

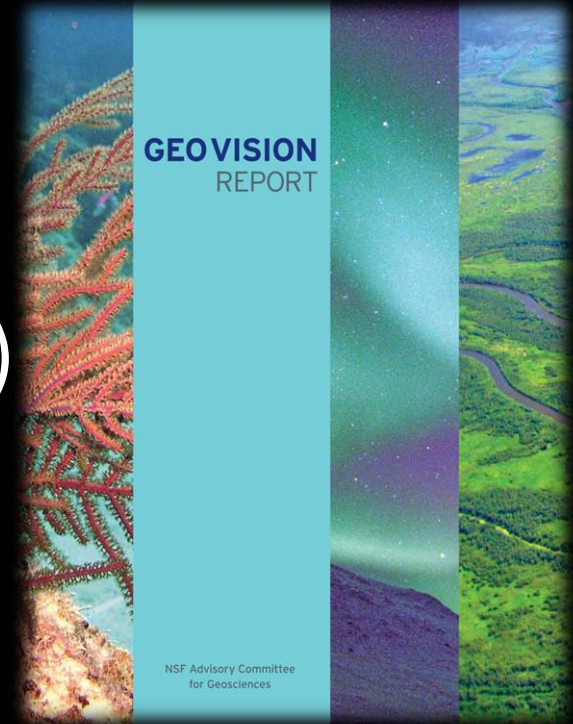


# Report to the Unidata Polcon & User Committee

Clifford Jacobs, NSF (almost retired)

October 27, 2011

via Internet



# Topical Outline

- NSF
- Budget
- Facilities
- Planned Major Investment

New strategic plan and priorities

**NSF**

# NSF's Strategic Plan 2011-2016

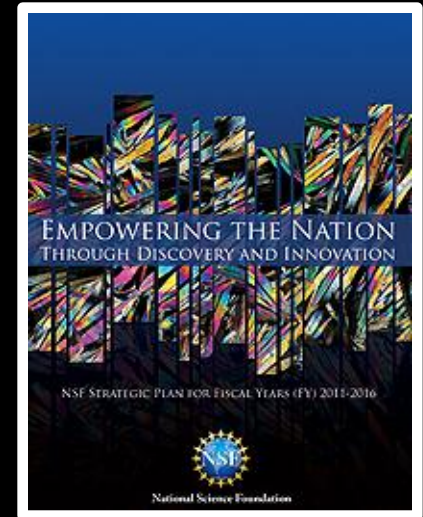
*Vision: NSF envisions a nation that capitalizes on new concepts in science and engineering and provides global leadership in advancing research and education.*

## *NSF Core Values*

- *Visionary*
- *Dedicated to Excellence*
- *Learning and Growing*
- *Broadly Inclusive*
- *Accountable*

## **Strategic Goals**

- 1. Transform the Frontiers: Emphasizes the seamless integration of research and education as well as the close coupling of research infrastructure and discovery.**
- 2. Innovate for Society: Points to the tight linkage between NSF programs and societal needs, and highlights the role that new knowledge and creativity play in economic prosperity and society's general welfare.**
- 3. Perform as a Model Organization: Emphasizes importance to NSF to attain excellence and inclusion in all operational aspects.**



# Cross-NSF Priorities and Activities



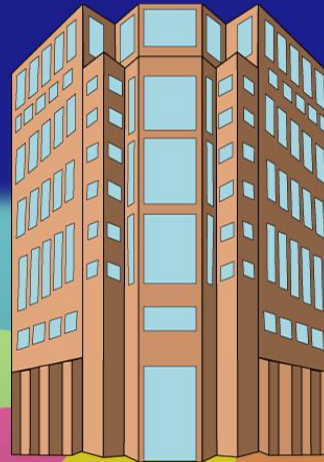
## OneNSF



**catalyze** human capital development



**improve**  
organizational  
efficiency



**create**  
networks and  
infrastructure  
for the nation



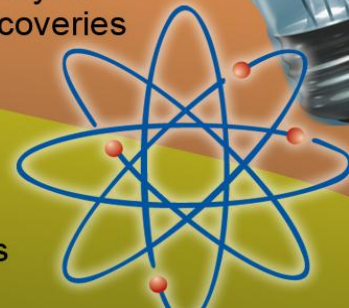
**spark** greater innovation  
and opportunity for  
scientific discoveries



