



EarthCube Charter

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1 Preamble

The EarthCube Charter (hereafter the Charter) embraces the leadership, strategic direction, operations, and all other formalized activities of EarthCube, and defines the structure of EarthCube's Governance.

The Charter is a living document; suggestions for changes to the Charter may be made by any registered EarthCube member (§3), subject to the proposed changes being approved by a Leadership Council vote. The Leadership Council will consider changes to the Charter at any of its meetings only after four weeks' notice of any change has been given to and comments have been received from the community. A two-thirds majority of all Leadership Council voting



members is required to approve changes to the Charter.

Maintaining openness and transparency, and promoting inclusivity in all decision-making processes are core commitments of EarthCube. In presenting the Charter as an open living document, the intent is to ensure that the community understands how each individual can actively participate in EarthCube governance.

EarthCube was initiated by the National Science Foundation; jointly funded by the Directorate for Geosciences and the Division of Advanced Cyberinfrastructure. Envisioned as an evolving, dynamic community effort, EarthCube is not only a new way for the National Science Foundation to partner with the scientific community, but also a challenge for the many academic, Foundation, and industry stakeholders in the geosciences, geoinformatics, cyberinfrastructure, computer sciences and social sciences to create new capabilities for sharing data and knowledge and conducting research.

2 Mission and Vision

EarthCube's mission is to enable geoscientists to better understand and predict the complex and evolving Earth by fostering a community-governed, common cyberinfrastructure to collect, access, analyze, share, and visualize all forms of data and resources, using advanced technological and computational capabilities. EarthCube's long-term vision is a community-driven, dynamic cyberinfrastructure that supports standards for interoperability, infuses advanced technologies to improve and facilitate interdisciplinary research, and helps educate scientists in the emerging practices of digital scholarship, data and software stewardship, and open science.

The text of the mission and vision statements is maintained at the following persistent URL: <http://earthcube.org/document/2015/mission-vision>

3 EarthCube Members and Partners

Individual membership in EarthCube is free, voluntary, and open to all. Membership is achieved via registration at the EarthCube website. EarthCube members constitute what is referred to as the EarthCube Community (capitalized), which is a subset of the broader relevant geoscience and cyberinfrastructure communities. EarthCube members are encouraged to be active and engaged by participating in standing Committee and Team activities, and expected to adhere to the membership policies specified in their individual Charters.

Registration via the EarthCube website is not a prerequisite for participation in any EarthCube activity or accessing resources. However, registered members have rights and responsibilities that include:

- Voting on matters presented to the EarthCube Community



- Nominating individuals or volunteering to stand for elected office in any core organizational unit
- Volunteering to form or chair special interest and working groups
- Proposing changes to the EarthCube Charter
- Contributing to forums, online discussions, and other publicly accessible areas of the EarthCube website
- Offering suggestions for sessions or speakers at the annual All Hands Meeting
- Receiving support as appropriate for EarthCube activities from the EarthCube Office

EarthCube partner organizations include, but are not limited to, organizations engaged in activities that complement or benefit the EarthCube’s mission. Partners are approved by EarthCube’s Leadership Council, at the recommendation of the Liaison Team. Partnership may be formal or informal, with mutually agreeable terms that relate to a specific activity or task, or to a designated period of time.

4 Governance Structure and Organizational Units

EarthCube governance will be implemented through four standing committees and two teams. The standing committees are: Leadership Council; Science Committee; Technology and Architecture Committee; and Council of Data Facilities. The teams are Engagement Team and Liaison Team.

Mindful of the requirements that the Leadership Council sets the strategic direction for EarthCube and coordinates activities that promote communication, collaboration, and engagement, the Council for Data Facilities and the standing Committees and Teams function independently to shape EarthCube’s vision and fulfill its mission, and are guided by their own Charters that define their functions and the scope of their internal operations. Depending on need, the functions and operations of EarthCube’s standing Committees and Teams may be facilitated through the formation of Special Interest and Working Groups, and are supported by the EarthCube Office.

