Management and Operations of the National Astronomy and Ionosphere Center (NAIC)

PROGRAM SOLICITATION
NSF 10-562

National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Astronomical Sciences

Directorate for Geosciences
Division of Atmospheric and Geospace Sciences

Letter of Intent Due Date(s) ***(required)*** (due by 5 p.m. proposer's local time)*:*

August 02, 2010

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

October 01, 2010

IMPORTANT INFORMATION AND REVISION NOTES

Informational Site Visit

NSF intends to conduct a site visit to Arecibo Observatory, Puerto Rico, for representatives of potential proposing organizations. The visit is expected to take place in June 2010, prior to the submission of Letters of Intent, and will be guided and managed by NSF staff. This will be an opportunity for potential proposers to view the Center's buildings and facilities and to acquire information relevant to the development of a proposal. Attendees will be responsible for their own expenses.

Eligible organizations that are interested in submitting a proposal and wish to send representatives to the site visit should email the Lead Cognizant Program Officer by May 31, 2010.

Please be advised that the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) includes revised guidelines to implement the mentoring provisions of the America COMPETES Act (ACA) (Pub. L. No. 110-69, Aug. 9, 2007.) As specified in the ACA, each proposal that requests funding to support postdoctoral researchers must include a description of the mentoring activities that will be provided for such individuals. Proposals that do not comply with this requirement will be returned without review (see the PAPP Guide Part I: *Grant Proposal Guide* Chapter II for further information about the implementation of this new requirement).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Management and Operations of the National Astronomy and Ionosphere Center (NAIC)

Synopsis of Program:

Proposals are solicited to manage and operate the National Astronomy and Ionosphere Center (NAIC) through cooperative agreement with the National Science Foundation (NSF). NAIC is a center of excellence for multidisciplinary research and education, as enabled by the world-class observational facilities of the Arecibo Observatory (AO). AO's cornerstone research instrument is a 305-meter diameter, fixed, spherical reflector, located on approximately 120 acres of U.S. Government-owned land near Arecibo, Puerto Rico. As the world's largest single-dish radio telescope and most powerful scientific radar system, AO is unique in its sensitivity for passive radio astronomy, solar system radar astronomy and space and atmospheric sciences.

The awardee will work closely with NSF and the scientific community to ensure that NAIC continues to support, sustain and advance frontier science as enabled by AO's unique research capabilities and as promoted through a culture of excellence. In cooperation with NSF and within available resources, NAIC will plan and execute a viable, coherent and inclusive program of research and education, consistent with the objectives and priorities of the scientific community. The awardee will manage facilities and equipment provided by NSF, will provide additional facilities and equipment as necessary to fulfill the proposed programmatic scope, and will provide support and technical personnel to manage AO as a well integrated research and education facility. The Observatory is a multidisciplinary resource; as such, a significant portion of the NAIC research and education program should be carried out in collaboration with its stakeholder communities.

Proposals should describe how the proposing institution(s) will provide observing capabilities and scientific data; conduct a competitive research program and an integrated program of education, training and outreach; maintain instruments, facilities and infrastructure; manage and develop a skilled and diverse workforce; and establish appropriate partnerships with universities, industry, private organizations and the international community to support the NAIC mission.

The successful proposal will be awarded as a cooperative agreement(s) with a duration of five years beginning October 1, 2011.

Cognizant Program Officer(s):

- Dana E. Lehr, Lead Program Officer, telephone: (703) 292-7456, fax: (703) 292-9034, email: dlehr@nsf.gov
- Robert M. Robinson, Program Officer, telephone: (703) 292-8529, fax: (703) 292-9022, email: rmrobins@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1

Anticipated Funding Amount: $41,200,000 over 5-year period, beginning in FY 2012 pending availability of funds.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.
- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposals:**
  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required under this solicitation.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

- **Letter of Intent Due Date(s)** ***(required)*** (due by 5 p.m. proposer's local time)***:***

  August 02, 2010

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

  October 01, 2010

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

The National Science Foundation (NSF) is authorized by the National Science Act of 1950, as amended, to initiate and support basic and applied scientific research and to initiate and support programs to strengthen scientific research potential. To achieve these goals, NSF supports facilities that provide research capabilities in various scientific disciplines. One such facility, the National Astronomy and Ionosphere Center (NAIC), provides world-class instrumentation at the Arecibo Observatory (AO) for research in radio astronomy, planetary radar studies, space and atmospheric sciences.

The mission of NAIC is to:

- Maintain and operate AO to support, sustain and advance frontier science, as enabled by AO's unique research capabilities, for the benefit of the scientific research community;
- Acquire, analyze, archive and disseminate AO data;
- Develop instruments and techniques as necessary to support AO-enabled research in partnership with scientists from related sectors, including academia, industry, government and the international community;
- Develop and maintain a skilled and diverse workforce, as necessary to support the sciences served by AO;
- Provide integrated and effective education and training programs that utilize the knowledge and discoveries made at AO and that strengthen education and public awareness of AO-related science, engineering and technology;
- Develop and sustain appropriate partnerships with universities, industry, private organizations and the international community to enhance AO's scientific productivity and educational impact.

NAIC is currently managed through a cooperative agreement with Cornell University. The National Science Board (NSB) has adopted the principle that NSF awards should be competed to assure the best use of NSF funds for supporting research and education (NSB-08-12). Through this program solicitation, NSF's Division of Astronomical Sciences (AST), in coordination with the Division of Atmospheric and Geospace Sciences (AGS), hereby solicits proposals for the management and operation of NAIC through a cooperative agreement beginning October 1, 2011, and continuing through a five-year award period.

Upon award of the next cooperative agreement, NAIC will be decertified as a Federally Funded Research and Development Center (FFRDC). Responders to this solicitation should not assume any privileges, requirements, or restrictions associated with NAIC's current status as an FFRDC. Decertification of NAIC as an FFRDC reflects a change only to the Federal administrative regulations applicable to NAIC and does not imply any change in NAIC's continuing status as a center of excellence for multidisciplinary scientific research. Standard NSF cooperative agreement terms and conditions, including supplements for managers of Large Facilities, are available at
http://www.nsf.gov/awards/managing/co-op_conditions.jsp?org=NSF.

II. PROGRAM DESCRIPTION

A. **Description of the National Astronomy and Ionosphere Center**

NAIC is a center of excellence for multidisciplinary research and education, as enabled by the world-class observational facilities of the Arecibo Observatory (AO). AO's cornerstone research instrument is a 305-meter diameter, fixed, spherical reflector, located on approximately 120 acres of U.S. Government-owned land in Barrio Esperanza, Arecibo, Puerto Rico, some 10 miles inland from the city of Arecibo. As the world's largest single-dish radio telescope and most powerful scientific radar system, AO is unique in its sensitivity for passive radio astronomy, solar system radar astronomy and for observations of the upper atmosphere and ionosphere.