**address**  
multidisciplinary  
challenges of  
national/global significance



**support**  
fundamental  
research in  
all disciplines



# Director's Priorities: *OneNSF*

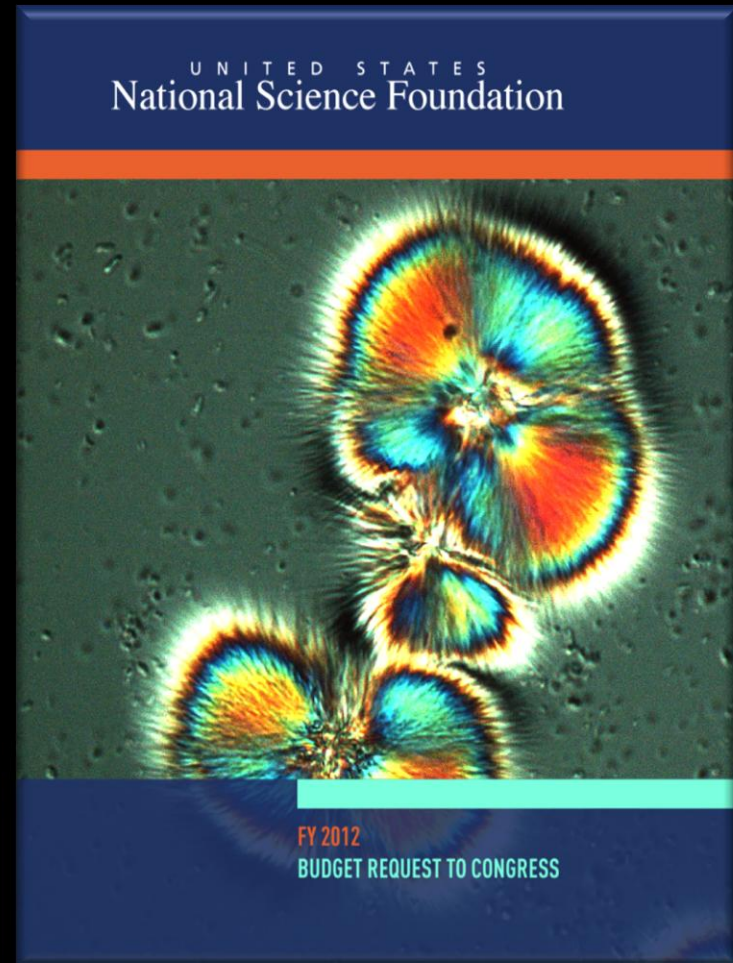
- Innovation Agency
  - Global leader in science and engineering innovation and research into education
  - Important role from discovery to marketplace
- Strategic Agency
  - Integrated, systems-level thinking
  - Responsive to societal needs
  - Catalyst for breakthroughs
- Model Agency
  - Proactively share best practices across agency and globally
  - Experiment with latest technologies
  - Use new technologies to increase participation
  - Accountable and efficient

