Foundations for EarthCube

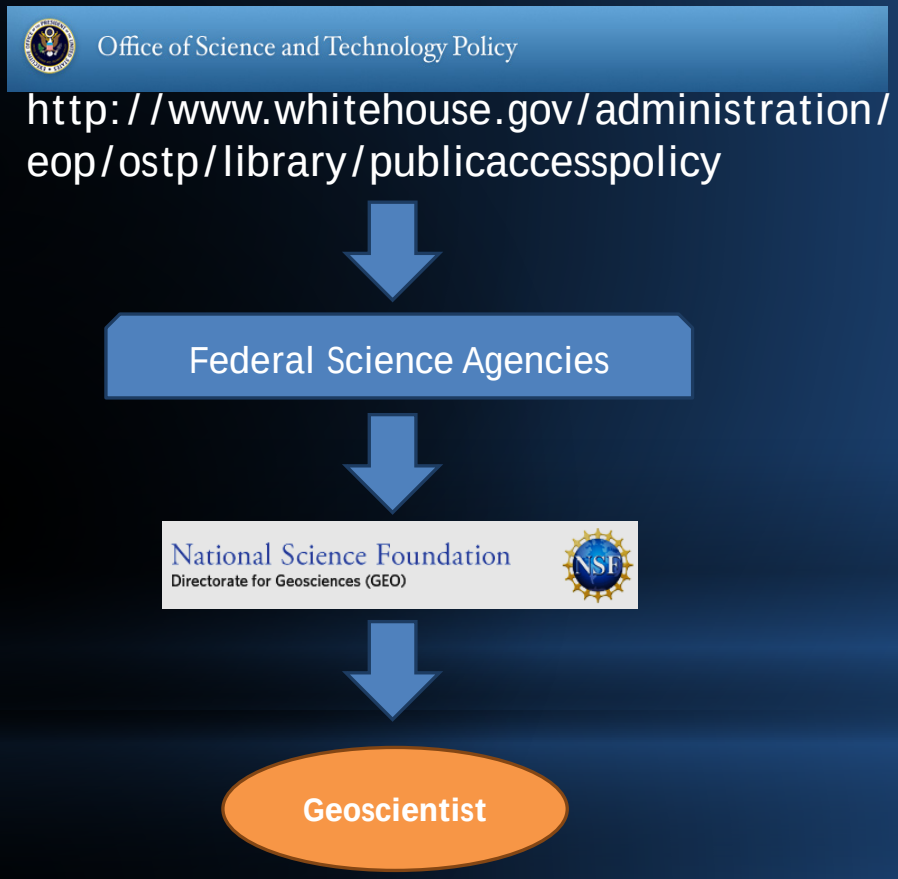
PURPOSE: "To understand more deeply the planet and its interactions will require the geosciences to take an increasingly holistic approach, exploring knowledge coming from all scientific and engineering disciplines."

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."

NSF GEO Vision report

*NSF Motivations

- Interdisciplinary Science Questions
- Big, Heterogeneous Data issues
- Communities that are poorly served/have no community resources
- ~$100M on CI in GEO alone



*Community Motivations

Responses on Data Access/Use (all responses normalized on a scale of zero to one, with one being most positive) Mean (s.d.)	Inland Waters n=35	Petrol-ogy n=59	Educa-tion n=33	Critical Zone n=35	Atmos-pheric model-ing n=29	Early Career n=37	Earth-Cube Web-site n=127	Data Cen-ters n=578
How IMPORTANT is it for you to find, access, and/or integrate multiple datasets, observations, visualization tools, and/or models in your field or discipline?	.87 (.17)	.89 (.17)	.84 (.18)	.88 (.14)	.89 (.17)	.89 (.19)	.89 (.18)	.87 (.20)
How EASY is . . . in your field or discipline?	.39 (.19)	.44 (.24)	.40 (.22)	.46 (.25)	.45 (.25)	.33 (.30)	.41 (.25)	.42 (.24)
How IMPORTANT is …span different fields or disciplines ?	.77 (.22)	.74 (.24)	.81 (.19)	.82 (.20)	.57 (.32)	.77 (.31)	.79 (.24)	.73 (.27)
How EASY is it . . . spanning different fields or disciplines?	.30 (.21)	.29 (.20)	.30 (.21)	.33 (.25)	.37 (.24)	.20 (.23)	.29 (.23)	.32 (.22)
Please use the scale ranging from Inadequate (0) to Adequate (1) to assess the present suite of publicly accessible datasets, data analysis tools, and modeling software	.43 (.23)	.40 (.23)	.42 (.24)	.46 (.19)	.61 (.22)	.40 (.26)	.42 (.24)	.48 (.26)

