



NASA Call for Proposals FY 2011

Introduction

NASA has released the Cooperative Agreement Notice (CAN) for the 2011 EPSCoR Competition. Oklahoma is eligible to submit up to two proposals with the possibility of having two awards. It is anticipated that 6-10 awards of up to \$750,000 each to be expended over a three-year period of performance may be made under this Notice pursuant to the authority of the *NASA Grant and Cooperative Agreement Handbook*. Within this competition, twenty eight jurisdictions are eligible to submit up to two proposals. **Jurisdictions are strongly encouraged to submit proposals that demonstrate partnerships or cooperative arrangements among academia, government agencies, business and industry, private research foundations, jurisdiction agencies, and local agencies. Partnerships with minority-serving institutions are strongly encouraged. Inclusion of faculty and students from underrepresented/underserved groups is also strongly encouraged.**

NASA Research Areas of Interest

NASA EPSCoR research priorities are defined by the Mission Directorates (Aeronautics Research, Exploration Systems, Science, and Space Operations) and the Office of the Chief Technologist. Each Mission Directorate and the Office of the Chief Technologist covers a major area of the Agency's research and technology development efforts.

Information about current NASA research solicitations can be found on NSPIRES at <http://nspires.nasaprs.com> (select "Solicitations" and then "Open Solicitations").

Research priorities for each of the Mission Directorates and the Office of the Chief Technologist are summarized below and can be found at the following locations:

Aeronautics Research Mission Directorate (ARMD)

Researchers responding to the ARMD should propose research that is aligned with one or more of the ARMD programs. Proposers are directed to the following:

ARMD Programs: <http://www.aeronautics.nasa.gov/programs.htm>

Research Opportunities in Aeronautics (ROA) <http://nspires.nasaprs.com> (select "Solicitations" and then "Open Solicitations")

Exploration Systems Mission Directorate (ESMD)

General priorities of ESMD can be found at <http://www.nasa.gov/directorates/esmd> .

- **Human Research**

The Human Research Program (HRP) investigates and mitigates the highest risks to astronaut health and performance in exploration missions. The goal of the HRP is to provide human health and performance countermeasures, knowledge, technologies, and tools to enable safe, reliable, and productive human space exploration, and to ensure safe and productive human spaceflight. The scope of these goals includes both the successful completion of exploration missions and the preservation of astronaut health over the life of the astronaut.

Two foundational documents of the HRP are the Program Requirements Document (PRD) and the Integrated Research Plan (IRP). The PRD lists the crew health and performance risks that the HRP must understand and mitigate. The IRP describes the plan to understand and reduce the risks. The PRD (<http://humanresearch.jsc.nasa.gov/elements/smo/nra.asp>) describes the high-level requirements that the Program must meet.

The IRP (<http://humanresearch.jsc.nasa.gov/elements/smo/nra.asp>) describes the Program's research activities that are intended to address the needs of human space exploration and serve HRP customers. The IRP illustrates the program's research plan through the timescale of early lunar missions of extended duration. The Human Research Roadmap (<http://humanresearchroadmap.nasa.gov>) is a web-based version of the IRP document that allows users to search HRP risks, gaps, and tasks.

This EPSCoR solicitation solicits proposals in the following three areas:

1. Team Autonomy in the context of Long duration Space missions;
2. Maintaining optimal performance by reducing the risk associated with Reduced Muscle Mass, Strength and Endurance; and
3. Research on Individual Radiation Sensitivity

More details and background information on Topics 1 and 2 can be found by referring to the research solicitation in this area:

<http://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=241609/NNJ10ZSA003N%20NRA%208-5-2010.pdf>

For more background information and details on Topic 3, please refer to the solicitation:

<https://utworks.tennessee.edu/research/pdt/Announce/NNJ10ZSA001N.pdf> .

- **Engineering Research**

- Spacecraft: Guidance, navigation and control; thermal; electrical; structures; software; avionics; displays; high speed re-entry; modeling; power systems; interoperability/commonality; advanced spacecraft materials; crew/vehicle health monitoring; life support.