What is hoped for in the context of what has been

**BUDGET**

# NSF FY 2012 Budget Request

TOTAL: \$7.767 billion  
Increase: 13 percent over  
2010 enacted level



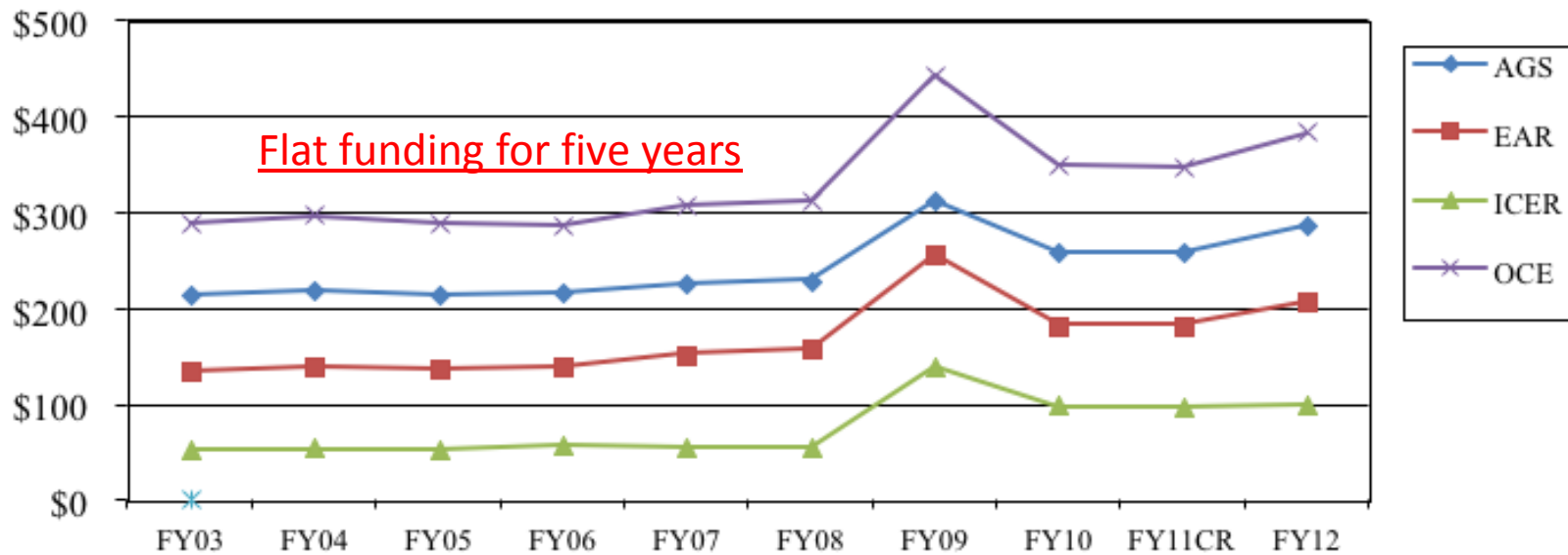


# GEO FY 2012 Budget Request

- In 2012, GEO is requesting \$979,160,000; an increase of \$89.52 million or 10.1%.
- All increases are based on the existing FY 2011 Continuing Resolution, which for GEO is the same as the 2010 Appropriation.

# GEO Ten-year Funding History

**GEO Subactivity Funding**  
(Dollars in Millions)



# Budget Request by Division

<b>GEO Funding</b>						
<b>(Dollars in Millions)</b>						
	FY 2010	FY 2010	FY 2012	Change Over		
	Omnibus	Enacted/ Annualized FY	Request	FY 2010 Enacted		
	Actual	2011 CR		Amount	Percent	
AGS	\$259.87	\$259.80	\$286.33	\$26.53	10.2%	
EAR	183.26	183.00	207.27	24.27	13.3%	
ICER	98.87	97.92	100.92	3.00	3.1%	
OCE	349.88	348.92	384.64	35.72	10.2%	
<b>Total, GEO</b>	<b>\$891.87</b>	<b>\$889.64</b>	<b>\$979.16</b>	<b>\$89.52</b>	<b>10.1%</b>	
Totals may not add due to rounding.						

# GEO and ARRA

- Major ARRA Investments:
  - Alaska Region Research Vessel \$105.93M from ARRA
  - Ocean Observatories Initiative \$148.07M from ARRA
  - Education (\$35M)
    - GRF (\$10M), IGERT (\$9M)
  - Research Infrastructure (\$72M)
  - Research Activities (\$240M)

Recent and future investments

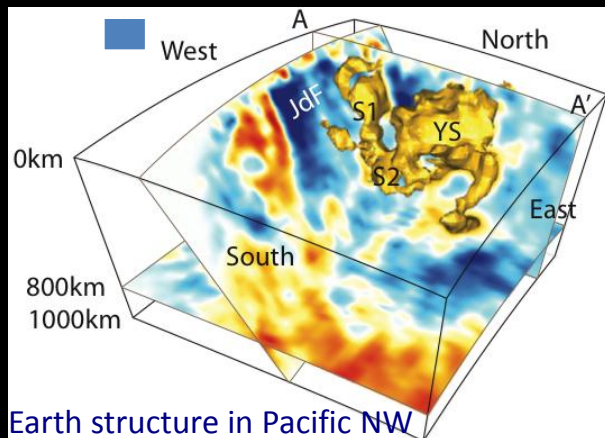
# **FACILITIES**

# Recent and Ongoing Major Facility Investments



- HIAPER: Operational
- AMISR: Poker Flat, AK: operational; Resolute Bay, Canada: under construction.
- EarthScope: Operational
- Scientific Ocean Drilling Vessel: Operational
- Ocean Observatories Investment: under construction
- R/V Sikiliaq (formerly Alaska Regional Research Vessel): under construction
- NCAR/Wyoming Supercomputing Center: under construction
- Regional Class Research Vessels: up to 3 ships under consideration as an MREFC project