Underlying this Charter are a number of key assumptions, including:

- An integrated and effective cyberinfrastructure for the geosciences is both a technical and social accomplishment
- Although EarthCube was initiated by the National Science Foundation (NSF) and operates in coordination with the NSF (with NSF funding for operations and projects), EarthCube also has the capacity to coordinate with other public and private organizations in order to best advance the mission
- There will be a continuing need to balance inclusive deliberations with decisive action, with this Charter designed to ensure the necessary checks and balances

4.1 Leadership Council



The Leadership Council is the elected voice of the EarthCube Community, setting the strategic direction for EarthCube and making decisions critical to the success of EarthCube. The Leadership Council will conduct its business at the EarthCube All Hands Meeting, other face-to-face meetings, and a minimum of one virtual meeting in each of the remaining ten calendar months. It is anticipated that most Leadership Council decisions will be achieved through dialogue and consensus. Except where otherwise specified, if a vote is called, a two-thirds majority of all Leadership Council voting members is required to approve the measure.

4.1.1 Leadership Council Functions

The Leadership Council is the starting point for ensuring continuity throughout EarthCube's governance structure, and will fulfill the following functions:

- Serve as a leading source of scientific, technical and intellectual guidance for EarthCube
- Act as a leading point of communication for coordinating with, reporting and making recommendations to the National Science Foundation and other funding agencies on behalf of EarthCube
- Define, implement and revisit, as required, the scope and strategic direction of EarthCube
- Identify and implement monitoring metrics to assess progress towards EarthCube goals
- Establish, maintain, and ensure consistency, transparency and community participation in all policy-making procedures and decision-making processes
- Communicate outcomes to the EarthCube Community
- Form and work with others to form and coordinate standing Committees, Teams and Working Groups as needed to perform critical functions
- Enable communication among the core governance organizational units to close gaps, eliminate duplication, and build synergies
- Foster business models to sustain and maintain the infrastructure of EarthCube
- Provide for appropriate dispute resolution and proactive management of risk and conflicts of interest

The EarthCube Leadership Council does not replace or duplicate the roles of the Principal Investigators on individual EarthCube funded projects, nor that of the EarthCube Project Office in executing the Project Office collaborative agreement.

4.1.2 Leadership Council Membership

Mindful of the potential for either expansion or contraction as circumstances dictate, the nucleus of the Leadership Council comprises ten elected, voting members: the Chair; one representative each from the Council for Data Facilities, the Science Committee, the Technology and Architecture Committee, the Engagement Team and the Liaison Team; and four at-large



members, representative of the constituencies of the National Science Foundation Directorate for Geosciences. The EarthCube Office Principal Investigator, or their designated representative, serves as a non-voting member of the Leadership Council, as does the newly-elected Leadership Council Chair. The preceding Chair and a representative from the National Science Foundation may also participate as non-voting members of the Leadership Council.

4.1.3 Leadership Council Chair

The Chair is the executive presence representing EarthCube's interests as a community-led organization. He or she mobilizes the community, champions EarthCube's portfolio of integrated activities to all constituencies and parties, and advances EarthCube's vision, mission, and strategic plan through open and inclusive governance. The Leadership Council will select from among its members a Deputy Chair who works with the Leadership Council Chair and the EarthCube Office Principal Investigator in advancing the work of the Leadership Council. The Deputy Chair is also the point of contact in step two of the conflict resolution procedure.

The Office will, in consultation with the National Science Foundation, administer an appropriate annual honorarium, beyond travel support, for the Leadership Council Chair.

4.1.4 Leadership Council Elections and Terms

The goal is to run Leadership Council, standing Committees, and Teams chair elections once a year, in the late Fall, with a second annual election if needed (because of early resignations) in late Spring. It is also a goal to have staggered Leadership Council terms to minimize the chance of significant membership turnover all at one time. Depending upon the time of election, appointment to the Leadership Council may start immediately, or be postponed for up to 6 months, at the discretion of the Leadership Council Chair and EarthCube Office Principal Investigator.

