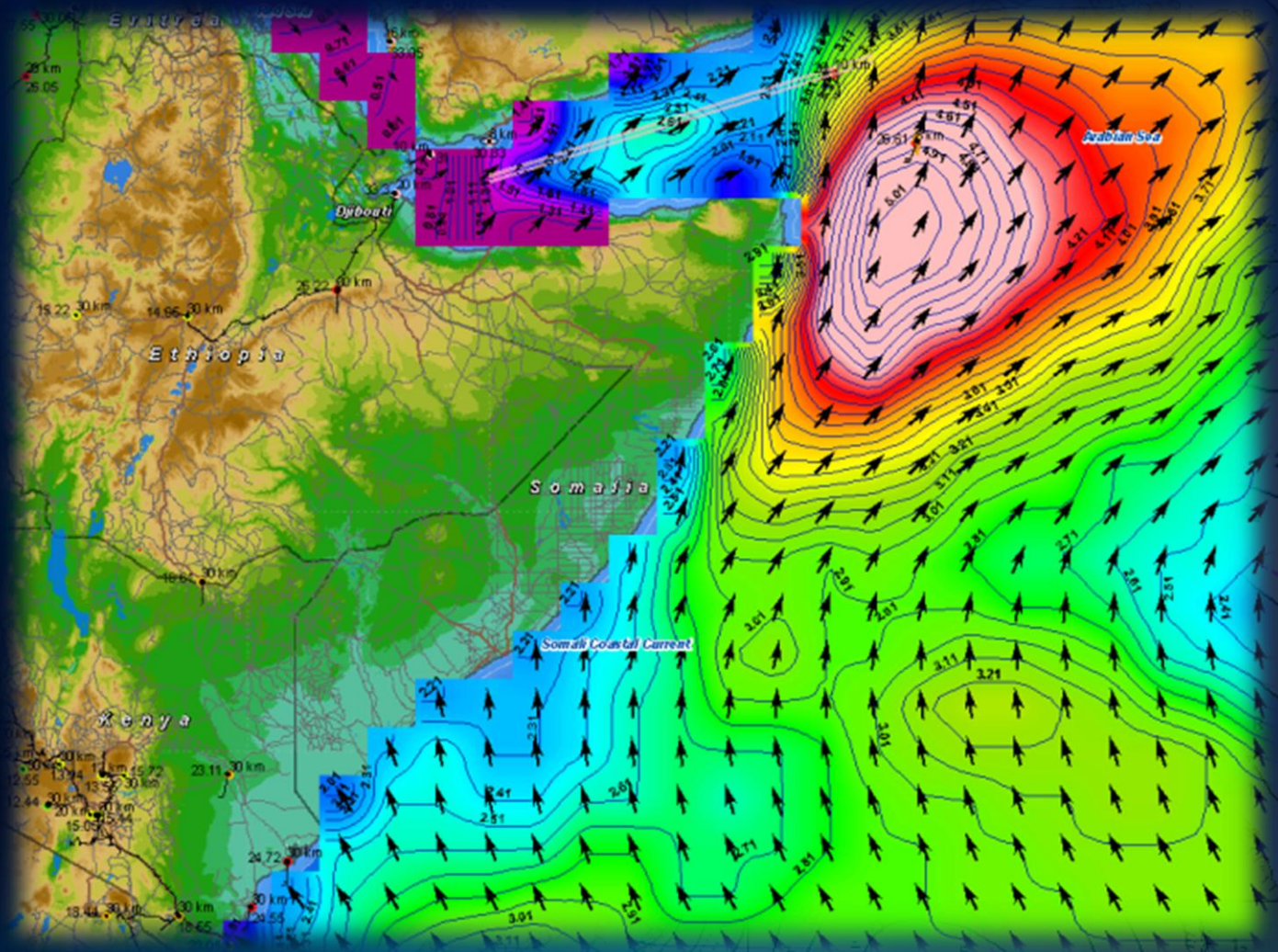
Wave Heights (2 Hours Ago)