# GEO Infrastructure Investments: Recent, Underway, and Considered



# NCAR-Wyoming Supercomputing Center

- Construction began June 2010 and proceeding on schedule
- RFPs for supercomputer, data storage and data archive released.
- System will be 1-1.5 Pflops peak – at or above NSF “Track 2”
- Earned Value Management System data indicate satisfactory cost and schedule performance in each of the primary areas of activity.
- No significant issues or areas of concern.

2010	2011	Total
\$31 million	\$17.1 million	\$48.1 million

MILESTONE	DATE
Completion of Construction	August 2011
Supercomputer and Data Storage Procurement	RFPs: December 2010 HPC Delivery: January 2012
Transition from Boulder	Begins: August 2011
Start of Full Operations	July 2012 (or earlier)



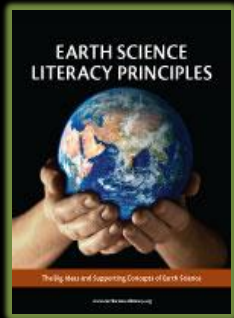


Underway and planned

# **MAJOR INVESTMENTS**

# Major Investments Planned

- Science, Engineering and Education for Sustainability (SEES)
- Creating a More Disaster Resilient America (CaMRA)
- Cyber-infrastructure - *EarthCube*
- Continuing investments in Basic Research, Education & Diversity, Infrastructure



# Science, Engineering, and Education for Sustainability (SEES)

- Generate discoveries and build capacity to achieve an environmentally and economically sustainable future
- FY 2012 priorities:
  - Advance a clean energy future
  - Nurture the emerging SEES workforce
  - Expand research, education, and knowledge dissemination
  - Engage with global partners
- Environment, energy, and economy nexus

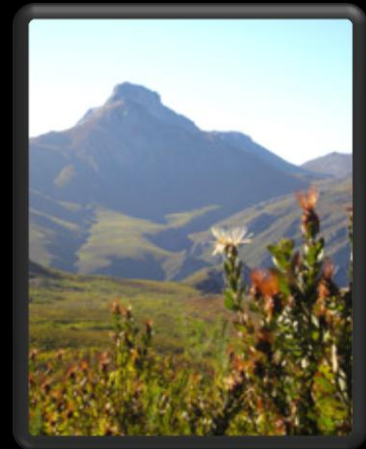


# SEES – Geosciences Foci

- Sustainable Energy Pathways
  - characterize and understand existing energy systems and their limitations (e.g. wind, geothermal, hydro)
  - understand risks and stressors associated with new and emerging energy sources (e.g. tidal, clean coal, carbon sequestration)
- Sustainability Research Networks
  - interdisciplinary research and education partnerships involving government, academe, and the private sector
  - address fundamental issues of use in improving policy and practices with regard to energy, the environment, and human well-being

# FY 2011 and 2012 Activities

- Dear Colleague Letter (*NSF 11-022*)
- Research Coordination Networks–SEES track (*NSF 11-531*)
- SEES submission encouraged in Dynamics of Coupled Natural & Human Systems (*NSF 10-612*)
- **New: Sustainability Research Networks (*NSF 11-574*)**
- **New: SEES Fellows (*NSF 11-575*)**
- **New: Sustainable Energy Pathways (*NSF 11-590*)**
- Exclusive SEES focus in Partnerships for International Research and Education (PIRE) solicitation (*NSF 11-564*)
- Climate-related competitions continue
- SEES Summit planned for March 2012



