The people who were putting up millions of dollars were asking my father, “So, Captain, what do you expect to find?” and his answer to those people who were about to make major commitments was: “If I knew, I wouldn’t go.”

Jean-Michel Cousteau
2005
Since 2001: Exploration Driving Technology

- Processing Power and Data Storage, Miniaturization, Robotics, Autonomous Systems, Increased Energy Densities
- Megapixel, Megabyte Revolution coupled with fiber optics and optical analytics
- Signal processing and analysis algorithms, transducers, positioning, motion sensors, and visualization capabilities
- Communications

Since 2001: Technology Accelerators

- Telepresence
- New tools to visualize and manipulate data
- Google Ocean in Google Earth

Since 2001: Visualization

- Crowdsourced science, data collection
- Telepresence
- Real time or near real-time access to data
- Social networks
- Wikipedia
- Google Ocean
- Ocean Biogeographic Information System
Since 2001: Increasing Interest

Since 2001: International Ocean Exploration

Since 2001: International Capacity to Map

Since 2001: Sister Agency Ocean Explorers

- National Science Foundation
- National Aeronautics and Space Administration
- Department of the Interior
- Department of the Navy
Since 2001: Institutional Ocean Explorers

- Academic Institutions
- Non-governmental/Not-for-profit Organizations
- Foundations

Since 2001: Citizen Ocean Explorers

- Robert Ballard
- James Cameron
- Richard Branson
- Eric Schmidt
- Sylvia Earle
- Eric Stackpole

Since 2001: New Drivers in Ocean Exploration

New understanding of ocean systems and threats to ocean health:
- Ocean acidification
- Climate change
- Dramatic reduction in Arctic Sea ice
- Marine debris
- Fisheries pushed to the brink all over the world

Since 2001: What HASN’T Changed

- The importance of ocean exploration
- The value of ocean exploration
- The public’s keen interest in the deep ocean
- By and large, the amount of ocean unexplored
2012-2022: Future Exploration Environment

- Cost and technology drive changes in large platform use
- AUVs and ROVs more capable and deployed in new ways
- *in situ* sensors and analysis smaller, more capable, cheaper
- Increased bandwidth/lower cost communications
- Social media and crowdsourced science increasingly important
- International and unconventional partnerships critical

2012-2022: Future Global Environment

- Emerging holistic view of security: oceans and climate increasing concern re: national security
- Major demographic shifts in response to climate change
- Society – increasing concern over oceans’ conditions
- Ocean environment: climate change; ocean acidification; oil and gas development; deep ocean mining
- More non-government explorers with more money
- Scientists and Engineers – networked collaboration over competition

Purpose of the Review

- Strengthen program
- Recommendations - to *inform*:
  - NOAA senior leadership, OAR
  - Interagency ocean exploration partners
  - Congress
  - Science community
  - Non-governmental organizations, business, industry
- Recommendations - to *guide*:
  - NOAA Ocean Exploration Program towards the future
  - New Ocean Exploration Advisory Board

Need and Expectations for Review

- Touch on the past of the NOAA ocean exploration program; focus on its future
- Help illuminate the “important” and the “uncertain”
- Focus on how we move to a truly national ocean exploration program across federal agencies
  - …. and the increasingly important contributors outside of government
2012: Director’s View—Government Role

- Coordinate systematic and strategic plans to identify and implement national ocean exploration priorities
- Mobilize the science community to contribute to the national ocean exploration agenda
- Conduct long-term, systematic exploration to meet national needs
- Focus on national priorities in STEM; in research
- Build a national framework for data and information management systems

2012: Director’s View—PL 111-11

PL 111-11’s Title IX—Oceans essentially implements the President’s Panel report:

- Part I authorizes a National Ocean Exploration Program
- Part II authorizes the National Undersea Research Program

The statute establishes a coordinated national ocean exploration program that calls for NOAA to:
- Promote collaboration with other federal agencies in ocean exploration
- Facilitate
  - Coordination of data and information management services
  - Outreach and education programs
  - Development and transfer of ocean exploration technologies
- Conduct interdisciplinary voyages or other scientific activities with other Federal Agencies or academic or educational institutions
- Give priority attention to deep ocean regions
- Conduct scientific voyages that combine marine archeology and oceanographic sciences
2012 Director’s View-PL 111-11

- Implement a [transparent] competitive process for conducting [ocean exploration] activities
- Enhance the technical capacity of the U.S. marine science community
- Establish an ocean exploration forum

2012 Director’s View-PL 111-11

Calls for NOAA to:
- Develop and implement an ocean exploration Technology and Infrastructure Task Force
  - Facilitate transfer of new exploration technology
  - Encourage cost-sharing partnerships
  - Coordinate development of agency budgets
- Appoint an Ocean Exploration Advisory Board

2002-2012 Funding Trends

NOAA Ocean Exploration Program - Allocation in Constant FY2002 Dollars

Publications and Data Volume Trends

[Graph showing data trends over years]
2002-2012: Increasing Knowledge

- Ecosystems
- Genetic Analysts
- NW Atlantic Ecosystems
- Arctic Ecosystems
- Seamounts and Spreading Centers

2002-2012 Other Trends

- Partnerships
- Explorations
- Information Management
- Engagement through Education and Outreach

2012: Trends

Environmental Challenges:
- Declining federal budget
- Unstable funding
- NURP uncertainty
- Election year wildcards
**NOAA Ocean Exploration Context Snapshot**

- **External Opportunities:**
  - Increasing public attention on ocean exploration
  - Recognition of importance of "soft power" diplomacy
  - Global competition for natural resources

**NOAA Ocean Exploration Context Snapshot**

- **Program Weakness:**
  - Strategic, long-term planning
    - Limited by budget uncertainty and instability

**NOAA Ocean Exploration Context Snapshot**

- **Program Strengths:**
  - Dedicated, passionate, resilient team
  - Partnership culture
  - Advocates on the Hill

**Towards a National Program**

- President’s Panel Report provides a compelling vision and objectives for ocean exploration
- Public Law 111-11 provides
  - Solid framework for a national program
  - Basis for a tangible and compelling national strategic plan for ocean exploration to encourage and unify interagency, non-governmental, and private efforts
- Draft National Ocean Policy Implementation Plan
  - Emphasizes importance of ocean exploration and partnerships
  - Calls for five-year strategy for ocean exploration