- Propulsion: Propulsion methods that will utilize materials found on the moon or Mars, “green” propellants, on-orbit propellant storage, motors, testing, fuels, manufacturing, soft landing, throttle-able propellants, high performance, and descent.
- Robotic Systems for Precursor Near Earth Asteroid (NEA) Missions: Navigation and proximity operations systems; hazard detection; techniques for interacting and anchoring with Near Earth Asteroids; methods of remote and interactive characterization of Near Earth Asteroid (NEA) environments, composition and structural properties; robotics (specifically environmental scouting prior to human arrival and later to assist astronauts with NEA exploration); environmental analysis; radiation protection; spacecraft autonomy, enhanced methods of NEA characterization from earth-based observation.
- Robotic Systems for Lunar Precursor Missions: Precision landing and hazard avoidance hardware and software; high-bandwidth communication; in-situ resource utilization (ISRU) and prospecting; navigation systems; robotics (specifically environmental scouting prior to human arrival, and to assist astronaut with surface exploration); environmental analysis, radiation protection.
- Data and Visualization Systems for Exploration: Area focus on turning precursor mission data into meaningful engineering knowledge for system design and mission planning of lunar surface and NEAs. Visualization and data display; interactive data manipulation and sharing; mapping and data layering including coordinate transformations for irregular shaped NEAs; modeling of lighting and thermal environments; simulation of environmental interactions including proximity operations in irregular micro-G gravity fields and physical stability of weakly bound NEAs.

Science Mission Directorate (SMD)

Detailed information on SMD research priorities is available at the following URLs:

- NASA Science Plan 2010: <http://science.hq.nasa.gov/strategy/> and <http://science.nasa.gov/media/medialibrary/2010/08/10/2010SciencePlan.pdf> .
- NASA's Plan for a Climate-Centric Architecture for Earth Observations and Applications from Space: http://science.nasa.gov/media/medialibrary/2010/07/01/Climate_Architecture_Final.pdf .
- Research Opportunities in Space and Earth Science (ROSES): <http://nspires.nasaprs.com/external/> . Select “Solicitations”, “Open Solicitations”, and then “Research Opportunities in Space and Earth Sciences (ROSES) – 2010”.
- In addition, proposers can visit the following URL: <http://nasascience.nasa.gov/big-questions> which summarizes the research questions across all four SMD divisions and links to their respective 2007-2016 science strategy.

Space Operations Mission Directorate (SOMD)

The primary research and technology development areas in SOMD support launch vehicles, space communications, and the International Space Station. Examples of research and technology development areas (and the associated lead NASA Center) with great potential include:

- Processing and Operations
 - Crew Health and Safety Including Medical Operations (Johnson Space Center (JSC))
 - In-helmet Speech Audio Systems and Technologies (Glenn Research Center (GRC))
 - Vehicle Integration and Ground Processing (Kennedy Space Center (KSC))
 - Mission Operations (Ames Research Center (ARC))
 - Portable Life Support Systems (JSC)
 - Pressure Garments and Gloves (JSC)
 - Air Revitalization Technologies (ARC)
 - In-Space Waste Processing Technologies (JSC)
 - Cryogenic Fluids Management Systems (GRC)
- Space Communications and Navigation
 - Coding, Modulation, and Compression (Goddard Spaceflight Center (GSFC))
 - Precision Spacecraft and Lunar/Planetary Surface Navigation and Tracking (GSFC)
 - Communication for Space-Based Range (GSFC)
 - Antenna Technology (Glenn Research Center (GRC))
 - Reconfigurable/Reprogrammable Communication Systems (GRC)
 - Miniaturized Digital EVA Radio (Johnson Space Center (JSC))
 - Transformational Communications Technology (GRC)
 - Long Range Optical Telecommunications (Jet Propulsion Laboratory (JPL))
 - Long Range Space RF Telecommunications (JPL)
 - Surface Networks and Orbit Access Links (GRC)
 - Software for Space Communications Infrastructure Operations (JPL)

- TDRS transponders for launch vehicle applications that support space communication and launch services (GRC)
- Space Transportation
 - Optical Tracking and Image Analysis (KSC)
 - Space Transportation Propulsion System and Test Facility Requirements and Instrumentation (Stennis Space Center (SSC))
 - Automated Collection and Transfer of Launch Range Surveillance/Intrusion Data (KSC)
 - Technology tools to assess secondary payload capability with launch vehicles (KSC)
 - Spacecraft Charging/Plasma Interactions (Environment definition & arcing mitigation) (Marshall Space Flight Center (MSFC))

Office of the Chief Technologist (OCT)

NASA's Chief Technologist serves as the NASA Administrator's principal advisor and advocate on matters concerning agency-wide technology policy and programs. The Office of the Chief Technologist (OCT) is responsible for direct management of NASA's Space Technology programs and for coordination and tracking of all technology investments across the agency. Space Technology is a new budget line in the President's FY11 Budget Request for NASA. Space Technology consists of 10 technology development and innovation programs that are broadly applicable to the Agency's aeronautics, science and exploration enterprises (http://www.nasa.gov/pdf/485335main_OCT_Overview_slides_TAGGED.pdf). These 10 programs are managed by the OCT through the formation of 3 Divisions:

- The Early-Stage Innovation Division
 - NASA Innovative Advanced Concepts (NIAC)
 - Space Technology Research Grants
 - Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR)
 - Centennial Challenges
 - Center Innovation Fund
- Game Changing Technology Division
 - Innovative ideas enabling new capabilities or radically altering our current approaches to space systems

- Franklin Small Satellite Subsystem Technology Program
- Crosscutting Capability Demonstrations Division
 - Technology Demonstration Missions Program
 - Edison Small Satellite Missions Program
 - Flight Opportunities Program

Researchers responding to the Office of the Chief Technologist should propose research that is aligned with one or more of the OCT programs. Proposers are directed to the following URL: <http://www.nasa.gov/offices/oct/home/index.html> .

Research Student Support

The use of NASA EPSCoR funds for support of research students is allowable, and must be detailed in the Budget Justification and described in the narrative and evaluation sections of the proposal (see Section VIII. Proposal Evaluation Criteria and Selection Process).

Match

NASA EPSCoR now requires cost sharing at a level of at least 50%. This means there must be \$1.00 of match for every \$2.00 of NASA funds. **The Oklahoma State Regents for Higher Education Matching Fund will provide \$50,000 per year in match for each funded project. The remaining matching funds will be the responsibility of the participating institutions.**

PIs should work with their campus research administration offices in preparing a preliminary budget for their preproposals and indicate how the campus portion of the match would be funded (i.e., from department, college, and/or central funds). PIs may also seek cost matching from other sources. Possible sources for campus cost match include the 1) unrecovered F&A (indirect costs) on the State Regents' match, 2) direct dollar match from the campuses and 3) indirect costs on the campus match. **Please direct all questions regarding matching funds to your campus Office of Research Administration rather than to the EPSCoR Office.**

PROJECT SELECTION

The Oklahoma EPSCoR Committee review panel will select the two projects to be submitted to NASA. Project selection will be based on review of preproposals using the following criteria as outlined by NASA on pages 21-24 of the CAN: Intrinsic Merit, NASA Alignment and Partnerships, Management and Evaluation, and Budget Justification: Narrative and Details.

PREPROPOSALS

The preproposals must include:

1. PI name(s), full contact information including email address, and affiliation(s).
2. Project Title.
3. Project Description (5 page maximum). Literature references may be provided if necessary and they do not count toward this page limitation.
4. Preliminary Budget (1 page) Include both NASA and matching funds in the budget request and include F&A on the NASA funds. Please note that 15% of the direct cost budget must be allocated for administrative costs incurred by the NASA EPSCoR Office. The NASA EPSCoR office carries out longitudinal tracking of the students involved in research projects and is the liaison between the researchers and NASA for the annual reports, budgets, and on-going alignment with NASA Mission Directorates.
5. Name of the NASA Directorate and program the proposal is directed towards.
6. List of past, current and pending NASA research support.
7. Brief Vitae for PI (up to 2 pages).
8. Description (up to 2 pages) of how well the proposal addresses current NASA research needs and the prospects for future non-EPSCoR NASA research funding.

TIMETABLE for FY 2011

- First – Carefully, read the NASA CAN. If you receive this via email, it should be attached. If you access this via the Oklahoma EPSCoR website, it will be posted there, along with this notice.
- **Wednesday, January 12, 2011, 5:00 p.m.** - Preproposals (**20 hard copies**) are due in the OU NASA EPSCoR office (College of Atmospheric and Geographic Sciences, 1623 Cross Center Drive, Norman, OK 73069. Phone: 405-325-6559).
- **Friday, January 28, 2011** (or earlier, if possible) - PI's will be notified as to which preproposals were selected, and given final instructions.
- **Friday, January 28, 2011: Notice of Intent to Submit via NSPIRES due to NASA**
- **Friday, February 25, 2011, 5:00 p.m.** - Completed proposals (original and 15 copies), with all relevant signatures and certifications etc. are due to the NASA EPSCoR office at OU Norman. They must be mailed to NASA on March 10 to arrive by the March 11 deadline.

For more information or discussion of specific project ideas, please contact NASA EPSCoR Director, Dr. Victoria Snowden at (405) 325-6559 or yduca@ou.edu .