# Creating a More Disaster Resilient America (CaMRA)

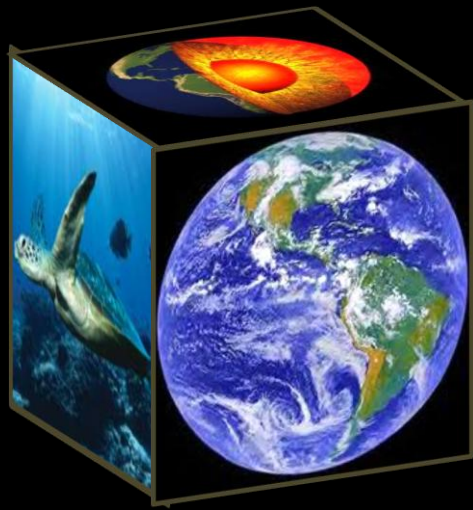
- GEO will initiate a new program -- Creating a More Disaster Resilient America (CaMRA)
- CAMRA will catalyze basic research efforts in hazard-related science to improve forecasting and prediction of natural and man-made hazardous events
- AGS, EAR, OCE participating
- Formal solicitation planned



# EarthCube

## Towards Knowledge Management for Earth System Science

(A progress report)



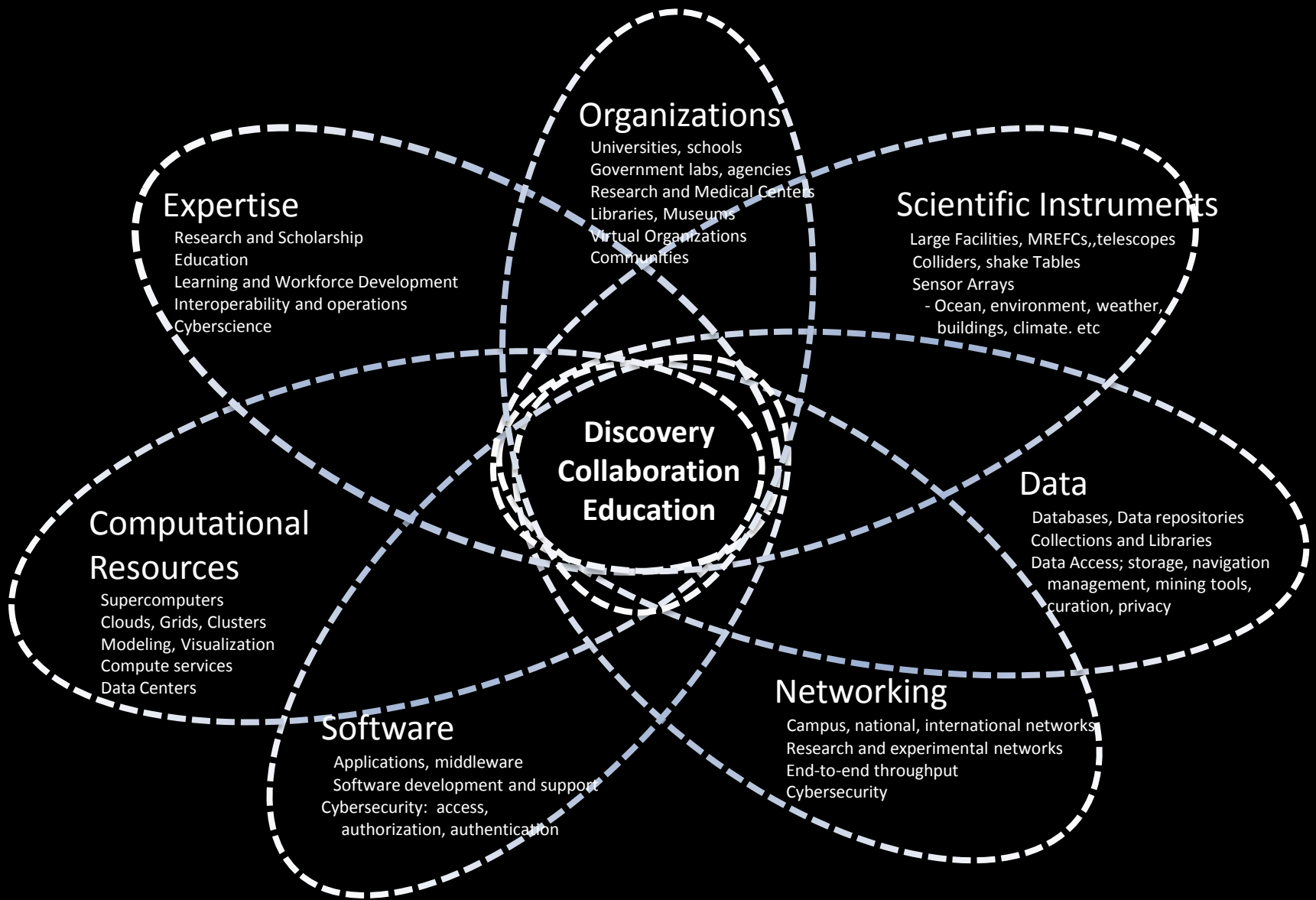
Cliff Jacobs  
Eva Zanzierkia  
Jennifer Schopf