*Community Motivations

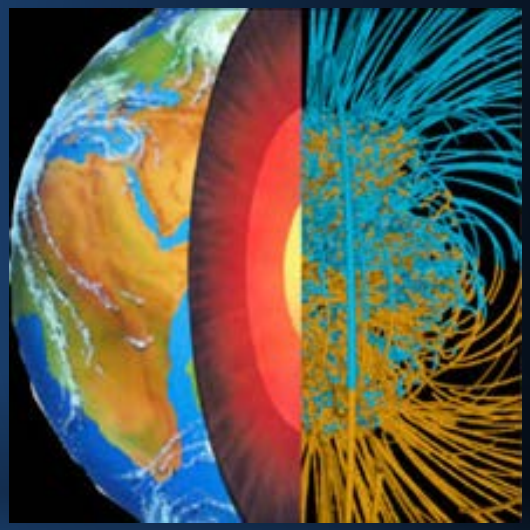
State of the Geosciences:

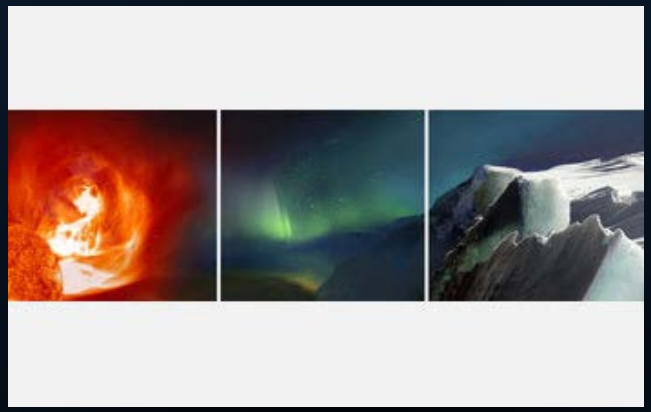
- Getting Science done now and in the future--Science drivers and aspirations
- Similar barriers and challenges across communities
- There are many similar activities/solutions to barriers without much cross-communication
- Assessing distribution of resources (data and CI) and access to them

Top Six Barriers to Sharing Data (survey):

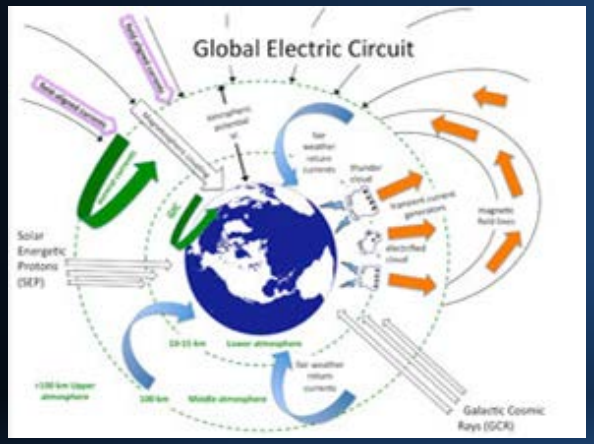
* No time/Not enough time for QA/QC
* No repository or known repository
* Inadequate standards, standardized formats, etc.
* Want to publish first/not be scooped
* File size too large/server size too small
* No credit/incentive for sharing