Any person showing a demonstrated commitment to EarthCube's vision may be nominated to serve as Chair of the Leadership Council. The nominees will be asked by the Nominations Committee to submit an NSF-style biographical sketch (two pages, covering professional preparation, selected appointments, selected publications, synergistic activities, collaborations, and other affiliations) and a statement of interest (approximately 250 words). In consultation with the NSF, nominees will be reviewed by the Nominations Committee for conflicts of interest and appropriate diversity across fields and disciplines before being presented to the EarthCube community for election.

The Chair of the Leadership Council is voted into office by the EarthCube Community and serves for two years with the opportunity for re-election for one additional consecutive term. If the newly-elected Chair does not start immediately, they may participate in Leadership Council meetings as a non-voting member. For the six months after leaving office, the outgoing Chair may also participate in Leadership Council meetings as a non-voting member.



Elected Leadership Council members will normally serve for two years, with one opportunity for reelection for a consecutive term. A serving Leadership Council member may at any time choose to stand for election as Leadership Council Chair. To preclude dominance by any one faction and to preserve continuity, elections for the representatives from one standing Committee, one Team, and two at-large members will be held one year, and elections for representatives to the other standing Committee, the other Team, and two at-large members will be held in the alternate year.

4.1.5 Leadership Council Resignation and Unscheduled Departure from Elected Office

Leadership Council members and standing Committee or Team Co-Chairs may resign from office at any time, by giving written notice to the Nominations Committee and EarthCube Office Principal Investigator.

Except for the Chair, any two voting Leadership Council members, may through a communication in writing to the EarthCube Office Principal Investigator, move for a vote of no confidence in another voting Leadership Council member. The serious nature of this action requires that its origin(s) be clearly, concisely, and rationally explained. In the event that the matter(s) in question cannot be resolved through dialogue, and a motion of no confidence in any voting member of the Leadership Council becomes an agenda item for discussion, and is duly seconded, the member may be removed from office by an affirmative vote cast by two-thirds of the remaining voting members of the Leadership Council. All Leadership Council members will be given a minimum of five working days' notice of the upcoming agenda item, and given the opportunity to cast their vote *in absentia*. Votes of no confidence will be anonymous.

In the event that the person elected to the position of Chair resigns or becomes, for any reason, unable to perform or discharge the duties of their office, the Leadership Council either will instruct that a new election be held or ask the Nominations Committee to appoint, within 20 working days, a Leadership Council member as *locum tenens* for the remainder of the Chair's term of office. The former option is preferred but not mandated. During the time that there is not a Chair, the Deputy Chair of the Leadership Council will assume these duties in a way that provides continuity for EarthCube.

It is important to ensure that EarthCube Leadership Council (LC) members remain committed and engaged within the positions they hold, in order to promote effective functioning and efficient communication of EC governance. The LC members must attend meetings to maintain governance continuity, to be fully informed about the issues on which they will vote, and to meet their responsibility to contribute to the decisions they are required to make.

If an LC member will be absent from all or part of any meeting, the LC member is expected to contact the LC Chairperson as soon as the need to be absent is known. If an LC member is absent from four consecutive LC meetings or misses half or more of the meetings in a 6-month period without a valid reason, after consultation with the affected member, the LC Chair may ask the LC to consider removing the person from membership on the LC. Once motioned by the Chair



and seconded by another member of the LC, the member shall be removed upon an affirmative vote by two-thirds of the remaining LC membership. This action will necessitate an out-of-cycle election for the position previously held by the removed member.

4.2 Nominations Committee, Standing Committees, and Teams

EarthCube's standing Committees and Teams, and the Council of Data Facilities are governed by individual Charters that delineate specific responsibilities, operations, and functions. The Leadership Council may, as required, dissolve, amalgamate or create standing Committees and Teams, in consultation with the EarthCube Office, based on the principles of:

- Open membership based on volunteer effort, as defined in the standing Committee's charter (with efforts made to foster inclusivity and diversity, including, for example, representation of minorities; early-career scientists; and participation across all of the constituencies of the National Science Foundation Directorate for Geosciences)
- Elected leadership as defined by the standing Committee's charter
- Coordinating with the Leadership Council, and the other elements of EarthCube's governance structure, to advance EarthCube's goals, fulfill its mission and help formulate strategic priorities
- Creating explicit mechanisms for coordination amongst EarthCube's standing Committees and Teams including, but not limited to, forming joint working groups, appointing individuals to act as liaisons, and planning joint workshops or other events
- Forming Working Groups to address issues, opportunities, activities, and deliverables to advance EarthCube goals

4.2.1 Nominations Committee

The Nominations Committee does not select leaders, but helps identify and evaluate candidates for elected office. The mission of the Nominations Committee is to assure a fair, inclusive, and expeditious process for identifying candidates for all EarthCube's elected offices (i.e., the Leadership Council Chair, Leadership Council Members, standing Committee Chairs, and Team Chairs).

