

HIAPER Aircraft Instrumentation (HAI)

Program Solicitation

NSF 04-517



National Science Foundation

Directorate for Geosciences

Division of Atmospheric Sciences

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

February 18, 2004

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

HIAPER Aircraft Instrumentation (HAI)

Synopsis of Program:

The HIAPER (High-performance Instrumented Airborne Platform for Environmental Research) project consists of a highly modified Gulfstream V (GV) aircraft capable of high altitude, long duration, large payload capability and high speed flight. The HIAPER aircraft is intended to fill an important niche in the national fleet of scientific airborne platforms and will readily and regularly allow higher altitude and longer duration science payload missions than those generally available to the academic research community.

An integral part of the HIAPER project is development and flight configuration of advanced research instrumentation for the HIAPER aircraft. This solicitation is aimed at acquisition and development of innovative instrumentation, measurement and sensing systems and new observational approaches (e.g. using emerging technologies, telescience) to complement the platform's versatility and flight capabilities. Such instrumentation will accommodate scientific investigations important to national and international studies of atmospheric sciences, climate, hazardous weather, and earth systems science supporting societal needs. In order to achieve its specified flight and performance characteristics, HIAPER is not a large airframe. Accordingly, it is desirable that its new instrumentation systems and payload modules necessarily be of lower volume and mass, consume less power, require less overt operator intervention and generally be more autonomous than comparable instrumentation used in current research aircraft platforms. Consideration of these design characteristics is encouraged for all airborne platforms and is consistent with National Research Council recognized needs (NRC - Atmospheric Sciences: Entering the 21st Century, NAS, 1998) for the atmospheric sciences community to devote increased effort to instrument development.

This solicitation covers instrumentation acquisition or research and development of instrumentation for the HIAPER platform. It is a key element of the HIAPER project. Instrumentation acquired and developed

under its funding is intended to become part of the community's core of pool and shared instrumentation at the National Center for Atmospheric Research (NCAR), the NSF facility that maintains and operates the HIAPER aircraft on behalf of the atmospheric and related sciences community.

Cognizant Program Officer(s):

- James R. Huning, Facilities Coordinator, Directorate for Geosciences, Division of Atmospheric Sciences, 775 S, telephone: (703) 292-8521, email: jhuning@nsf.gov
- Clifford A. Jacobs, Section Head, Directorate for Geosciences, Division of Atmospheric Sciences, 775 S, telephone: (703) 292-8521, fax: (703) 292-9022, email: cjacobs@nsf.gov
- Peter J. Milne, Program Coordinator, Directorate for Geosciences, Division of Atmospheric Sciences, 775 S, telephone: (703)292-8521, fax: (703) 292-9022, email: pmilne@nsf.gov

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

- 47.050 --- Geosciences

Eligibility Information

- **Organization Limit:**

Proposals may be submitted by U.S. institutions of higher education and independent non-profit research organizations including NSF-supported Federally Funded Research and Development Centers (FFRDCs) (e.g. NCAR). A consortium may also submit a proposal through a U.S. institution of higher education for instrumentation to be developed at a non NSF-supported FFRDC. Small businesses are eligible for instrument development support as subawards through submitting U.S. organizations.

- **PI Eligibility Limit:**

By prior agreement, staff from the NCAR Atmospheric Technology Division (ATD), including the Research Aviation Facility (RAF), are not eligible as PIs to this solicitation.

- **Limit on Number of Proposals:** 5. An organization may submit up to five proposals as the lead organization with the following restriction. An organization may submit no more than 3 proposals for instrument acquisition. Any additional proposals must be for instrument research and development. Investigators at a non-lead institution may be included as a member of a research team put together on a proposal by a lead organization without it counting toward the total number of proposals that the non-lead organization may submit.

Award Information

- **Anticipated Type of Award:** Other - Subawards will be made under an existing Cooperative Agreement.
- **Estimated Number of Awards:** 7 to 15
- **Anticipated Funding Amount:** \$12,500,000 subject to the availability of funds.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** This solicitation contains information that deviates from the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

B. Budgetary Information

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

C. Due Dates

- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):
February 18, 2004

Proposal Review Information

- **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.