In the 1990s a major upgrade was conducted in which the telescope was equipped with aberration-correcting Gregorian optics and outfitted with a suite of state-of-the-art, low-noise receivers that cover frequency bands ranging from 400 MHz to 10 GHz. A seven-feed array receiver, the Arecibo L-band Feed Array (ALFA), was commissioned in FY 2006, and is now conducting routine science observations. Operating near 1.4 GHz, ALFA consists of a cluster of seven cooled dual-polarization feeds, a fiber-optical transmission system, and digital back-end signal processors. The installation and commissioning of new, wide-band spectrometers in FY 2008 allows up to three observing programs to be conducted simultaneously on each sky pointing.

Additionally, a 1 MW S-band (2380 MHz) radar system is available for solar system studies, and a 430 MHz incoherent scatter radar serves as the key instrument for space and atmospheric sciences research. Several lidars and other optical instruments are also located on-site. An ionospheric high-frequency heating facility is currently under construction with completion anticipated in September 2010. In FY 2010 NAIC will acquire a 12-meter steerable radio antenna to be used for phase-referenced very long baseline interferometric (VLBI) observations.

At current funding levels, NAIC is staffed at approximately 120 FTE, of which about 100 are funded by NSF. The remaining FTE are supported by other internal or external funding sources or by the Angel Ramos Foundation Visitor Center, which is a self-sustaining unit independently operated by Cornell University. Further details about the facilities and operations managed by NAIC may be found on the NAIC web site at http://www.naic.edu/.

NAIC administers observing time to the astronomy, planetary science, and space and atmospheric sciences communities via competitive observing proposals. Typically, each year NAIC evaluates and allocates observing time for up to 100 proposals and serves 250–400 users. About 75 percent of astronomy users conduct their observing programs remotely via networked control software, while radar and lidar observations typically employ on-site users.

Researchers use AO observational facilities to study such diverse areas as the origin and evolution of magnetic fields, pulsars and fundamental physics, complex and pre-biotic molecules in the interstellar medium, and the formation and evolution of galactic structure, as well as topics in solar system astronomy such as the physical properties of asteroids, planetary surfaces and moons and the post-discovery characterization and orbital refinement of near-Earth asteroids.

The AO incoherent scatter radar is part of an NSF-supported network of radars strategically distributed to observe the transport of radiative energy and charged particles, from their origins at the sun to their deposition in Earth's upper atmosphere. The unique sensitivity of the AO radar system allows it to measure the density, temperature and motion of plasma in Earth's ionosphere with unrivaled time and spatial resolution. It is also the only aeronomy observatory located at tropical mid-latitudes where many important ionospheric processes take place.

In addition to supporting a multidisciplinary user community, NAIC has supported educational and public outreach programs at all levels. These programs include observing support for graduate students, Research Experiences for Undergraduates (REU), Research Experiences for Teachers (RET), web-based public outreach, and the operation and maintenance of the Angel Ramos Foundation Visitor Center. With recent support from the Puerto Rico Department of Education, partnership programs in education and public outreach have reached tens of thousands of K–12 students in public and private school systems in Puerto Rico with enrichment programs in astronomy, space and atmospheric sciences.

In 2005–06, AST conducted a Senior Review of its large facilities with the goal of identifying funds to be transferred from current programs into new initiatives being proposed by the astronomical community. The Senior Review report, available at http://www.nsf.gov/mps/ast/seniorreview/sr_report_mpsac_updated_12-1-06.pdf, praises the past and current achievements of NAIC and recognizes the scientific contributions of the facility and its potential for important discoveries well into the next decade. Nevertheless, in order to free up funds for investment in new capabilities, the report recommends a significant reduction in funding for NAIC and advises that NSF seek a different operations model that can accomplish a substantial fraction of the future NAIC scientific program at a reduced cost to AST. The report also calls for NAIC to seek partners beyond the cooperative agreement with NSF to provide additional financial or personnel contributions to NAIC operations.

Consistent with the AST Senior Review recommendations for NAIC, and with the role of Arecibo Observatory as a critical component of the strategically distributed chain of incoherent scatter radars managed by AGS, NSF is committed to provide support to maintain Arecibo Observatory as a unique resource for astronomical and atmospheric research and education. In response to the Senior Review recommendations, AGS has increased

funding to NAIC in FY 2011 and beyond, including support for general operations.

In FY 2009, AST provided to NAIC $3.1M of American Recovery and Reinvestment Act (ARRA) appropriations to fund deferred maintenance and infrastructure investments that support both the NAIC mission and the Center's long-term viability with reduced operational funding from NSF. To address critical safety needs, environmental compliance and energy efficiency at its facilities, NAIC has utilized these funds to replace outdated air conditioning systems, upgrade fire detection and suppression systems, and perform a structural condition survey of the telescope to inspect and redress potential safety or structural deficiencies. In addition, NAIC will refurbish the S-band planetary radar transmitter, including replacement of its klystron amplifier tubes, and will acquire a 12-meter steerable radio antenna for VLBI as referenced above.

In FY 2010, Cornell finalized an assistance agreement with the Puerto Rico Infrastructure Financing Authority (PRIFA) to receive $3.0 million in support of major infrastructure improvements at AO, including the procurement of new generators to renew the high-power electrical system needed for both the S-band planetary radar system and the new ionospheric high-frequency heating facility. Additional improvements with PRIFA funds will include the painting of the main support cables for the telescope platform.

The National Aeronautics and Space Administration (NASA) FY 2010 appropriation included funding to support research with the NAIC planetary radar through FY 2011. NASA has also submitted budget plans to continue support for planetary radar in FY2012 and beyond. More information regarding NASA's interest in the NAIC planetary radar program can be found at http://science.nasa.gov/researchers/sara/library-and-useful-links/psd-radar/.

Anticipated NSF funding for future NAIC management and operations, as described in Section III, is reduced relative to historical levels. In responding to this solicitation, proposing organizations are encouraged to consider alternative models of operations and governance, changes to programmatic scope, and/or effective partnerships that would leverage NSF support to sustain Arecibo Observatory as a national, multi-user center that is responsive to its stakeholders in the scientific community and in the Commonwealth of Puerto Rico. Within available resources and as consistent with the expectations and criteria identified in this solicitation, the successful proposal will present a compelling, sustainable vision for NAIC that supports an optimal suite of user-driven research and education activities through effective structures for management and operations.

B. **Description of Awardee Responsibilities**

Core Expectations

As the NAIC managing organization, the awardee will work closely with NSF and the scientific research community to ensure that, within available resources, NAIC supports, sustains and advances frontier science as enabled by AO's unique research capabilities and as promoted through a culture of excellence. The awardee will be accountable for fulfilling the NAIC mission through a visionary strategy that capitalizes on the Federal investment to serve the scientific community and to promote world-class research and education. The NAIC program should embody the NSF strategic vision: *advancing discovery, innovation and education beyond the frontiers of current knowledge, and empowering future generations in science and engineering.*

The awardee will be responsible for the overall management and performance of NAIC, including the infrastructure, instrumentation and staff, and for maximizing the benefits to the scientific research community through a strategically planned scope of activities. In discharging these responsibilities, the awardee will ensure that NAIC maintains its character as a multidisciplinary and multi-user facility that primarily enables first-rate visitor research.