# Talking Points

- Context (CiF21 and GEO Vision)
- EarthCube
- Progress to date
- Timeline & Guidance
- Anticipated Outcomes
- Comment and Questions



# Cyberinfrastructure Ecosystem (CIF21)



**Maintainability, sustainability, and extensibility**

# Transforming Earth Science

Grand Challenge

EarthCube



Multi-disciplinary & multi-scale integration

CIF21

Software

Analytic Tools

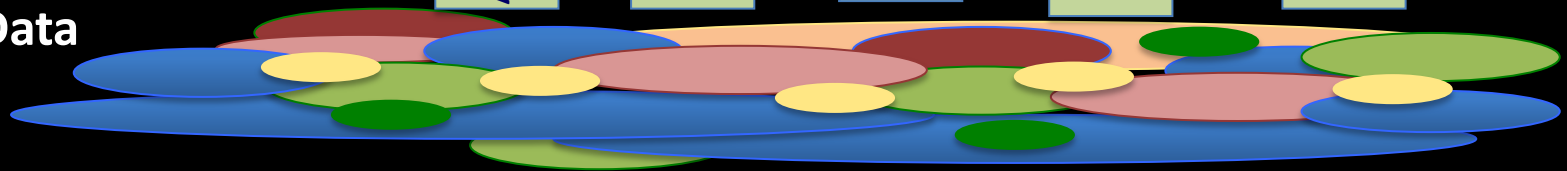
Compute,  
Modeling

Communities

Expertise,  
research

Networks

Sea of Data

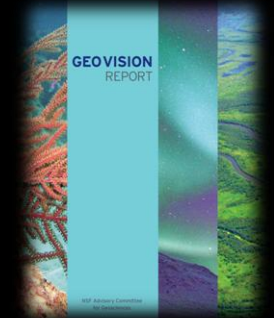


# Science Foundations of EarthCube

## GEO Vision

“To understand more deeply the planet and its interactions will require the geosciences to take an increasingly holistic approach, exploring knowledge coming from all scientific and engineering disciplines.”

“Fostering a sustainable future through a better understanding of our complex and changing planet.”



**CALL TO ACTION:** “Over the next decade, the geosciences community commits to developing a framework to understand and predict responses of the Earth as a system—from the space-atmosphere boundary to the core, including the influences of humans and ecosystems.”

## Take away points

- Community driven call to action
- EarthCube is an outcome and a process
- EarthCube will require broad community participation

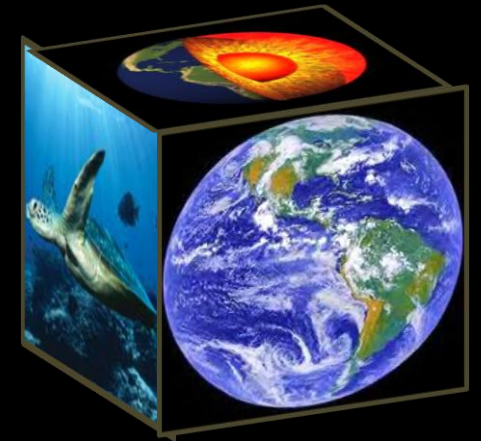
# WHAT IS EARTHCUBE?

# EARTHCUBE ASSUMPTIONS

- The geosciences community is ready to take on the EarthCube challenge
- Community will start self-organizing prior to the EarthCube Charrette
- Current and emerging technology will help achieve the convergence envisioned for EarthCube
- A broad range of expertise and resources must be engaged to shape EarthCube

# Goal of Earth Cube

to transform the conduct of research in geosciences by supporting the development of community-guided cyberinfrastructure to integrate data and information for knowledge management across the Geosciences.



