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*Prepared by the EarthCube Test Enterprise Governance Project*

*and the National Science Foundation*

CHARGE TO EARTHCUBE DEMONSTRATION GOVERNANCE

I. Purpose of this Document

The EarthCube Demonstration Governance organization is established under the auspices of the National Science Foundation sponsored project, “EarthCube Test Enterprise Governance: An Agile Approach” (the “Project”), through a cooperative research agreement with the University of Arizona.

Under the terms of the agreement, the Project is tasked with exploring, developing, and evaluating governance paradigms. At the end of a 24-month award, 1) an appropriate and community-agreed governance framework will be delivered; 2) this EarthCube Enterprise Governance framework will be vetted with the community; 3) the specific charter, by-laws, and terms of reference of the governance framework will be demonstrated and evaluated in a pilot; and 4) proposed next steps for implementing governance will be recommended.

The Leadership Council has requested that the EarthCube Project and Program Office supply guidance as a framework to help focus its efforts in this year. In response, this document describes the charges to the Project from NSF, along with the resulting charges to the Demonstration Governance organization as a whole (encompassing the committees, teams, and other formalized bodies within the governance framework), with the intention of achieving the goals of the Project and meeting its required deliverables to NSF.

# II. Project deliverables to NSF

The Project plan for carrying out the terms of the agreement are described in the report, “EarthCube Demonstration Governance: A Community Proposal for Establishing a Demonstration Governance Organization,” delivered to NSF on July 21, 2014. NSF subsequently approved formation of the EarthCube Demonstration Governance organization under the terms of this proposal.

# III. Priorities for Demonstration Governance

As determined at the 2014 EarthCube All-Hands Meeting (June 2014), the following priorities were identified for the initial tasks of organizational units of EarthCube. The participants at the All-Hands Meeting determined that without these priorities, EarthCube would be unsuccessful during the demonstration phase. The organizational unit identified for initially taking on the activity (within the governance workflow) is identified in parentheses following the priority.

* Refine the Scope and Vision for EarthCube (*Leadership Council*)
* Engage the scientific community and determine the structure of Working Groups (*Science Standing Committee)*
* Create a policy and/or strategy on EarthCube Data Management Plans (*Science Committee*)
* Consensus on EarthCube Architecture (*Technology & Architecture Standing Committee* in close coordination with the *Council of Data Facilities* and *Science Standing Committee*)
* Coordinate a testbed for EarthCube components (*Technology & Architecture Standing Committee*)
* Determine potential shared services through geoscience data providers (*Council of Data Facilities*)
* Identify and structure the Liaison Program focusing on national, international, and consortia collaboration (*Liaison Team*)
* Create science success stories (*Engagement Team* in conjunction with the *Science Standing Committee*)

# IV. Charges to the EarthCube Leadership Council

During the Demonstration Governance Phase (Year 2 of the ECTEG Project), the Leadership Council will be responsible for developing a strategic plan to be presented for review and critique at the All-Hands Meeting, after which there is a planned period of refinement and adjustment before the final strategic plan is presented. The Leadership Council is also responsible for developing methods of assessment for itself and for the other portions of EarthCube, including the funded projects, teams, committees, and the membership model and process.

Communication and cooperation will also be fundamental to the operation of the Leadership Council, both internally and externally with the broader EarthCube community. It will be a critical function of the Council to foster communication between the different committees and teams, as well as across the domains represented by NSF’s Geoscience Directorate. The Leadership Council is also the single point of contact between EarthCube and funding agencies, including NSF, and will need to be able to communicate assessment of the program and projects to those agencies.

## Long-term Charges

The EarthCube Leadership Council will operate within (but is not limited to) the general scope outlined below.

1. Being the voice of EarthCube to NSF
   1. Describing the state of EarthCube development and progress in achieving EarthCube goals
   2. Providing a set of priorities for cyberinfrastructure development that can be considered by NSF in shaping the EarthCube solicitation and other opportunities
      1. These priorities will be developed based on the current status of cyberinfrastructure in the geosciences, and assessment of EarthCube awards and activities.
      2. This will be done on a yearly basis at minimum. Given the flexible structure of the EarthCube solicitation, new amendments may be added throughout a fiscal year pending availability of funds.
2. Setting and maintaining the strategic direction of EarthCube
   1. Articulating the vision and goals of EarthCube as well as its benefit and value to the geosciences
   2. Providing oversight and governance of ongoing EarthCube activities, which may include:
      1. Facilitating convergence on an enterprise architecture
      2. Developing guiding principles and standards
      3. Assessing gaps in infrastructure
      4. Adjudicating tests of prototypes or other EarthCube developments
   3. Providing direction to governance bodies, such as committees and teams
   4. Assessing and changing the governance structure as needed to reach strategic goals
3. Representing and communicating with the academic geosciences community, cyberinfrastructure community, and other stakeholders
   1. Articulating EarthCube vision and goals to the community
   2. Being complete, thorough, and inclusive of the academic geosciences and CI domains
   3. Working with individual communities in the manner that suits each community to incorporate their scientific output into EarthCube
   4. Determining how to communicate to the geosciences community EarthCube results that they can use in their respective fields

## Specific Charges for the First 18-Month Phase

The Demonstration Phase is the opportunity to stress test the EarthCube Governance structure and assess whether it is able to provide meaningful priorities in its current state. The Interim Leadership Council of 7 members and 2 team representatives will have a term of 18 months after full population.   
  