In cooperation with NSF and within available resources, NAIC will plan and execute a viable, coherent and inclusive program of research and education, consistent with the objectives and priorities of the scientific community. The awardee will manage facilities and equipment provided by NSF, will provide additional facilities and equipment as necessary to fulfill the proposed programmatic scope, and will develop a diverse and inclusive team of expert support and technical personnel to manage AO as a scientifically competitive research and education facility. The Observatory is a multidisciplinary resource; as such, a significant portion of the NAIC research and education program should be carried out in collaboration with its stakeholder communities.

NSF intends that NAIC should serve as an exemplar of management excellence. The awardee will be expected to meet the highest standards for service and delivery to the scientific community and to demonstrate a proactive and effective approach to performance management. The awardee will ensure that NAIC operates with integrity and transparency, maintaining quality and responsiveness in administration and management.

Specific Duties

The awardee will:

- operate and maintain NAIC buildings and facilities and manage NAIC staff and all activities according to current best practices and in full compliance with all relevant laws and regulations;
- develop and employ effective mechanisms for engaging NAIC's primary stakeholders in order to ensure that NAIC's facilities, services and programs best reflect the evolving needs and priorities of its users;
- provide upgrades, enhancements and new services, as required and within available resources, to ensure community access to state-of-the art facilities, data and support;
- develop and maintain an outstanding scientific, engineering and administrative staff, as necessary to support the NAIC mission within the defined programmatic scope;
- develop and execute a competitive and inclusive science program of user-driven research enabled by AO that reflects the mission, core values and goals articulated in the NSF Strategic Plan and that demonstrably complements the research carried out in the broader scientific disciplines served by NAIC;
- seek and implement strategic partnerships with U.S. universities, Federal, non-Federal and international entities that will enhance the scientific capabilities and support available to NAIC's stakeholder communities;
- actively support the NSF strategic goal of cultivating a world-class, broadly inclusive science and engineering workforce and expanding the scientific literacy of all citizens;
- manage complementary programs supported by sponsors other than NSF as appropriate to supporting the NAIC mission;
- develop and implement appropriate mechanisms for assessing and continuously improving the performance of NAIC.

Management

The awardee will define and implement an organizational structure for NAIC that will provide vision, leadership and service to manage NAIC as a vibrant, community-serving, multidisciplinary facility. Models and approaches for observatory management should be consistent with NSF goals, the needs of the scientific community, and the requirements described in this solicitation. Organizational structures for NAIC management and operations may include the establishment of new institutions, corporations or consortia, provided that the proposing organization(s) provide materials in support of the financial capability of the awardee(s), as required in Section V.B.

The awardee will establish and maintain an effective governance and advisory structure to provide guidance, advice and oversight for all NAIC activities, consistent with its vision, goals, and objectives. The awardee's advisory structure should enable diverse representation from all sectors served by NAIC, and should include mechanisms to assess and advise on all aspects of NAIC including management, research, education and outreach, technical capabilities, project management and human resources.

The awardee will establish processes within a structured framework for planning, review and performance management, including the development and use of appropriate mechanisms to aid both the managing organization and NAIC's stakeholders in assessing performance and identifying areas for improvement.

Operations

The awardee will be responsible for staffing and managing AO to ensure that on-site instruments are able to operate in response to high-priority scientific research conducted by qualified scientists. To this end the awardee will articulate a strategic plan for maintaining a viable, community-driven scope of observatory operations and will employ mechanisms for reviewing and scheduling user access through an open process that demonstrates NSF core values. During the term of the cooperative agreement, the awardee will ensure that the 430-MHz radar is operated for at least 1000 hours per year, and that the lidar and optical instruments are available for operation to meet outside user requests and coordinated observing campaigns.

Additionally, awardees will be responsible for managing radio frequency interference (RFI) and frequency licensing and certifications. The awardee must maintain a vigilant awareness of the radio frequency environment of AO through a program of RFI monitoring, and take all appropriate steps to mitigate to the extent possible the impact of such signals on the observational mission of NAIC. The awardee will cooperate with NSF's efforts to shape national and international regulations and policies for the purpose of maintaining a manageable RFI environment in which to conduct AO science operations.

The awardee will provide a data management plan that describes the acquisition, analysis, archiving and accessibility of all AO data, including the definition of proprietary periods and appropriate cyberinfrastructure and cybersecurity to meet the proposed scope of user community support.

Maintenance

All parts of the AO infrastructure that are necessary to meet the proposed operations activities will be competently maintained to enable the attainment of program objectives and for the safety and security of staff and visitors. The awardee will be responsible for budgeting, scheduling and tracking a comprehensive safety, environmental compliance and maintenance plan for all parts of the AO infrastructure, including plans, as appropriate, to remove or dispose of those parts of the infrastructure deemed unnecessary for the proposed level of operations.

Science

The awardee will define a scientific program plan for NAIC that demonstrates responsiveness to community-based scientific objectives, an innovative vision built on existing and potential capabilities of AO, a well defined scope of high-priority activities, and a credible plan for establishing the necessary resources to support the proposed suite of activities.

As defined by the proposed science program, the awardee will ensure that NAIC has sufficient internal or external expertise to (1) support outside users, (2) help guide decisions relating to current and future instrumentation and observing modes, (3) develop and maintain data acquisition and data processing software, (4) develop and implement policies and strategies for data accessibility and data archiving, and (5) validate data through on-going research programs.

Staffing

The awardee will recruit, retain and develop an expert scientific, engineering, technical and administrative staff, consistent with the NSF strategic goal of cultivating a world-class, broadly inclusive science and engineering workforce. Proposing organizations may consider the retention of, and may propose as Key Personnel, NAIC staff currently employed by Cornell University.

Diversity

NAIC offers significant potential to enable the participation of traditionally underrepresented and underserved communities in the research and education mission of the Observatory and to strengthen the strategic growth of a scientific and technically trained workforce in the region. The awardee will demonstrate leadership in employing best practices for broadening participation in science and engineering at all levels within the Center's activities.

Education and Public Outreach

NAIC currently operates a vigorous program of education, outreach and community development activities that includes collaborative partnerships with undergraduate and minority-serving institutions, student involvement in AO research, a significant base of tourism and public visitors, and resources for K–12 students and teachers in the Commonwealth of Puerto Rico. The awardee will be responsible to develop and implement an innovative, integrated program of research and education that builds on AO's scientific strengths and on its local context to advance NSF strategic goals.