The Nominations Committee will have these members: three at-large members elected by the community, who will each serve for two years, plus the EarthCube Office Principal Investigator or their designated representative as a non-voting liaison. Terms are staggered to allow for knowledge continuity on the committee. One member is elected each first year, and two in the second. The at-large members of the Nominations Committee may not stand for or seek elected office in EarthCube's governance structure while they are members of the committee.

A Standing Committee or Team may, on an annual basis, either ask for or receive suggestions for



a Chair from the Nominations Committee, as will the Leadership Council for At-Large members and, in alternate years, with regard to its Chair. The Nominations Committee has sole responsibility for assembling the slate of candidates for at-large positions on the Leadership Council. To preclude dominance by any one faction and to preserve continuity, elections for the representatives from one Standing Committee, one Team, and two at-large members will be held one year, and elections for representatives to the other Standing Committee, the other Team, and two At-Large members will be held in the alternate year.

The EarthCube Office will make an open call for nominations from the community for each elected office at least 30 days before the election. Self-nominations and expressions of interest, supported by the candidate and a member of the EarthCube community, will be accepted prior to the election. Candidate suggestions for the committee must be submitted at least 15 days before an election. The nominees will be asked by the Nominations Committee to submit an NSF-style biographical sketch (two pages, covering professional preparation, selected appointments, selected publications, synergistic activities, collaborations, and other affiliations) and a statement of interest (approximately 250 words).

The Nominations Committee will, early in the nominating process, ensure there are at least two candidates for each elected position to be filled and will generally slate all candidates that have been nominated for vote by the community. Candidates for elected office should have a demonstrated commitment to EarthCube's mission, which should be reflected in their statement of interest and can also be indicated in other ways. The Nominations Committee is encouraged to identify qualified early career candidates. For many elections, candidates are not required to be existing members of the EarthCube Community, but are required to join if successfully elected. Additionally, the Nominations Committee will, in consultation with the National Science Foundation (NSF): ensure that there is appropriately diverse representation across the geoscience fields and disciplines and cyberinfrastructure expertise; verify that the mission of the NSF is not at risk due to any aspect of the leadership selection; and determine that there are no actual or potential conflicts of interest with any nominated or self-selected candidate for an elected position that would disqualify that individual's candidacy. The intent, with respect to the NSF's role in the nomination process, is to preserve the concept of community governance, while simultaneously averting the possibility that the interests of the Foundation are compromised by the composition of the Leadership Council. The final decision on candidate selection will rest with the NSF.

The Nominations Committee has a page on the EarthCube.org website that further details their role and includes a link to a welcome letter for new members.

4.2.2 Science Committee

The standing Science Committee maintains a connection between the academic geoscience and technology communities in EarthCube, and ensures that end user geoscientist needs, requirements, and aspirations are identified and prioritized.



The mission of the Science Committee is to ensure community science goals are realized through the development of cyberinfrastructure that will enhance geoscientists' ability to characterize and understand complex Earth systems by providing enhanced access to data, and new technologies and methods to integrate, analyze, and visualize those data.