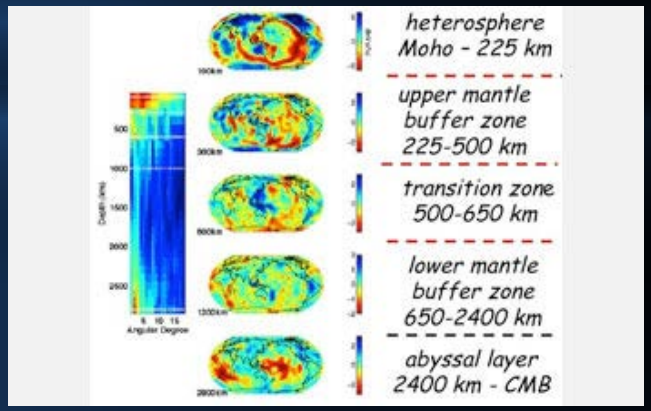
Frontiers in Earth Systems Dynamics

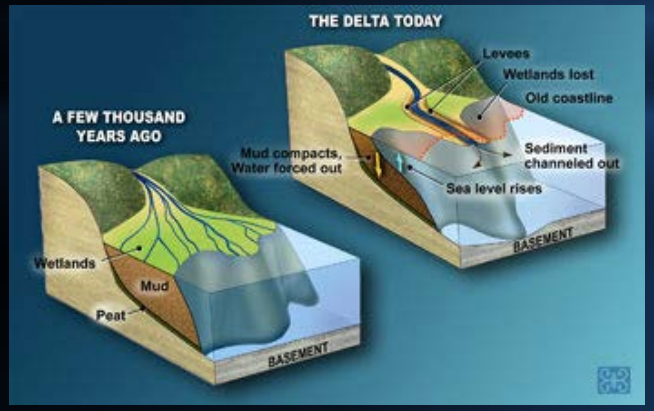




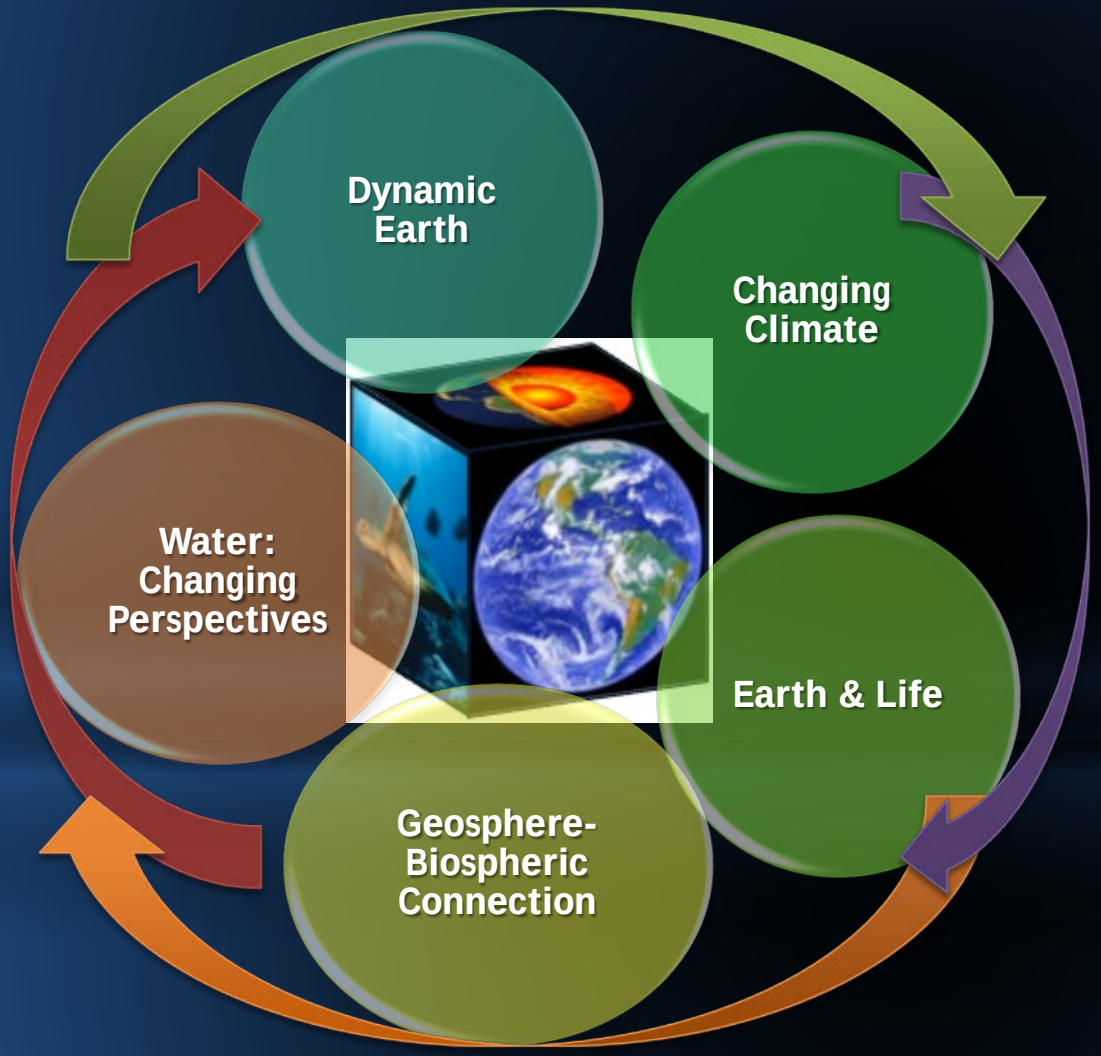
Data + Teams + Models





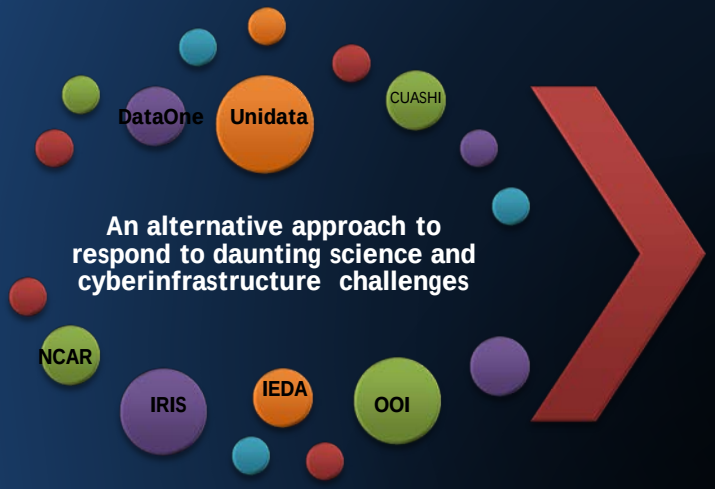


*EarthCube Vision



- Transform the conduct of geosciences research with the next generation CI .
- Create effective community-driven cyberinfrastructure.
- Enable global data discovery within the geosciences
- Achieve interoperability and data integration across disciplines.