Angel Ramos Foundation Visitor Center

The Angel Ramos Foundation Visitor Center (ARFVC) consists of approximately 10,000 square feet of building and outdoor space, including an observation platform overlooking the radio telescope. The facility houses 3,500 square feet of exhibits, a 100-person auditorium, a science store, and associated meeting and office space. The adjoining Learning Center is a well equipped meeting room that is large enough to hold small workshops. Over 100,000 visitors come to the facility per year, about 25% of them school children. Through a variety of interactive exhibits, audiovisual displays and informative panels, visitors are introduced to basic astronomical and atmospheric

sciences, the operation of the radio telescope, and related science and technology disciplines.

Funding for the construction of the ARFVC was raised by Cornell University mostly from institutions and corporations in Puerto Rico. The Angel Ramos Foundation provided a matching grant of one half the construction cost of the main ARFVC building and funded the construction of the Learning Center. Additional funding was provided by the Government of Puerto Rico, the Municipality of Arecibo, the Puerto Rico Government Tourism Company, several corporations and small foundations, Cornell University alumni, and Observatory friends and staff. The existing exhibit program was funded by the NSF Informal Science Education Program.

Currently, the ARFVC and its programs are independently operated by Cornell University, separate from the cooperative agreement to manage and operate NAIC. Revenue is provided by means of entrance fees and a gift shop, and the AFRVC currently operates on close to a self-sustaining basis. ARFVC staff is currently 8.0 FTEs, including a director, business manager, museum manager, and science educator. Local university students work part time as tour guides.

While an agreement has not yet been negotiated with Cornell University regarding the future management of the Visitor Center, proposers should consider use of the ARFVC in their proposals and should base proposals on the assumption of full access to, and operation of, its facilities.

Partnerships

As appropriate, the awardee will develop partnerships or arrangements with universities/colleges, national laboratories, research museums, private sector research laboratories and observatories, state and local government laboratories, and international collaborations that enable NAIC to attain its strategic goals. Partner institutions invest intellectual or other resources in NAIC activities and work collaboratively with the awardee and NSF to ensure that NAIC fulfills all aspects of its mission. The awardee is responsible for planning, operating, and managing all NAIC activities, including resources provided by partnering organizations.

Non-NSF programs managed by the awardee must be consistent with the NAIC mission and complement and enhance activities funded and approved by NSF.

Open Skies

U.S. national telescope facilities are open to all astronomers regardless of institutional or national affiliation. Observing time is available on a competitive basis to qualified scientists after evaluation of research proposals on the basis of scientific merit, the capability of the instruments to do the work, and the availability of the telescope during the requested time.

Partnership agreements that dedicate blocks of user time in exchange for financial or personnel contributions to NAIC must be consistent with the NAIC mission and justified in their overall benefit to the NAIC user community and the broader scientific research community.

C. **General Information**

For additional information on NAIC, the competition for its management, and NSF practices and policies, please contact a Cognizant Program Officer.

Proposing organizations should review the following documents, which will be made available through an NSF-maintained resource library:

- The current NAIC Annual Project Report and Program Plan,
- The current cooperative agreement for the management and operation of NAIC,
- A detailed list of property for which the current awardee is responsible.
- NSF proposal 0742925, "The Arecibo High Frequency (HF) Facility: An Instrument to Study Ionospheric Physics"

Access to the resource library will be provided to proposing organizations upon request to the Lead Cognizant Program Officer. Any additional materials and information relating to this solicitation, including NSF responses to frequently asked questions, will be made available through the resource library as appropriate.

For purposes of long-term planning of facility lifecycle costs, NSF conducted a study to estimate the costs of decommissioning Arecibo Observatory under several potential scenarios for the end state of the facility. While these estimates are broad-ranging and not directly applicable to continuing operations at AO, the study provides information of potential use to proposers regarding existing facilities and infrastructure at AO. An electronic copy of the decommissioning study will be made available upon request as above.

Proposing organizations may also consider the following studies and planning documents related to NAIC:

- *Defending Planet Earth: Near-Earth Object Surveys and Hazard Mitigation Strategies: Final Report*, The National Academies Press, 2010, http://www.nap.edu/catalog.php?record_id=12842
- *The National Science Foundation's Upper Atmospheric Facilities: Integrating Management, Operations, and Science*, Cornell University, 2008, http://landau.geo.cornell.edu/papers/UAFreport.pdf
- *Frontiers of Astronomy with the World's Largest Radio Telescope,* Cornell University, 2007, http://www.naic.edu/~astro/frontiers

The National Aeronautics and Space Administration (NASA) FY 2010 appropriation included funding to support research with the NAIC planetary radar through FY 2011. NASA has also submitted budget plans to continue support for planetary radar in FY 2012 and beyond. More information regarding NASA's interest in the NAIC planetary radar program can be found at http://science.nasa.gov/researchers/sara/library-and-useful-links/psd-radar/.

Informational Site Visit

NSF intends to conduct a site visit to Arecibo Observatory, Puerto Rico, for representatives of potential proposing organizations. The visit is expected to take place in June 2010, prior to the submission of Letters of Intent, and will be guided and managed by NSF staff. This will be an opportunity for potential proposers to view the Center's buildings and facilities and to acquire information relevant to the development of a proposal. Attendees will be responsible for their own expenses.

Eligible organizations that are interested in submitting a proposal and wish to send representatives to the site visit should email the Lead Cognizant Program Officer by May 31, 2010.

III. AWARD INFORMATION

The award will be a cooperative agreement for a duration of five years, beginning October 1, 2011, with anticipated NSF funding of:

FY 2012	$8,700,000
FY 2013	$8,300,000
FY 2014	$8,000,000
FY 2015	$8,000,000
FY 2016	$8,200,000

Current NSF funding for NAIC management and operations is anticipated at $10.7 million in FY 2010. For the purposes of long-term planning as applicable to writing a proposal, it may be assumed that available NSF funding will ramp down to $8 million in FY 2014–15 and increase thereafter by the rate of inflation. Guidelines for the use of Office of Management and Budget (OMB) inflation factors in planning for operations costs for large facilities may be found at http://www.nsf.gov/mps/ast/naic_2010/guidelines_for_use_of_omb_inflators.pdf. Annual funding increments will be determined on the basis of annual program plans submitted by the awardee to NSF and approved by NSF, subject to the availability of appropriated funds and to the performance of both the awardee and NAIC.

In the event that a new awardee is selected to replace the incumbent, NSF will fund additional, appropriate transition costs through a cooperative support agreement with the new awardee for a transition period of up to four months preceding the five-year cooperative agreement. During this transition period, the new awardee will have appropriate access to NAIC personnel and facilities.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Additional Eligibility Info:

Proposals for the management and operation of NAIC may be submitted by U. S. academic institutions, non-profit organizations, for-profit organizations, or consortia thereof, subject to the qualifications outlined in the Grant Proposal Guide (GPG). Collaborative proposals are acceptable. In collaborative proposals involving multiple organizations, a single organization must be identified as the lead organization and accept overall management responsibility.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent*(required)*:

Each lead proposing organization must submit a Letter of Intent through FastLane. Proposing organizations anticipating the submission of a collaborative proposal should submit only one Letter of Intent from the lead organization.