The goal of the Science Committee is to serve the working geoscience community by:

- Compiling and expressing the geoscience community's needs, wishes and requirements for EarthCube cyberinfrastructure
- Ensuring an explicit connection exists between the community's science goals and technical function, by defining workflows (the series of activities necessary to realize a specific science goal) and identifying use cases and developing setup challenges to help evaluate cyberinfrastructure components
- Aligning EarthCube-enabled science with community priorities, to revolutionize the ways geoscientists learn, collaborate and advance knowledge of complex Earth systems
- Encouraging, engaging and enabling future generations of geoscientists
- Promoting open science, including through the development and deployment of easy-to-adopt standards, tools, and cyberinfrastructure that can be exploited throughout the entire research lifecycle

The Science Committee Charter is maintained at the following persistent URL:

<http://earthcube.org/document/2015/science-committee-charter>

4.2.3 Technology and Architecture Committee

The standing Technology and Architecture Committee is charged with facilitating the development of the technology that is part of EarthCube.

The mission of the standing Technology and Architecture Committee is to oversee the technology and architecture development of EarthCube to assure that EarthCube infrastructure is community-driven, supports standards for interoperability, and incorporates advanced technologies to become a commonly used capability that supports scientists on their research efforts.

The goal of the standing Technology and Architecture Committee is to facilitate the continuing development of the technology component of EarthCube by:

- Providing stewardship of the architecture concepts and specification documents
- Stewardship includes providing access to documents and change management for those documents
- Provide a forum for synthesis of conceptual design and architectural approaches for EarthCube
- Ensuring coordination between technology development and scientific requirements
- Ensuring the explicit connection between the scientific process and technical function



- Coordinating testbed processes and other mechanisms for development and validation of cyberinfrastructure components for utility in science use cases
- Facilitating alignment of EarthCube funded projects to foster technology integration
- Providing recommendations for accommodation and incorporation of different standards in EarthCube
- Identifying gaps in coverage of needed cyberinfrastructure capabilities, and determining recommendations on how to fill them
- Developing recommendations for monitoring and assessing performance of EarthCube infrastructure in coordination with other EarthCube groups
- Monitoring technical requirements with the goal to ensure EarthCube is meeting end user needs
- Working with other EarthCube Governance organizations as an emissary between software developers, the science community, and infrastructure, as well as educators
- Supporting other activities as deemed relevant by the Technology and Architecture Committee

The Technology and Architecture Committee Charter is maintained at the following persistent URL: <http://earthcube.org/document/2015/tac-charter>

4.2.4 Council of Data Facilities

The Council for Data Facilities is a federation of existing and emerging geoscience data facilities that serve as a foundation for EarthCube and related aspects of the cyberinfrastructure for earth system science.

The mission of the Council of Data Facilities is to serve in a coordinating and facilitating role that includes advancing the following responsibilities and goals:

- Providing a collective voice on behalf of the member data facilities to the NSF and other foundations and associations, as appropriate
- Identifying, endorsing, and promoting standards and best or exemplary practices in the organization and operation of a data facility
- Collaborating with standard-setting bodies with respect to shared feedback on standards for data, models, software sharing interoperability, metadata, and related matters
- Identifying opportunities for and supporting the development and utilization of shared cyberinfrastructure, professional staff development and training, and other related activities
- Fostering innovation through collaborative and interdisciplinary projects
- Increasing understanding and engagement with relevant stakeholders

In advancing this mission, the Council of Data Facilities is committed to working with relevant agencies, professional associations, initiatives, and other complementary efforts. The



Council of Data Facilities is committed to interact constructively with all aspects of EarthCube through communication, coordination, and, where appropriate, integration of activities, initiatives, products, and processes.

The Council of Data Facilities Charter is maintained at the following persistent URL:

<http://earthcube.org/document/2014/council-data-facilities-founding-charter>

4.2.5 Engagement Team

The EarthCube Engagement Team facilitates engagement and communication between individuals within the broader community and the EarthCube program; where ‘engagement’ refers to the process by which individuals build relationships for the purpose of applying a collective EarthCube vision for the benefit of the geoscience community.

The mission of the EarthCube Engagement Team is to proactively reach out to the EarthCube community and beyond to encourage involvement in EarthCube and utilization of the EarthCube cyberinfrastructure, and serve as a conduit for feedback from the EarthCube Community to EarthCube Governance.