*The EarthCube Strategy



EarthCube is an outcome and a process

EarthCube: next generation CI to transform the conduct of geosciences

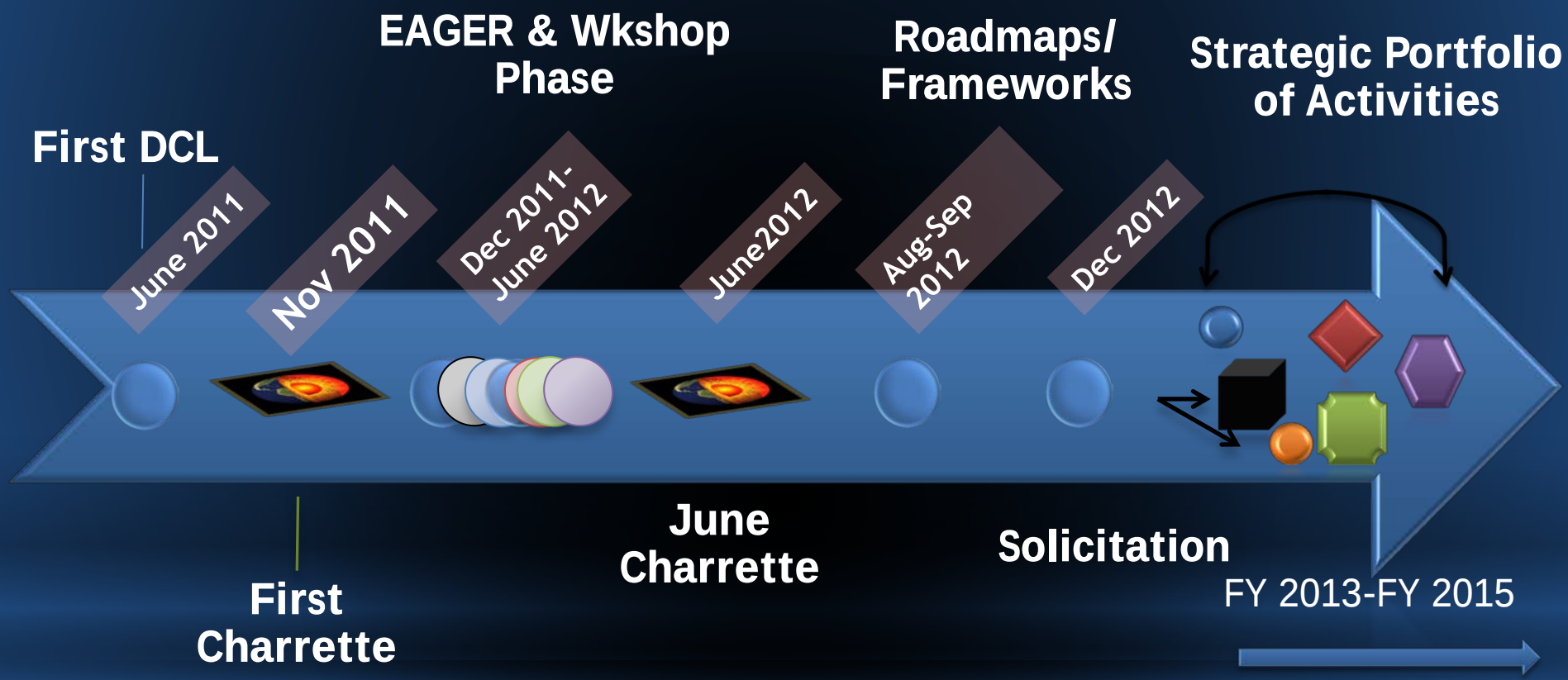
The process must

- Engage all stakeholders: Geosciences end-users
  Geosciences and CI facilities
  CI and Computer Science specialists

- Build upon existing resources, understanding that different geosciences communities are not uniformly served

- Build EarthCube iteratively, with community input and assessment in yearly intervals

*Timeline


EAGER & Wkshop Phase
Roadmaps/ Frameworks
Strategic Portfolio of Activities
First DCL
June 2011
Nov 2011
Dec 2011- June 2012
June2012
Aug-Sep 2012
Dec 2012
First Charrette
June Charrette
Solicitation
FY 2013-FY 2015

*FY13 Themes: Engage Stakeholders

Geoscientists

Geosciences Facilities

Academic Researchers

Students

Industry

Geo-ed

Computer Scientists

CI Experts Builders

Geosciences Cyberinfrastructure

CI Resources

Data Providers

*EarthCube's Iterative Process

YEAR 1

Community Assessment

Next Opportunities

YEAR 2

Community Assessment

Next Opportunities

YEAR 3

EarthCube designed in a step-wise fashion to accommodate needs, change and new developments.