Letters of Intent will be used by NSF to ensure that the appropriate expertise is available for participation in the review and selection

process, to foresee potential conflicts of interest, and to anticipate special award conditions that may be necessary to accommodate the proposed organizational and governance structure. The Letter of Intent is a statement of a proposer's preliminary plans; the senior personnel, collaborating or partnering organizations, and proposed plans may change between submission of the Letter of Intent and submission of the Full Proposal.

Full Proposals may be submitted only by organizations that have submitted a Letter of Intent by the due date, or that have been identified as a non-lead proposing organization in the Letter of Intent for a collaborative proposal.

Letter of Intent Preparation Instructions:

Complete submission of a Letter of Intent (LOI) requires two separate components that must each be submitted prior to the LOI due date.

FastLane LOI Component—Via Fastlane, submit the following LOI information:

- Project Title
- Synopsis (a brief abstract of maximum 2,500 characters of plain text)
- Point of Contact for NSF Inquiries
- Project PI Information
- Participating Organizations

Submission of this component via FastLane will produce an **LOI ID** that must be included in the PDF LOI Component described below.

PDF LOI Component—Via an email to the Lead Cognizant Program Officer, submit a document of no more than 5 pages in Portable Document Format (PDF) that addresses the following:

- a description of the proposed organizational and governance structure for the NAIC managing organization, including the identification of all collaborating and partnering institutions and their roles in the managing organization;
- a list of proposed Key Personnel, including all PIs, Co-PIs and senior personnel, that identifies full names and affiliations;
- a description of the organization's overall management concept for NAIC;
- a description of the strategic vision for the organization's fulfillment of the NAIC mission;
- a description of the major elements of the organization's transition plan and estimated resource needs for assuming management of NAIC.

The PDF document should include the FastLane **LOI ID** in a running header and must be consistent with NSF Grant Proposal Guide formatting guidelines (NSF GPG Section II.B).

When submitting a Letter of Intent in response to this Program Solicitation please note the conditions outlined below:

- Sponsored Projects Office (SPO) Submission is not required when submitting Letters of Intent
- Other Participating Organizations are allowed
- Submission of multiple Letters of Intent is not allowed

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.4 of the Grant Proposal Guide provides additional information on collaborative proposals. By submission of the proposal, the organization has determined that the proposed activity is administratively manageable. NSF may request a revised proposal, however, if it considers that the project is so complex that it will be too difficult to review or administer as presented.

Due to the complexity of the proposals being submitted, use of FastLane to prepare and submit proposals is strongly encouraged.

The Full Proposal shall conform to the guidelines specified in the NSF Grant Proposal Guide or the NSF Grants.gov Application Guide, except where detailed below.

Proposers are reminded to review procedures under "Proprietary or Privileged Information" in Chapter 1, Section D.3 of the GPG and to mark only such information, including patentable ideas, trade secrets, privileged or confidential commercial or financial information, disclosure of which might harm the proposer, with the appropriate legend such as, "The following is (proprietary or confidential) information that (name of proposing organization) requests not be released to persons outside the Government, except for purposes of review and evaluation." Please also see the section entitled "Privacy Act and Public Burden Statements" below.

The following information is required for the Full Proposal:

PI/Co-I Information - This should follow the standard GPG or NSF Grants.gov Application Guide guidelines.

Cover Sheet - A cover sheet must be submitted and electronically signed by an Authorized Organizational Representative for all full proposals.

Project Summary - This section should provide a one-page summary of the key points of the proposal and should be understandable to a scientifically or technically literate lay reader. This section must follow the standard GPG or NSF Grants.gov Application Guide guidelines. Proposals that do not separately address both NSF merit review criteria within the one-page Project Summary will be returned without review.

Project Description - This section of the Full Proposal should contain the information specified below, in the order listed, and be limited to no more than 50 pages. Where noted below, necessary resource material may be marked separately as an Appendix to the proposal and submitted as **Supplementary Documentation** (see below). Such material is not subject to, or included in, the 50-page limit.

Each proposal should address the proposing organization's scientific, technical, and managerial qualifications to operate NAIC, and should include the following (1-7) in describing how the organization will fulfill the expectations in Sections I and II of this solicitation:

1. ***Overall Management Concept***

   Discuss the organization's proposed approach to the management of NAIC. Describe the role of the managing organization and include a detailed plan for each of the following:

   - Employing effective mechanisms for engaging NAIC's primary stakeholders at all levels to ensure that the Center's facilities, services and programs best reflect the evolving needs and priorities of its stakeholder science communities;
   - Recognizing, estimating, and prioritizing future requirements for the services and facilities at NAIC needed to support the U.S. astronomy and space and atmospheric sciences research communities;
   - Developing an annual program plan for NSF review that will present the objectives, plans and priorities for NAIC, including scientific, technical, managerial, operational and long-range planning;
   - Implementing strategic partnerships with U.S. universities/colleges, Federal, non-Federal and/or international entities that will enhance the overall scientific and support capabilities available to the entire community; and
   - Achieving buy-in of NAIC vision and goals from stakeholders and employees.

   Proposals should describe the nature of any planned collaborations or partnerships and the added value to the observatory and to NSF-supported science. The commitment of collaborating or partnering institutions should be demonstrated through letters of commitment, memoranda of agreement, or other supporting documents (submitted as **Supplementary Documentation**, see below) that indicate the potential roles of partners and their intent to commit to the partnership. Proposals should carefully justify plans for collaborations or partnerships in which multiple institutions take on substantive roles in supporting, managing or operating NAIC.

2. ***Organization and Operations***

   The proposed approach must include a description of each of the following:

   - Organizational structure for NAIC, including appropriate governance and advisory structures. Describe roles, lines of authority, communications and accountability. Describe the oversight of the facility and of each significant program area. Include a clear discussion of how the planned organization will best serve the diverse needs of the science and education activities to be performed by NAIC;
   - Structure of the managing organization. Identify the lead organization and the level of commitment by the lead organization to NAIC support. Identify any major collaborating or partnering institutions or subawardees, clearly noted as such, along with their purpose and responsibilities;
   - Processes for planning, review and performance management within a structured framework, including the development and use of appropriate mechanisms to aid both the managing organization and NAIC's stakeholders in assessing performance and identifying areas for improvement;
   - Providing the space and equipment necessary for effective performance (in coordination with NSF);
   - Providing strategic logistics support for short and long-term science initiatives;
   - Operating and maintaining advanced observational facilities in support of NSF-funded science in full compliance with all applicable laws and regulations;
   - Plans for implementing and monitoring compliance with relevant environmental regulations, risk management, and health and safety;
   - Mechanisms for reviewing and scheduling user access through a process that demonstrates NSF core values;
   - A data management plan that describes the acquisition, analysis, archiving and accessibility of all AO data, including the definition of proprietary periods and adequate cyberinfrastructure, connectivity and cybersecurity to meet the proposed scope of user community support;
   - Plans for managing radio frequency interference (RFI) and frequency licensing and certifications.