Near Real Time – Jason Satellite

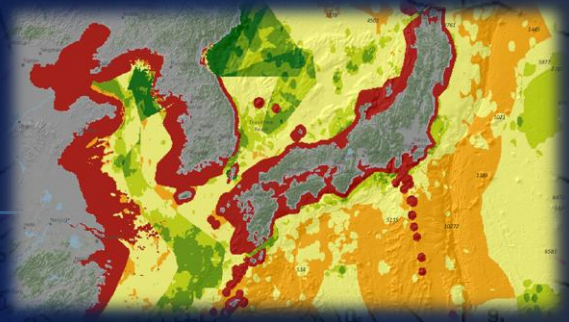


Daily Wave Models Supporting Safe Passage

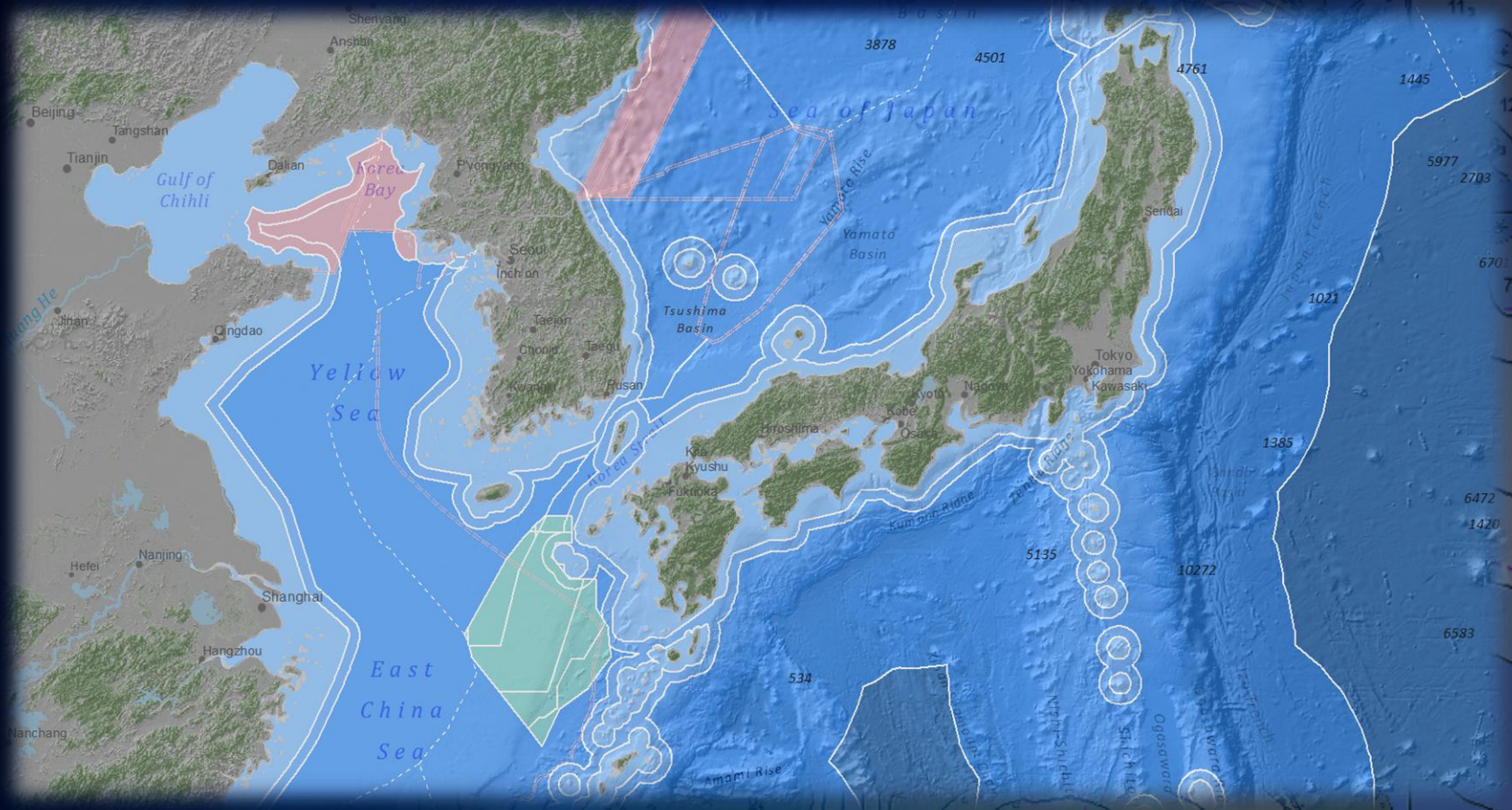
Forecasting Daily Events



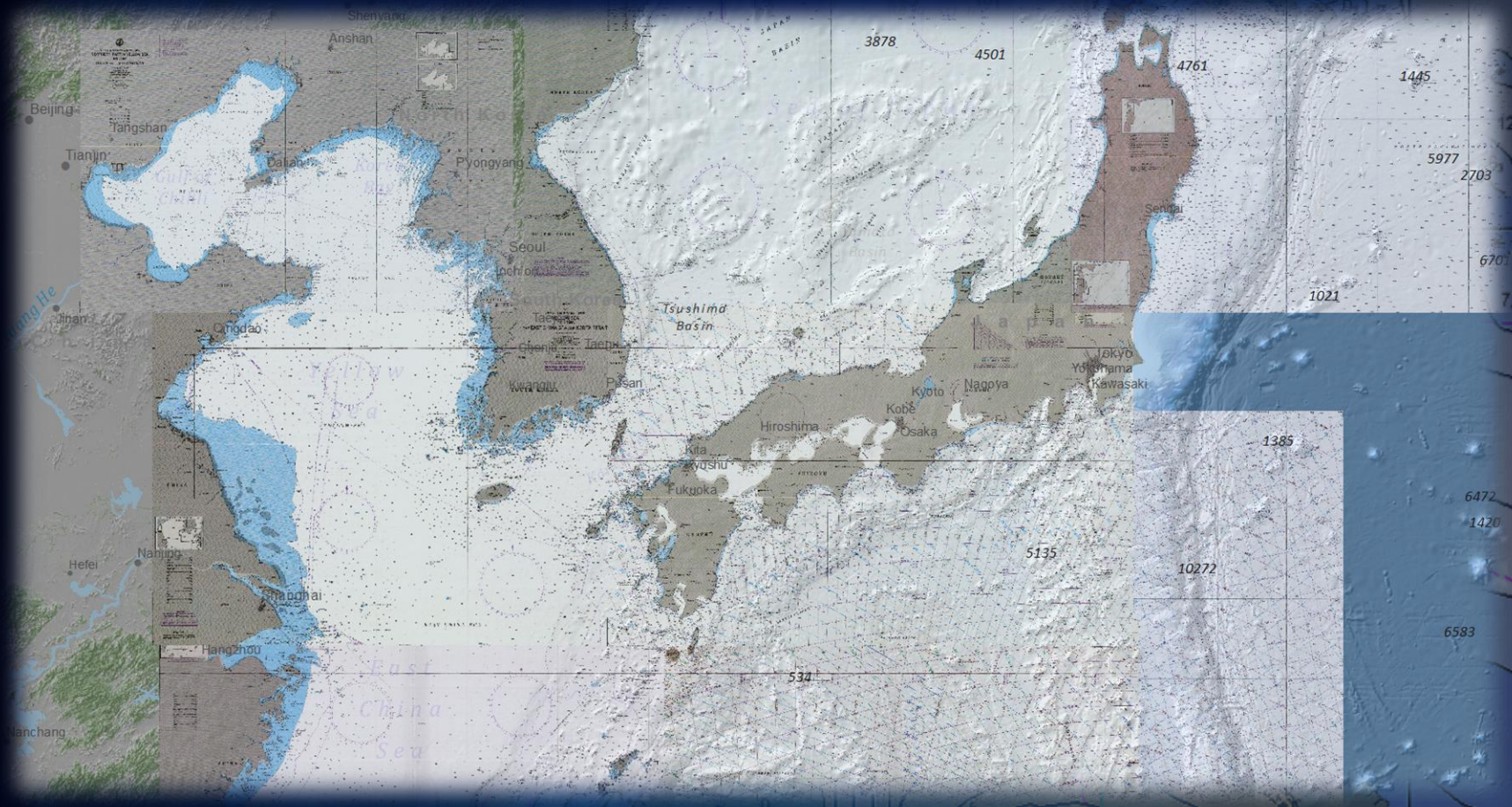