The goal of EarthCube’s Engagement Team is to engage individual geoscientists, members of the EarthCube Community and primarily, individuals within the United States by:

- Developing the EarthCube outreach strategy, documenting the strategy in the Engagement Roadmap, and identifying engagement metrics
- Enabling broad dissemination of EarthCube information to the community of individuals across academia, the private sector, and government using a variety of tools (including information to the EarthCube Website, a forum/commons) to enable community discussion
- Actively sharing information about EarthCube resources (data, workflows, software, etc.)
- Implementing branding strategies to enable users to easily identify EarthCube results and outcomes
- Engaging and supporting end users and stakeholders (e.g., professional societies, publishers, government, commercial), including attracting new users to EarthCube (collaborating with the EarthCube Liaison Team where appropriate)
- Encouraging, engaging, and enabling the next generation of EarthCube stakeholder leadership
- Supporting other activities as deemed relevant by the Engagement Team

The Engagement Team Charter is maintained at the following persistent URL:

<http://earthcube.org/document/2015/engagement-team-charter>



4.2.6 Liaison Team

EarthCube's Liaison Team links the activities of the wider EarthCube effort to relevant organizations and initiatives nationally and globally.

The mission of the EarthCube Liaison Team is to act as a liaison to cyberinfrastructure initiatives, collaborations, agencies, associations, private enterprises and other efforts and programs external to the National Science Foundation Directorate for Geosciences' core constituency of academic geoscientists. This may include national and international activities in other scientific and technical domains, as well as the private sector, the education sector, and operational geoscience agencies.

The goal of EarthCube's Liaison Team is to establish partnerships, affiliations, and connections to external organizations and initiatives, managing and maintaining formal and informal relationships (revisiting agreements as needed), by:

- Facilitating standing Committee and Working Group engagement and collaboration with external organizations and initiatives
- Reaching out to potential collaborators
- Supporting other activities as deemed relevant by the Liaison Team and the EarthCube Community

The Liaison Team Charter is maintained at the following persistent URL:

<http://earthcube.org/document/2015/liaison-team-charter>

4.3 Special Interest and Working Groups

Any EarthCube member can create a Special Interest Group focused on any topic relevant to EarthCube. There is no formal review or approval process. Inactive Special Interest Groups can be disbanded by the Leadership Council, in consultation with the EarthCube Office.

Working Groups have a formal approval process and serve as ad hoc organizational units created in response to a pressing issue, opportunity, activity, or deliverable related to moving forward EarthCube goals. Working Groups can emerge from the broad EarthCube Community, from under the auspices of a standing Committee or Team, or by direction of the Leadership Council. They can be initiated by any EarthCube members, provided there is a minimum commitment from at least three participants representing at least three separate institutions. Working Groups may bridge more than one standing Committee or Team, as they serve as important mechanisms to foster collaboration and resolve issues among Committees.

The formation of Special Interest and Working Groups is governed by guidelines maintained at the following persistent URL: <http://earthcube.org/document/2015/working-group-initiation-form>

5 The EarthCube Office



An ongoing EarthCube Office will operate under a cooperative agreement with the National Science Foundation. Under such an agreement, the Principal Investigator for the EarthCube Office is expected to help ensure constructive communication among the Leadership Council and EarthCube's standing Committees and Teams, the at-large community, and all relevant stakeholders. This includes service as a non-voting member of the Leadership Council and as a member of the Nominations Committee.

The EarthCube Office is responsible for assisting the Leadership Council, in support of EarthCube's core organizational units; Special Interest and Working Groups; Members and Partners; and funded projects supported by National Science Foundation awards. The Office may exist in a single physical location, comprise a virtually distributed team, or involve any combination of these two elements.

Critical EarthCube Office functions are anticipated to involve, but not be limited to, responsibility for:

- Managing, developing, enhancing and maintaining EarthCube's online presence through the organization's website in accordance with the Leadership Council's requirements and the community's needs
- Implementing and managing technologies that create, index, store and retrieve EarthCube's records, documents, and other information assets
- Providing logistics and performing administrative tasks in support of work being undertaken by the Leadership Council, standing Committees, Teams, Special Interest and Working Groups, and funded projects supported by National Science Foundation awards
- Managing and tracking EarthCube's operational and outgoing expenses;
- Conducting elections
- Supporting public relations, community engagement and outreach, and science education
- Providing support and logistics to the annual All Hands Meeting
- Providing support to all EarthCube workshop organizing committees

These and other functions may be further defined in the EarthCube Office cooperative agreement with the National Science Foundation. To ensure that organizational objectives are being fulfilled, the Leadership Council, in consultation with the standing Committee and Team Co-Chairs, may, as appropriate, review and provide constructive feedback on Office performance.