3. ***Human Resources, Workforce and Diversity***

   Describe the proposed techniques for recruiting and developing an expert scientific, engineering, technical and administrative staff, consistent with the NSF strategic goal of cultivating a world-class, broadly inclusive science and engineering workforce. Proposing organizations may identify specific individuals for key staffing positions, or present clear plans for seeking and hiring highly qualified individuals for those positions. Include details of the following:

   - Personnel qualifications, to include appropriate expertise in the multiple sciences and professions required to support the NAIC mission and defined programmatic scope;
   - The organization's minimum qualifications for all managerial and supervisory positions should be provided in an Appendix;
   - Key Personnel. Resumes for each Director, Co-Director and each named senior participant should be provided in the Biographical Sketches section of the proposal (see above). Resumes for other personnel who will occupy key positions and be specified in the awarded agreement may be provided in an Appendix. The submission of resumes for additional qualified personnel is encouraged. A signed letter of commitment for a minimum of twelve months should be provided by each named personnel and attached in an Appendix;
   - Strategy for the recruitment and retention of staff from underrepresented groups, including people with disabilities, and the promotion of diversity among the workforce, students and researchers;
   - Policies and practices to be employed in recruiting, developing and evolving an expert scientific, technical and administrative staff with the skill set appropriate for a leading national scientific center;

- The approaches to be taken (for example the relative proportions of permanent and temporary positions, use of visiting scientist posts and student placements) to ensure that NAIC supports a sufficiently stable, expert workforce, while encouraging vigor and innovation through its personnel policies.

4. ***Science and Facility Plan***

   Provide an initial five-year science and facility plan for NAIC, showing how the managing organization would develop and execute a program of services, facilities and research that would support and enhance the astronomy, atmospheric, and related scientific communities. Identify the major research instruments to be made available to the observing community and the primary scientific objectives that drive the programmatic scope of the science and facility plan. Include sufficient detail for reviewers to judge how work will be accomplished and identify the resources to be used.

   Show the relationship between the science and facility plan and the planned organizational structure detailed in section 2 (Organization and Operations). Describe how an NAIC strategic plan will be maintained during the award and how the NAIC science and facility plan will be reviewed and developed in response to ongoing community input and emerging needs. The plan must explain how the management of NAIC is directed toward accomplishing scientific objectives and how the priorities for these objectives will be determined.

   Describe the measures that would be employed to ensure that the NAIC strategic plan and the science and facility plan would optimally continue to meet the needs of NAIC's primary stakeholders. The science and facility plan must include details of how NAIC's ongoing core programs and existing commitments would be sustained and supported during the initial period of the agreement, or managed through strategic changes during the Transition Plan and subsequent award period. Describe the integration of projects within NAIC and the multidisciplinary mix needed to achieve the goals articulated in the science and facility plan, and discuss how any significant barriers would be overcome.

5. ***Education and Outreach Plan***

   Provide a vibrant, innovative and inclusive plan for education and outreach that is closely integrated with the programs and activities described in the science and facility plan. The education and outreach plan should engage and develop the Nation's intellectual talent, including groups underrepresented in the sciences, mathematics and engineering disciplines, in the conduct of NAIC research and education activities.

   Include details of involvement in national, regional and local programs, promotion of diversity in NAIC activities, and the type of opportunities and/or information that will be made available to help ensure equitable access among the scientific research community. The education and outreach plan should articulate clear goals and objectives, as related to the NAIC mission and to the science and facility plan, and identify the resources and expertise necessary to achieve them. The plan should identify mechanisms for formative and summative assessment of educational programs and a strategic vision for attaining the stated goals.

   The current program at NAIC includes support for graduate students, Research Experiences for Undergraduates (REU), Research Experiences for Teachers (RET), Web-based public outreach, and operating and maintaining the Angel Ramos Foundation Visitor Center. The REU and RET programs are funded through a separate NSF award administered under the current cooperative agreement. Proposing organizations may consider the continuation, expansion or reduction of these programs as appropriate to their overall strategic vision for NAIC.

6. ***Transition Plan***

   Proposing organizations may be funded for an additional transition period of up to four months preceding the five-year award. If a new awardee is selected to operate NAIC, the incumbent will cooperate with the successor to the extent necessary to facilitate uninterrupted support for NAIC during the transition period and will provide transfer of legal rights to relevant property and equipment. NSF will support appropriate transition costs incurred by a successor awardee if different from the current awardee.

   Organizations other than the incumbent should provide, as a Supplementary Document not to exceed 10 pages, a detailed transition plan and budget for a transition period of up to four months preceding the new award.

   The transition plan must include, at a minimum:

   - A proposed duration and schedule for the transition period;
   - Estimated resource needs for the transition period;
   - Plans for recruitment, orientation and training;
   - Plans for changes to staffing, facilities or operational modes;
   - A plan to acquire office infrastructure and manage the transfer of assets, inventory, commitments, plans and documents;
   - Identification of assumptions that underlie the transition plan.

7. ***Other Supporting Materials***

   Within the 50-page limit, the proposing organization may provide additional material that it believes will be of assistance in evaluating the proposal but that does not fit into any of the defined sections above.

   References Cited - This section should follow the standard GPG or NSF Grants.gov Application Guide guidelines.

   Biographical Sketches - A resumé, limited to 2 pages, should be provided for each Director, Co-Director and each named senior participant, including department heads and other members of the management team. At a minimum, each resumé should include a description of the individual's education and professional preparation, academic/professional appointments, relevant publications, and synergistic activities as required in GPG Section II.C.2.f.(i)a-d. Other GPG guidelines on order and format do not apply to this section of the proposal.

   Budget - See the instructions in Section B, below.

   Current and Pending Support - This section should follow the standard GPG or NSF Grants.gov Application Guide guidelines.

   Supplementary Documentation - Except as specified in this solicitation (e.g., as required Appendices) and in the NSF Grant Proposal Guide (see GPG Section II.C.2.j), special information and supplementary documentation must be included as part of the Project Description (or as part of the budget justification), if it is relevant to determining the quality of the proposed work. Exceptions include, but are not limited to, documentation of collaborative

arrangements of significance to the proposal through letters of commitment, and the required submission of a Postdoctoral Researcher Mentoring Plan for each proposal that requests funding to support postdoctoral researchers.

Single Copy Documents - Information for the two items below should be entered via the Single Copy Documents section in Fastlane as "Additional Single Copy Documents." This information is required by NSF for determining conflicts of interest in the review process. The information includes the names of Project Personnel and the names of Collaborators and other Individuals with Conflicts. The information should be entered in the Single Copy Document section of FastLane "List of Personnel, Collaborators and Affiliates."