Solving Problems in Undersea Warfare



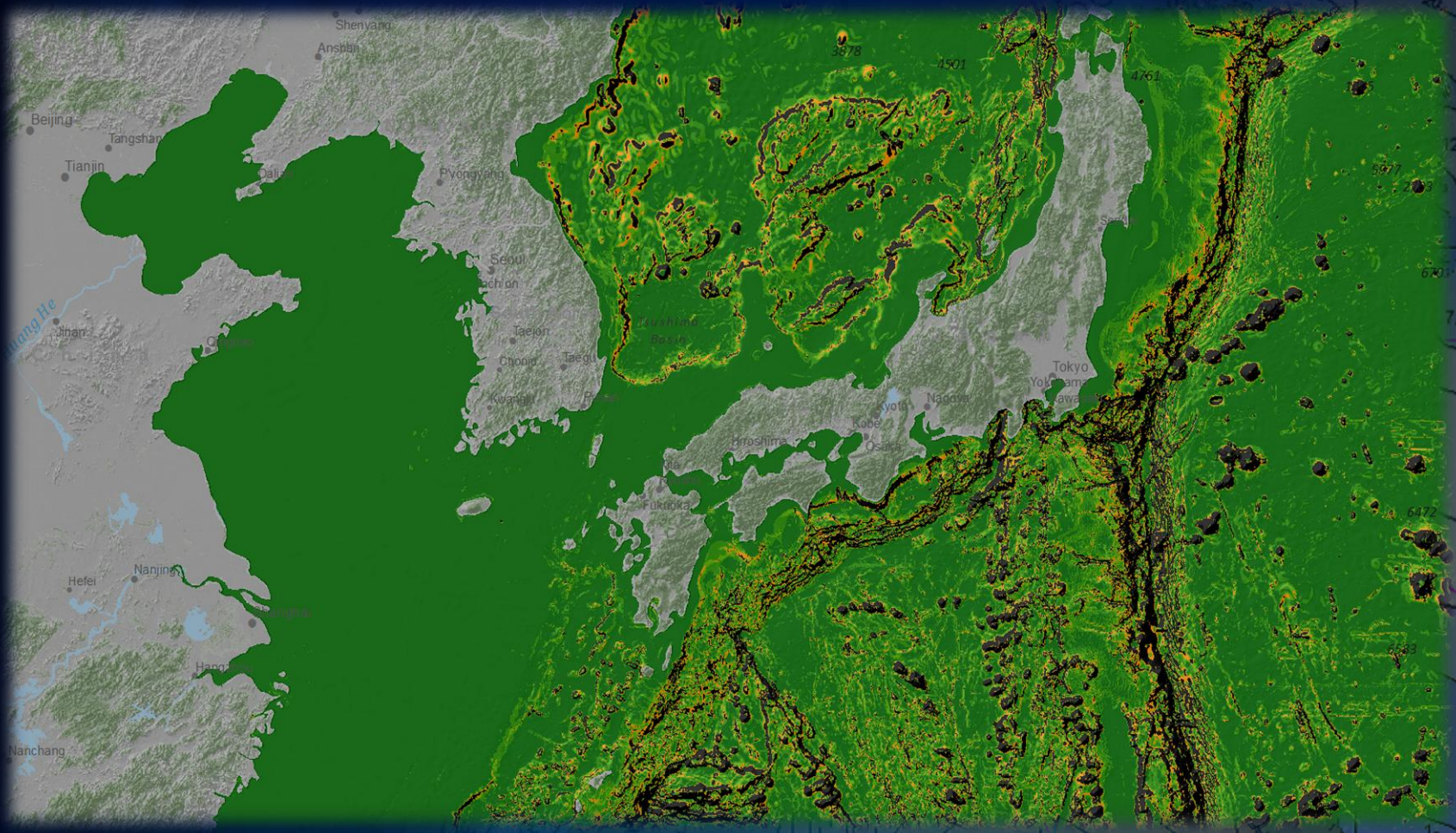
International Boundaries and Disputed Territories