# Knowledge Management

## Making Knowledge Visible

Easy Usability

- Who knows what
- Taxonomy of expertise
- Yellow pages
- Competence
- Uniformity of access

## Building Knowledge Intensity

(community) Creation

- Capacity Building
- Face-to-face contact
- Competence centers
- Community of practices
- Management of knowledge processes
- Networking – incl. web

## Building Knowledge Infrastructure

Global Access

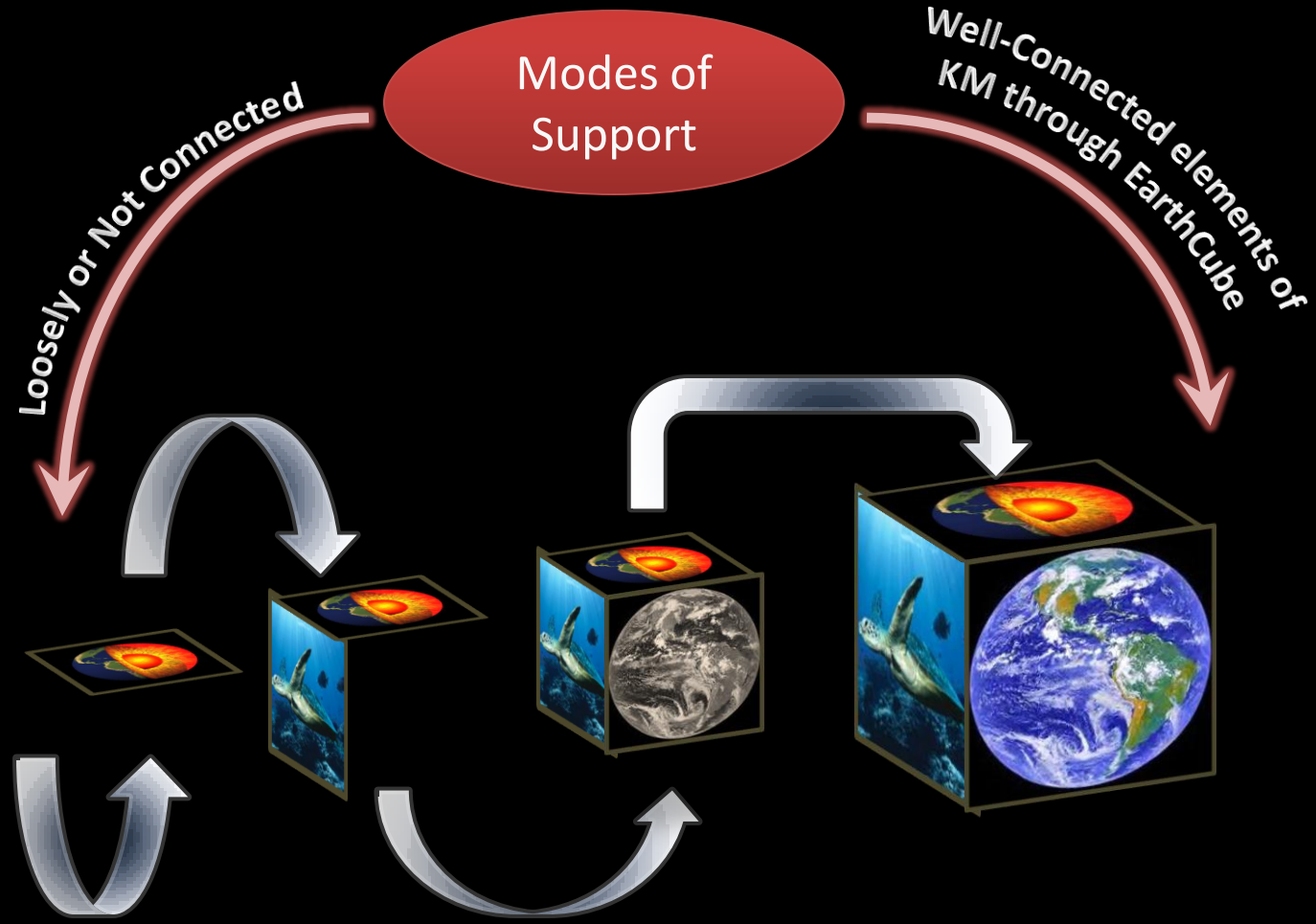
- Common communication infrastructure
- Access to external /internal information /knowledge/sources
- Use of modern methods and tools