The following responsibilities are the charge to the Interim Leadership Council during this term, and the Leadership Council has been given funds to support work to accomplish these responsibilities. Funds can be spent to support the following types of activities (not an exhaustive list):

* Workshops
* Working groups (face-to-face meetings, cloud computing, or other required expenses, etc.)
* Participant support for attending EarthCube or other geoscience/cyberinfrastructure meetings
* Funds allocated to EarthCube governance leaders and committees to be used at their discretion for similar activities
* Activities determined as valuable by the liaison and engagement teams
* Recognition of volunteers
* Similar activities sponsored by the Council of Data Facilities

The rules and processes developed to prioritize, authorize, and account for funds are a part of the responsibilities to be developed in the following section.

1. Work with ECTEG to formulate and test the governing charter by-laws and rules for this body, as well as for their interactions with the committees, teams, funded projects, and administrative functions.
   1. This will be accomplished by June 2015
   2. Define the rules for election of Leadership Council members in conjunction with ECTEG and NSF and oversee the transition to the next Leadership Council near the end of the Interim Leadership Council term.
2. Refine the Scope and Vision of EarthCube.
   1. Articulate the EarthCube vision and goals, including science and cyberinfrastructure drivers
   2. Be responsible for the first iteration of a long-term strategy for EarthCube (including convergence on an architecture, setting priorities, and the sustainability and integration of funded projects).
      1. Create the initial plan using already existing input from the end-user workshops, All Hands Meeting, roadmaps, and other EarthCube documentation. Assessment of gaps in these materials, such as communities that still require outreach, may be included in the plan.
      2. Task working groups, committees, teams, and office personnel with actions required to develop this long-term strategy.
      3. ECTEG may provide models for reaching a long-term strategy, such as from the Belmont Forum or other activities that have similar goals.
      4. The timeline for this activity should coincide with other milestones in the demo phase, but there will be flexibility in the timeline for delivering the long-term strategy.
3. Develop a framework through which NSF funded work in EarthCube will be assessed and how to implement new principles/standards.
   1. Guide active awardees towards appropriate outputs for the all-hands meeting.
   2. Determine appropriate next activities following the all-hands—this includes follow on from the current Building Blocks, RCN and Conceptual Design awards, as well as activities that may already be possible within existing support. Next steps should not be retreads of current activities.
   3. Task Committees to determine gaps in funded projects, assess progress on architectural concepts and assemble user requirements, and translate this into priorities for NSF to inform future solicitations. This must be accomplished by August, 2015.
   4. Task the Liaison Team to understand the role other initiatives/activities can play in this framework.
   5. Articulate the value of the volunteer work in EarthCube and the intersection of this with funded project work. Determine ways to recognize/reward volunteers.
4. Continue engagement of academic geosciences communities.
   1. Short-term
      1. Task the Engagement team to re-engage the end user workshops (and/or RCNs) as groups to define next steps for sharing data in those communities. This may include pointing them to appropriate funding mechanisms, Liaison groups, etc. to make progress.
      2. Assess whether there are geosciences communities that have not had workshops or other mechanisms for engaging with EarthCube and develop a strategy for engaging those communities
      3. Consider what end-user geoscientists could do with EarthCube now.
   2. Longer-term
      1. Determine how to translate EarthCube results to the geosciences community in a way they can use.
      2. Advise the community on next steps/next stages for EarthCube.

# IV. Functions of the EarthCube Leadership Council

The following set of functions were determined by the EarthCube community at the 2014 EarthCube All-Hands Meeting:

* Set, implement, and revisit as needed the strategic direction of EarthCube, including identifying what is within and outside of the scope of EarthCube. This includes monitoring of metrics and adjusting course as needed, thereby ensuring the governance organization improves over time.
* Ensure consistency and transparency in policies, procedures, and decision-making, including providing multiple ways for people to participate in the process of making decisions, and communicating outcomes of decisions to the broad EarthCube community.
* Enable communication between governance organizational units to close gaps, eliminate duplication, and build synergies.
* Establish and manage Standing Committees and Working Groups as needed to perform critical functions.
* Foster business models to sustain and maintain the infrastructure of EarthCube.
* Establish, facilitate, and maintain policies and procedures.
* Provide for public dispute resolution and proactive management of risk and conflicts of interest.
* Act as the single point of communication for coordinating with and making recommendations to the NSF and other funding agencies on behalf of EarthCube.
* Develop methods of assessment for itself and for the other portions of EarthCube, including the funded projects, teams, committees, and the membership model and process.