- **Project Personnel**: Provide the full names and affiliations of all Key Personnel, including directors, co-directors, department heads, coordinators, and other members of the management team.
- **Collaborators/Individuals with Conflicts of Interest:** Provide the names of all persons, participants and affiliates with potential conflicts of interest as specified in Section II.C.2.f.(i)e. of the NSF GPG. For each person, enter the first name, last name, and institutional affiliation(s). For each person listed on the project personnel list include all co-authors/editors and collaborators (within the past 48 months); list all graduate advisors and advisees; list individuals who would act as external advisory committee members for NAIC; list all subcontractors who would receive funds through the award.

The following section is **not** required for the Full Proposal:

- **Facilities, Equipment and Other Resources** (all relevant information must be provided in the Project Description and Appendices).

Note that when the proposal is submitted, FastLane or Grants.gov will perform a check for all of the standard sections of a proposal. Proposers will receive warning messages that the Facilities, Equipment and Other Resources section has not been completed or uploaded. Proposers should disregard these messages, since this solicitation does not require submission of this section of the Full Proposal. The check performed by FastLane does not provide assurance that a proposal is fully compliant with the GPG or with the requirements of this solicitation.

B. Budgetary Information

Cost Sharing: Cost sharing is not required under this solicitation.

Budget Preparation Instructions: The full proposal will include a budget for each of the five years proposed. FastLane and Grants.gov will automatically provide a cumulative budget.

The proposal should provide all staffing and budgeting information needed to describe how the organization will fulfill the expectations in Sections I and II of this solicitation. Requested budget amounts for each year of the proposal should reflect the level considered necessary to perform the NSF-funded activities described in the proposal. Proposers should also be cognizant of budget constraints implied by the estimated funding levels provided under Section III.

Enter the anticipated total level of subcontract support on line G5, Subawards, of the FastLane budget or line F5 of the R&R Budget Form in Grants.gov. Full proposals require the inclusion of separate budgets for subcontracts that exceed $250,000 per year. For subcontracts that would be less than $250,000 year, include the costs in the aggregate on the subaward line in the budget.

Proposing organizations other than the incumbent must also provide a detailed budget for a transition period of up to four months preceding the new award. This information must be provided in an Appendix labeled **Transition Budget** and submitted as **Supplementary Documentation**. The budget must be presented in the same style with all applicable budget line items as for the budget for each year of the proposal. If a new awardee is selected to manage and operate NAIC, the incumbent will cooperate with the successor to the extent necessary to facilitate uninterrupted support for NAIC during the transition period and will provide transfer of legal rights to relevant property and equipment. NSF will support appropriate transition costs incurred by a successor awardee if different from the current awardee.

The transition budget should not include non-renewal costs of the incumbent. If a new operator is selected, the incumbent may submit to NSF costs related to the cooperative agreement non-renewal, and these costs will be considered separately.

In an Appendix labeled **Financial Capability**, proposing organizations must provide the following in support of the organization's financial condition and capability:

- A detailed structure and plan for implementing and monitoring business systems and internal controls for financial management and accounting, property standards, equipment standards, procurement standards, reporting and records management.
- Total compensation plan setting forth proposed salaries and fringe benefits for professional employees, with supporting information such as recognized national and regional compensation surveys, and studies of professional, public and private organizations used in establishing the total compensation structure.
- If available, the organization's annual audited financial statements (e.g. Balance Sheet, Profit and loss Statement and Annual Reports) for the three most recent fiscal years and/or other documentation to clearly explain its current financial strength and resource capability.
- A current indirect cost rate proposal and supporting financial data. If the organization's indirect cost rates have been approved by another Federal agency, provide copies of such agreements. NSF does not participate in or contribute to the cost of Independent Research and Development (IR&D) and such costs shall bear a proportionate share of overhead and G&A costs; therefore, IR&D costs should be excluded from indirect expense pools and included in the appropriate distribution bases. If the organization has no IR&D costs, a statement to that effect should be included with the indirect cost rate proposal;
- A current Cost Accounting Standards Board (CASB) Disclosure Statement.

Organizations that have not previously received NSF awards should review the NSF Prospective New Awardee Guide http://www.nsf.gov/pubs/2005/nsf0529/guide05_29.pdf for additional guidance in preparing their budget submission.

Other Budgetary Limitations:

Proposing organizations may include a fixed annual management fee in their proposed budget. The management fee must be clearly identified as such.

C. Due Dates

- **Letter of Intent Due Date(s)** ***(required)*** (due by 5 p.m. proposer's local time)***:***

  August 02, 2010

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

  October 01, 2010

Informational Site Visit

NSF intends to conduct a site visit to Arecibo Observatory, Puerto Rico, for representatives of potential proposing organizations. The visit is expected to take place in June 2010, prior to the submission of Letters of Intent, and will be guided and managed by NSF staff. This will be an opportunity for potential proposers to view the Center's buildings and facilities and to acquire information relevant to the development of a proposal. Attendees will be responsible for their own expenses.

Eligible organizations that are interested in submitting a proposal and wish to send representatives to the site visit should email the Lead Cognizant Program Officer by May 31, 2010.

D. FastLane/Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

  Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are available at: https://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

  Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: https://www.fastlane.nsf.gov/fastlane.jsp.

- **For Proposals Submitted Via Grants.gov:**

  Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: http://www.grants.gov/CustomerSupport. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

  Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program where they will be reviewed if they meet NSF proposal preparation requirements. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

What is the intellectual merit of the proposed activity?
How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the

reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?
How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf.

Mentoring activities provided to postdoctoral researchers supported on the project, as described in a one-page supplementary document, will be evaluated under the Broader Impacts criterion.

NSF staff also will give careful consideration to the following in making funding decisions:

Integration of Research and Education
One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities
Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria:

For this solicitation, the following additional and specific review criteria will be used in the evaluation of proposals.

For **Full Proposals**, reviewers will be asked to identify and analyze the following:

- Strengths and weaknesses of the proposed approach;
- Opportunities and potential benefits that the proposed approach presents for NAIC;
- Risks to the future success of NAIC in the proposer's approach that are not satisfactorily addressed;
- Cost reasonableness and cost efficiency of the proposed approach.

Reviewers will consider the following specific criteria in each of the areas below, as well as the integration of these areas into a coherent and viable management and operations plan for NAIC.

1. ***Overall Management Concept***

   Reviewers will consider:

   - the quality, relevance and extent of the proposing organization's strategic vision for fulfillment of the NAIC mission;
   - the viability of the organization's management strategy to maintain and develop NAIC's position as a world-class, multi-user facility;
   - the role of the managing organization in relation to NAIC, NSF and the Center's stakeholders;
   - the relevance of proposed methods to reinforce the NAIC mission and programmatic scope with primary stakeholders;
   - the extent and quality of the plan to engage the multidisciplinary community served by NAIC, with clear lines of communication, understanding of community needs and issues, and the means to engage the community in planning, research, education and development of relevant instruments and technology;
   - the suitability, credibility and risks of proposed partnerships and their added value to NAIC and to NSF-supported science, education and outreach;
   - the applicability of proposed methodologies for identifying, estimating and prioritizing future requirements, including demonstrated awareness of potential directions of the relevant sciences and responsiveness to stated community needs and ambitions.