## Developing a Knowledge Culture

Motivation Enablers

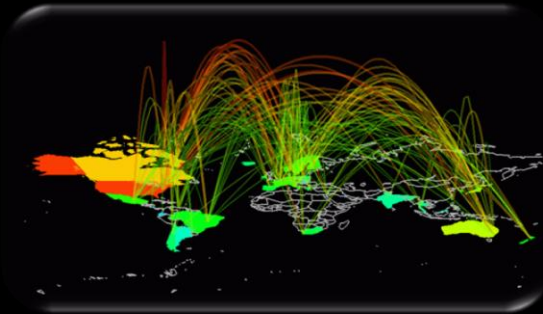
- Value and culture
- Rewarding
- Sharing/exchange of knowledge
- Shared mindsets and visions
- Trust of each other
- Bridging generations

# A Unifying Architecture and Technology Advances Will Lead to Strategic Convergence on KM

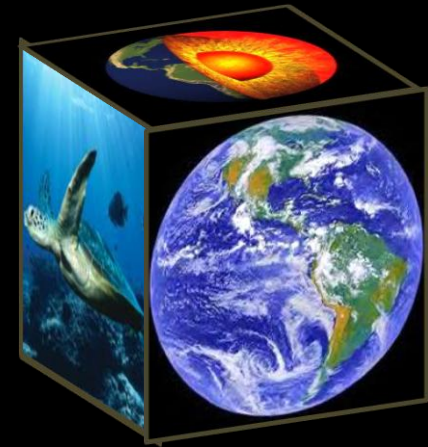




# Building on the Internet Paradigm



Internet for  
interoperability



Interworkability for  
collaboration

- The Internet provided a knowledge system that transformed the modality of science
  - Unanticipated Outcomes
  - NSF's role included influencing the set of standards that were adopted
- CIF21 investments must provide a framework of integrated and interactive services

# Progress to Date

- Two WebEx's (~350 signed up)
- Set up social media website (518 participants)
  - 185 people have filled out the science requirements (public)
  - 111 white papers submitted (deadline Oct. 17)
  - ~140 people registered for on-site and ~40 virtual
- Establish an internal working group to guide process and serve as moderators on website
- Established an sub-group of AC/GEO to help guide process (AC/OCI sub-group work in progress)
- Detailed planning for Charrette (Nov. 1-4)

# Charrette Planning

- Duration: Three and ½ day meeting
- Place: The Hilton Washington Dulles Hotel
- Purpose: to present, refine, and integrate the best ideas, technologies, and approaches to meet the science needs of the community
- Agenda:
  - Day 1 – From here to EarthCube a call to action
  - Day 2 – The Challenges to realize EarthCube
  - Day 3 – Mapping vision, challenges, and milestones to EarthCube design
  - Day 4 – Next steps

# EARTHCUBE TIMELINE

- **On-line Community Information: (August to November, 2011)**
- **EarthCube Charrette: (Early November, 2011)**
- **Post Charrette: (Mid-November to April, 2012)**
- **EarthCube 2<sup>nd</sup> community event: (Tentatively Early May, 2012)**
- **Prototype Development: (May to December 2013)**
- **Fully integrated geosciences infrastructure: (2014-2022):**

# Anticipated Outcomes

- Transform scientific enterprise
- Substantial increase in scientific productivity and capability
- Integrate and sustain connections among multiple modes of support
- An engaged community with a common vision
- Iterative discovery process leading to consensus on the best approach

# EarthCube Pointers

- External Website
  - <http://earthcube.ning.com>
- NSF Website
  - <http://www.nsf.gov/geo/earthcube/index.jsp>
- Internal Wiki
  - <https://nswiki.nsf.gov/display/geo/earthcube>
- EarthCube Group
  - Representatives from all GEO directorates and OCI
  - [earthcube-@nsf.gov](mailto:earthcube-@nsf.gov)
- Smaller group for day-to-day management
  - [earthcube@nsf.gov](mailto:earthcube@nsf.gov)

# Remembering Jarvis



To honor Jarvis' many contributions to the field, the American Meteorological Society is establishing the Jarvis Moyers Travel Fund to support students who want to attend the annual AMS meeting.

# Thanks



NATIONAL SCIENCE FOUNDATION