10 Years

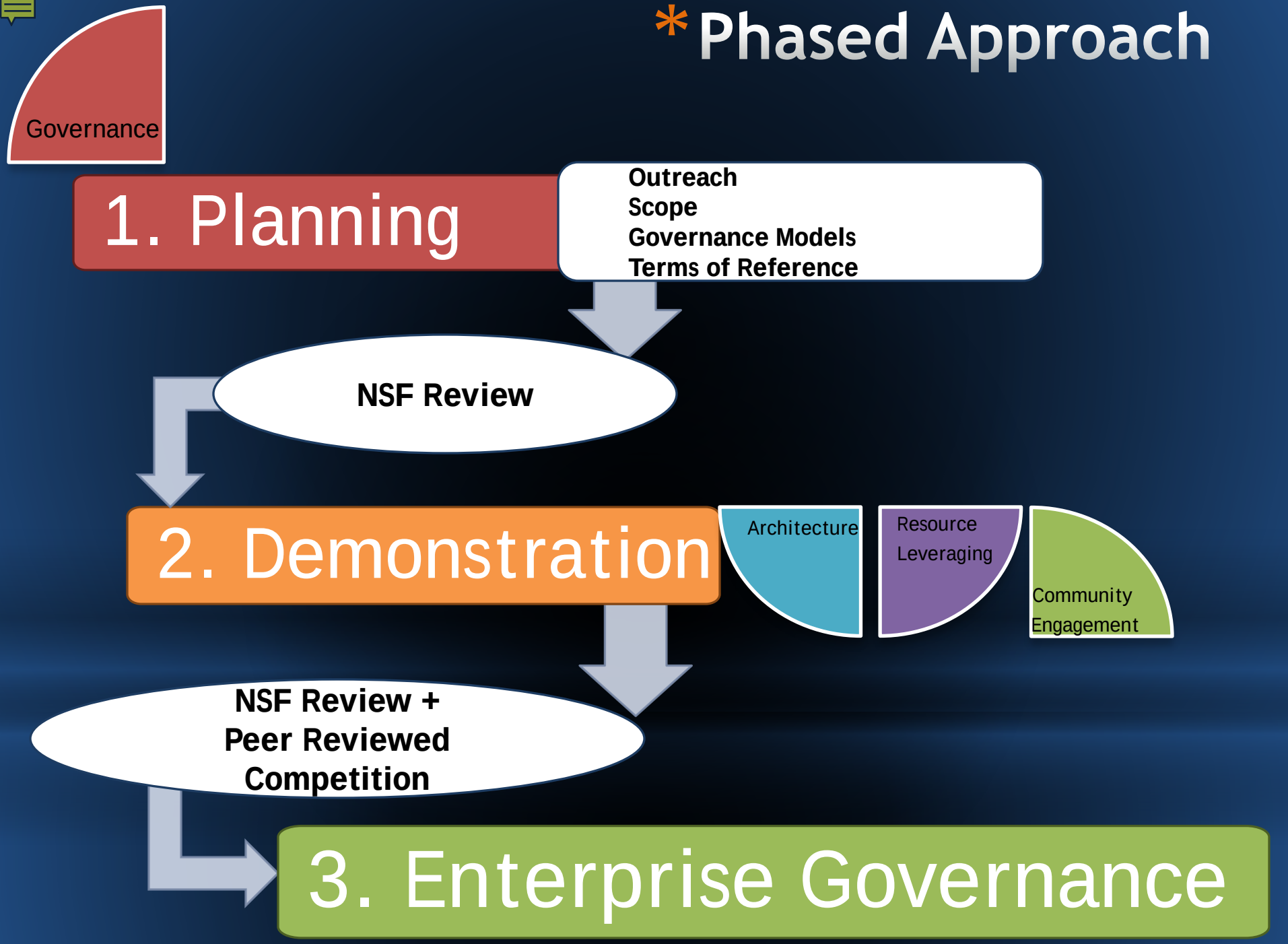
*Test Enterprise Governance

*Two stage process

1. Facilitate the creation of a terms of reference engaging the appropriate organizations and people
2. Demonstrate the terms of reference

*Coordinate, organize and set priorities for a complex set of activities that will change over time

*Phased Approach



Community Engagement

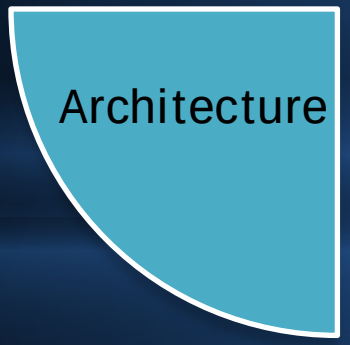
*Research Coordination Networks

*Planning activity for geosciences communities
  *Shared resources
  *Representative plans for needed CI
  *Data/CI standards

*Multi-disciplinary is preferred
*Communication and Participation Required

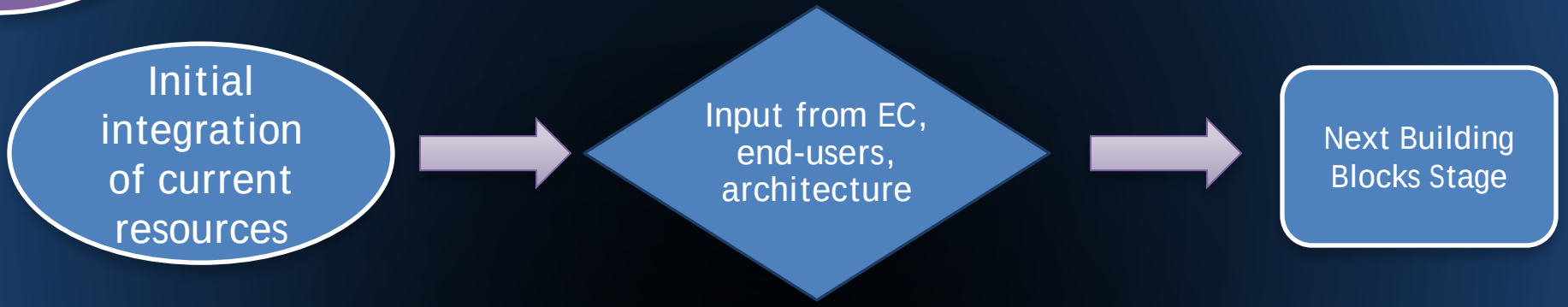
*EarthCube Amendment II

- *May 22 deadline
  - *Building Blocks
    - *4-6 awards; 2yrs; up to $2m
  - *Conceptual Designs
    - *3-5 awards; 2yrs; $300k