6 External Advisory Group

The EarthCube Advisory Group (EAG) is asked to help guide the development of EarthCube by providing external scientific and high-level technical advice to the Leadership Council. The EAG is specifically asked to provide advice on how EarthCube can continue to enable the study of cross-disciplinary Grand Challenge problems in the geosciences. The advice will be provided to



EarthCube Leadership on an ongoing basis through virtual or in-person meetings as agreed to by both the Leadership Council and the EAG. EarthCube Leadership may also request specific feedback from the EAG on other EarthCube-related matters, and the EAG may request feedback from the EarthCube Leadership on scientific, technical, organizational or governance activities.

7 Evaluation

Key to EarthCube's success and sustainability is the capacity to adapt to changing community needs, combined with scientific and technological advances. EarthCube's core organizational units must be advancing EarthCube's mission, and EarthCube's vision in ways that are aligned with the needs and capabilities of the geoscience and cyberinfrastructure communities. Towards this goal, three forms of evaluation are considered.

First, rather than the traditional formative and summative evaluations of the EarthCube office, an ongoing developmental evaluation will be employed to provide feedback on operations and governance. Where appropriate this first form of evaluation will include developmental facilitation. Both process and outcome metrics will be assessed. A second form of evaluation is externally oriented, centered on assessing the alignment of geoscience fields and disciplines, cyberinfrastructure domains of expertise, and other key stakeholders relevant to the initiative. Also employing the developmental approach, the aim of this aspect of the evaluation is broader situational awareness for the initiative. Where appropriate this second form of evaluation will include developmental facilitation. A third form of evaluation involves NSF-initiated program reviews, which are subject to the policies and procedures governing such reviews.

Data generated during these evaluation processes will be made public, with due attention given to standards of confidentiality and with proper treatment of sensitive information. All three forms of evaluation may include, but are not limited to: the collection and analysis of survey data; monitoring website events; tracking use and extracting trends; compiling membership demographics; tracking membership participation in EarthCube events and the presence of EarthCube members at professional meetings and conferences; and identifying the impact of EarthCube activities, including advances in the geosciences and cyberinfrastructure that have been enabled through EarthCube.

8 Conflict Resolution

Conflicts arising under this charter should be resolved in a timely, constructive manner. Towards that end, a two-step process is established.

Step one of the process involves problem-solving dialogue and resolution just between or among the disputing parties. It is recommended that in such a discussion the parties first ensure that they define the issue, discuss the interests or concerns of all involved, and generate multiple options for consideration. It is often the case that resolution is facilitated when there is a well-defined issue, a full listing of interests, and the identification of multiple options



before any party advocates for any particular resolution. No written record is needed for issues arising and resolved at step one of this process, but a record of the issue, interests, and options will be needed for appeal to step two.

Step two is an appeal by any involved party not satisfied with the resolution at step one. This involves a formal indication of a dispute to the Deputy Chair of the Leadership Council, who then is charged with documenting the issue, the parties involved, and their report on the interests and options identified in step one. If there is not a clear record of the issue, the interests and the options, the parties may be asked to generate this before advancing further in the process – since this becomes the formal record of the issue. In step two, the Deputy Chair of the Leadership Council, in consultation with the Chair and the Principle Investigator where appropriate, will identify a third-party knowledgeable about EarthCube and appropriate to serve as a facilitator or mediator working with the parties.

If resolution cannot be reached in Step two, any involved party can appeal to the relevant body charged with a final and binding decision. In some cases, this will be the Leadership Council. In other cases, this will be the National Science Foundation. In some cases, it may be the courts or other administrative agencies. The aim, however, is to maximize the capacity to resolve issues at step one – in a timely manner among the parties directly involved – with additional avenues of appeal available.