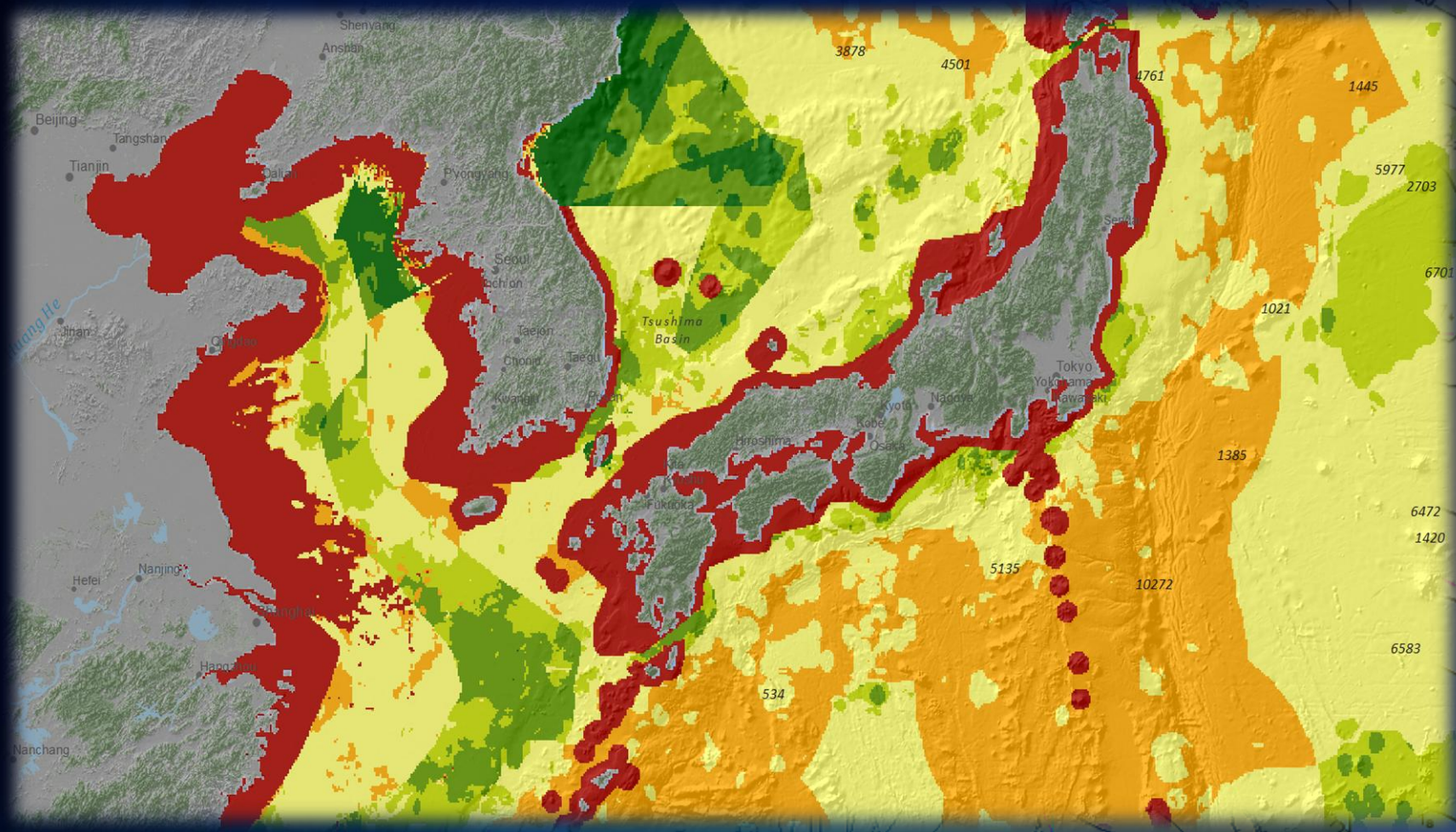
Nautical Charts and Bathymetry



Ocean Sediment and Slope



Models for Predictive Analysis through Fusion



Deploying Interoperable Systems for Problem Solving

Supporting Individuals, Groups, and Organizations

Integrating and Synthesizing Information from Many Sources

Facilitating Communication and Collaboration

Breaking Down Barriers Between Institutions, Disciplines and Cultures

Maritime Collaboration “Unity of Action”

esri

Maritime