*Building Blocks

Resource Leveraging



2 Outcomes

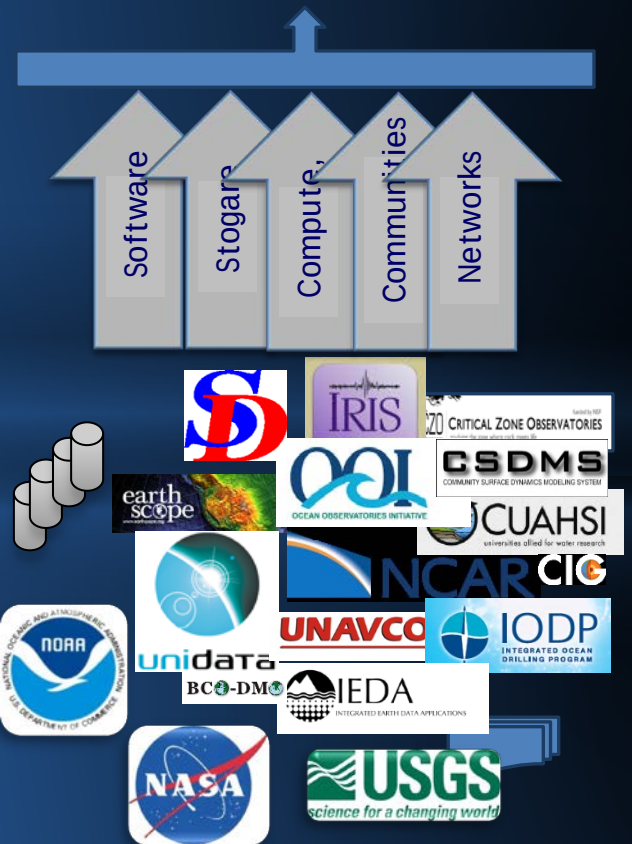
* Demo utility to geosciences communities within 24 months
* How does the approach extend and fit into “ecosystem”

Proposals must

* Have credible links to end-users geosciences communities—not just a subset
* Motivate how the solution might be broadly applied across ALL geosciences community

Architecture

*Conceptual Designs



Initial planning for Enterprise Architecture

- *CI Architecture Teams
  - *Understand the landscape of existing resources
  - *Consider innovative designs for an evolving system
- *Output Conceptual Design Reports
  - *Engage end users
  - *Presented to other EarthCubers
  - *Discussion about different approaches
- *Phased Approach

How Will It All Fit Together: Phased Approach

NSF Review

Community-Run Status Assessment

Year 1

- Input into Governance
- GovernanceTerms of Reference
- Initial interactions between all groups

Year 2

- Conceptual Design Reports
- Building Block output
- RCN interaction
- Priorities

Year 3

- Design revisions
- Gaps/ Missing Pieces
- Building Block development
- Enterprise Governance

*7 Modes of Failure

Participation

- Requirement of awards
- Understand there is uncertainty

Collaboration

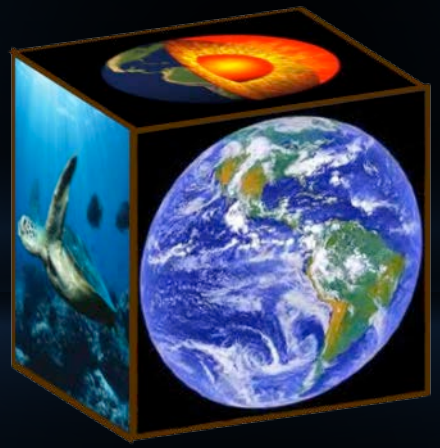
- Deep connections to the academic geosciences community
- Shared solutions

Flexibility

- NSF will play a facilitation role
- Technology will change
- EarthCube is just a name

*Guiding Principles

*Questions and Comments?



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