2. ***Organization and Operations***

   Reviewers will consider:

   - the feasibility, relevance to NAIC stakeholders, and potential for success of the proposed approach, including organizational structure, resource integration, provision of space and equipment, logistics support for scientific initiatives, data management and information technology, management of radio frequency interference, and maintenance, safety and security of systems and facilities;
   - the sufficiency, and potential for achieving effective results, of the proposed methodology for assessing and improving NAIC performance.

3. ***Human Resources, Workforce and Diversity***

   Reviewers will consider:

   - the adequacy and appropriateness of the organization's named personnel and proposed labor categories for fulfilling the NAIC mission;
   - the suitability and potential for success of the proposed methods for recruitment and retention, promoting diversity at all levels in the organization, invigorating and training the workforce, and infusing new ideas and approaches in NAIC programs and administration.

4. ***Science and Facility Plan***

Reviewers will consider:

- the degree to which the proposed scientific programs, priorities and technical capabilities reflect the needs of NAIC stakeholder communities and utilize the unique research capabilities of AO;
- the scope, feasibility and innovation of the planned activities,
- the ability to respond to and prioritize evolving scientific and engineering needs and opportunities in the community,
- the extent to which the plan targets critical goals relevant to the NAIC strategic vision, identifies challenging scientific and technical questions or barriers to be overcome, proposes high-quality research projects to address the stated goals, identifies performance measures for the planning and delivery process, and reflects appropriate and effective use of resources where possible.

5. ***Education and Outreach Plan***

   Reviewers will consider:

   - the extent and quality of the proposed education and outreach programs, their potential for success, and the resulting impacts on identified target audiences;
   - the relevance of the proposed plan to engage and develop intellectual talent, including groups underrepresented in the sciences, mathematics and engineering, in the conduct of NAIC research, education and operational support activities;
   - the effectiveness of the plan to engage local, regional and National public audiences in NAIC activities and the extent to which the knowledge and discoveries made at AO will be used to strengthen public awareness of NAIC-related science;
   - the suitability of proposed mechanisms to ensure broad and equitable access to NAIC among the relevant scientific research communities;
   - the adequacy of the proposed plan to assess and improve NAIC education and outreach activities as based on defined goals and objectives.

6. ***Transition Plan***

   The Transition Plan will be evaluated to assess the proposing organization's ability to assume full responsibility for the management and operation of NAIC upon completion of the transition period without degradation of high-quality services, research efforts and facilities.

7. ***Other Supporting Materials***

   Materials provided in this section will be considered by reviewers to help form an overall impression of the proposal.

   Budget and Financial Review

   NSF will assess the organization's budgetary and financial information as requested under Section V.B of this solicitation. The organization will be assessed for the adequacy of its internal accounting and operational controls (including human resources, property control and procurement systems), potential for attracting qualified employees, and the adequacy of its financial resources for managing NAIC. The proposed fee (if any) and proposed direct and indirect rates will be evaluated for reasonableness and potential impact on funding available for science and related activities. The impact of rates and any proposed fee will be evaluated relative to other organizations' proposed rates and fees.

   The business evaluation will be used to help inform the Program Officer's recommendation for award.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, or Reverse Site Review.

In addition to individual reviews of each proposal by outside experts, a panel of reviewers will be convened to assess the relative merits of all proposals submitted for consideration by the NSF Program Officer. To further clarify the panel's understanding of the proposal(s), the evaluation may include one or more reverse site visits to be held at the NSF offices in Arlington, Virginia. Based on their evaluation, the panel will be asked to formulate a recommendation to either support or decline each proposal.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Acquisition and Cooperative Support for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants and Agreements Officer in the Division of Acquisition and Cooperative Support. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); * or Research Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

Special Award Conditions:

The award associated with this solicitation will be a cooperative agreement, not a standard grant or a contract. Individual cooperative support agreements will be issued under the terms and conditions of the overall agreement. Any special requirements not stated herein will be negotiated at time of award.

Programmatic Terms and Conditions: The cooperative agreement(s) awarded as a result of this competition will be administered by the NSF Division of Astronomical Sciences in cooperation with the Division of Atmospheric and Geospace Sciences. The following measures will be employed in providing oversight for the cooperative agreement:

- Review of annual reports, program plans and performance metrics;
- Review of research and education activities and management performance approximately midway through the five-year award;
- Site visits annually, or as necessary.

Financial and Administrative Terms and Conditions: Costs to be reimbursed in accordance with 2 CFR 220 -- Cost Principles for Educational Institutions, 2 CFR 230 -- Cost Principles for Nonprofit Organizations, or Federal Acquisition Regulation (FAR) Part 31, as applicable.

The awardee will be required to submit to a Business Systems Review at least once during the five-year award period.

Standard cooperative agreement terms and conditions, including supplements for managers of Large Facilities, are available at: http://www.nsf.gov/awards/managing/co-op_conditions.jsp?org=NSF. Specific terms and conditions will be negotiated at time of award.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

The managing organization will be required to provide annual program plans, including long-range plans, and quarterly reports for all programs at NAIC, along with other reports as may be required by NSF. In addition, as a requirement under the Government Performance and Results Act (GPRA), NSF is required to report on the Federal Performance Goals for Facilities. Any and all facilities with an annual budget exceeding a specific threshold must report on their operations activities; and any and all construction/upgrade projects that exceed a total project cost of a specific threshold must report on their construction/upgrade activities. Therefore, the awardee will be required, upon request of the cognizant NSF program officer, to submit annual reports related to the GPRA performance goals. This may include the collection and submission of specific data related to the NSF GPRA requirements.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Dana E. Lehr, Lead Program Officer, telephone: (703) 292-7456, fax: (703) 292-9034, email: dlehr@nsf.gov
- Robert M. Robinson, Program Officer, telephone: (703) 292-8529, fax: (703) 292-9022, email: rmrobins@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, National Science Foundation Update is a free e-mail subscription service designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the NSF web site.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at http://www.grants.gov.

Sources of Additional Information:

National Science Foundation Strategic Plan:

http://nsf.gov/pubs/2006/nsf0648/NSF-06-48.pdf

National Science Foundation, Astronomical Sciences:

http://www.nsf.gov/div/index.jsp?div=AST

National Science Foundation, Mathematical and Physical Sciences:

http://www.nsf.gov/dir/index.jsp?org=MPS

National Science Foundation, Atmospheric and Geospace Sciences:

http://nsf.gov/div/index.jsp?div=AGS

National Science Foundation, Geosciences:

http://www.nsf.gov/dir/index.jsp?org=GEO

National Astronomy and Ionosphere Center:

http://www.naic.edu/

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable

persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at http://www.nsf.gov

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

  Send an e-mail to: nsfpubs@nsf.gov

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records, " 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
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Division of Administrative Services
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