# V. Guidance to the EarthCube Leadership Council

The following needs have been recognized by the EarthCube community as important aspects in demonstrating EarthCube’s value.

**1. There is a need to demonstrate *competence.***

### Governance competence

* The ability to make decisions that are transparent and defensible
* An ability to make decisions in a timely and deliberate fashion
* An ability to engage the community in the governance effort

Leadership competence

* The ability to recruit and select (elect) leaders
* The ability of leaders to effect actual work
* The ability to distribute leadership across the membership

Office support competence (Program Office/Project)

* The ability to offer resources as needed and help keep work on track
* The ability to support website and other media
* The ability to account for funds spent and reimburse members in a timely fashion

**2. There is a need to demonstrate *vision.***

### Science vision

What does “EarthCube enabled” science look like? How does this add value to the lives of domain scientists? How does this match the science vision articulated by the NSF? How does this open up new trans-domain data use and modeling? What are the impediments to achieving this vision? (Includes next phases for funded projects and efforts).

### Technology/Architecture vision

What are the technologies and best practices that define an EarthCube approach to the geosciences? What is the process to insert these into science practice? Where are standards being produced that might help this process? How much new learning is required for scientists to be fluent in these technologies? How can EarthCube build capacity in this arena? (Includes next phases for funded projects and efforts).

### Cyberinfrastructure for the geosciences vision

How can EarthCube bring domain scientists, data scientists, software engineers and computer scientists into a productive conversation about a common future? How can existing/funded cyberinfrastructure efforts be leveraged? What are the gaps that EarthCube is positioned to fill?

**3. There is a need to demonstrate a *plan for growth.***

### Participant growth

Planning, capacity building, and pilot activities to expand EarthCube participation and engagement, particularly among domain scientists including early-career and mainstream (“long-tail”) scientists. Also includes efforts to discover needs and to help members communicate.

### Volunteer growth

An ability to recognize and reward volunteer efforts. The combination of funded projects and volunteer efforts can be problematic unless there is a visible sense of where volunteer community efforts add value beyond what might be directly fundable. Some of this value needs to return to the individual volunteers.

Growth of active connections with other efforts

Active conversations with data providers and external NSF funded science programs (LTERs, DataOne, international associations, etc.) are essential for EarthCube to understand how it can best position itself to provide value to the geosciences. Active liaisons extend the value of EarthCube to the work of partner organizations, while it leverages this work for EarthCube members.

## Tenets of EarthCube Governance

The additional guidelines that follow serve to illustrate the framework in which the Demonstration Governance Organization should be operating:

1. **Alignment:** Guide EarthCube via its governance to support the work of its stakeholders toward a common agenda. Alignment refers to whether or not the work of EarthCube as a whole and under the guidance of EarthCube Governance supports the work of the stakeholders and the work in their field. Alignment relates to the creation of a common goal, which is particularly important for network structures, where multiple individuals or organizations come together to solve a problem.
2. **Inclusivity:** Foster a broad level of community engagement that is balanced and representative of EarthCube participants and stakeholders. Inclusivity refers to the perception that there is a broad level of community engagement, and that a balanced and representative spectrum of the community has an active voice in decision-making. Inclusivity is especially important for EarthCube, as EarthCube is a bridging together related, but separate, disciplines from the geosciences and cyberinfrastructure. On top of supporting participant buy-in and commitment, a high level of inclusivity also increases the likelihood of receiving valuable input to drive effective policies and decisions.
3. **Transparency:** Establish clear lines of authority, define who has decision-making power, and implement two-way communication. Transparency around decision-making is highly influential in building the trust of stakeholders. To be effective, governance must not only be clear about how decisions were reached but also create an atmosphere where stakeholders are willing to share their insight and ideas.
4. **Decision quality:** Establish clear criteria for selection processes and decision-making including assessing multiple options. Decision-making quality underlies the effectiveness of governance, which has been defined as a match between the expectation of the constituents and how the processes and outcomes evolve.
5. **Confidence:** Foster trust in and perceived confidence in decision-makers and the EarthCube governing processes. Confidence from stakeholders in the decisions made by governance is based on trust in and perceived competence of governance members or other decision makers. Confidence effectively begets internal legitimacy of a governance structure with its members and constituents.
6. **Commitment:** Encourage the use of EarthCube products and external products, both within and outside EarthCube. Involvement of EarthCube-funded projects as well as groups external to EarthCube and to NSF that are doing similar things will help ensure that EarthCube is not only aligned in the cyber-ecosystem but that similar work from other programs can be leveraged.
7. **NSF’s Role:** Examine what the role of EarthCube could be or will be in NSF’s geoscience cyberinfrastructure initiatives. The EarthCube community through its governing process could provide NSF with advice on and responses to approaches, concepts, requirements, and priorities.
8. **Principles or guidelines:** Propose and foster adoption of a set of principles or guidelines around which the EarthCube system will be based. A set of guiding principles could help organize existing and future projects into contributing to a collaborative infrastructure and provide frameworks for governance, architecture, and processes for consideration and adoption.

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