TABLE OF CONTENTS

Summary of Program Requirements

- I. **Introduction**
- II. **Program Description**
- III. **Eligibility Information**
- IV. **Award Information**
- V. **Proposal Preparation and Submission Instructions**
 - A. Proposal Preparation Instructions
 - B. Budgetary Information
 - C. Due Dates
 - D. FastLane Requirements
- VI. **Proposal Review Information**
 - A. NSF Proposal Review Process
 - B. Review Protocol and Associated Customer Service Standard

VII. Award Administration Information

- A. Notification of the Award
- B. Award Conditions
- C. Reporting Requirements

VIII. Contacts for Additional Information

IX. Other Programs of Interest

I. INTRODUCTION

The High Performance Instrumented Airborne Platform for Environmental Research (HIAPER), including provision for its instrumentation and research equipment, will be an important addition to the national airborne sampling capabilities for the atmospheric and related science communities. The combination of altitude, range, and payload of the HIAPER platform are unique for a jet-powered pressurized aircraft, and will provide new capabilities for sampling wide regions of the Earth not previously regularly accessible to instrumented aircraft.

The design, modification and installation of airborne research equipment and instrumentation is a demanding and time consuming aspect of atmospheric research. Newly designed, commercially purchased and experimental equipment packages must of necessity be evaluated for their structural integrity, conformity to design and installation specifications appropriate to the airborne platform. Several safety issues may also apply.

Common platform specifications for load, construction materials, installation power, signal conditioning needs for data acquisition and storage systems, together with data systems software must also be considered. Guidelines to be followed for the GV HIAPER aircraft have been issued and may be consulted in the NSF [GV Investigator's Handbook](#). It is expected that investigators will make every effort to conform to the system specifications and infrastructure requirements applicable to the HIAPER aircraft, as laid out in the Investigators Handbook. Several of these requirements are specified by relevant Federal Aviation Authority (FAA) regulations. Also, additional guidelines may be required for investigator equipment packages that utilize components or subsystems including but not limited to: i) lasers, ii) RF sources, iii) cryogen use, iv) compressed gases, iv) toxic or combustible gases, v) pressurized vessels and systems, vi) batteries, viii) motors and pumps, ix) heaters, x) power distribution or conditioning equipment, xi) radioactive sources, xii) flammable or potentially noxious materials.

II. PROGRAM DESCRIPTION

The overall HIAPER project consists of 4 stages: (1) acquisition of an airframe that meets specified performance requirements; (2) modification of the basic airframe to accept specialized instrumentation; (3) systems integration and research infrastructure, which includes data display and communications systems together with the necessary project management, and; (4) outfitting of the platform with a complement of research instrumentation through a combination of acquisition and development of investigator equipment packages. This solicitation is directed towards fulfilling the fourth stage of the HIAPER project. Investigator equipment packages funded under this solicitation will eventually become part of the instrumentation suite available to the HIAPER user community. At the conclusion of the HIAPER project in 2005, future funding for operations, and additional instrument development or modifications to the facility, may be funded by NSF's regular programs as well as other funding sources (e.g. MRI program).

This solicitation is based on the outcome of a community instrumentation and equipment [workshop](#) conducted in November 2002. This workshop identified a number of measurement areas for which new or improved instrumentation needs to be developed to make significant progress in a number of atmospheric science questions and disciplines, and for which HIAPER would be the platform of choice. Following the workshop, the [HIAPER Advisory Committee](#) (HAC) assessed areas of

measurement overlap and instrumentation commonality for these identified science focus discussion areas.

Science categories identified by, but not limited to, these discussions included:

- Aerosols and Cloud Microphysics
- Gas Phase Chemistry
- Radiation, Clouds and Climate
- Large-Scale Dynamics of Weather Systems
- Sensing Systems for Geosciences and Biosciences Applications

Investigator equipment packages for these science categories are encouraged under this solicitation.

Categories of Investigator Equipment Packages

Based on discussions at the community workshop, the HAC suggested a categorization of measurements by the ease of which they could be integrated with the HIAPER platform, as a first step in community ranking of desired instrumentation priorities. These instrumentation categories are listed below as a guide.

STANDARD USE: Measurements of 'state' parameters that are likely to be called for on most missions and that do not require extensive modification or R&D efforts to implement. Following their acquisition, these investigator equipment packages would be maintained and operated on behalf of the community by NCAR/RAF and ATD staff, who would also be directly responsible for data quality, recording, and distribution to investigators. *The expected level of performance risk (project outcome uncertainty) associated with such instrumentation is expected to be low.*

ROUTINE OPERATIONAL: Existing, proven or attainable technologies that could be readily adapted to HIAPER (e.g., by miniaturization, repackaging, engineering) following a relatively short R&D effort (e.g., 1-2 years) after which the technology could be transitioned to NCAR - ATD for maintenance and operation as "Standard" instrumentation. While in the development phase (before being declared a "Standard" instrument), deployment of this category of instrumentation may require additional support personnel and funds, and possibly some specialized expertise to commission, analyze and interpret the data streams. These investigator equipment packages need not fly on every HIAPER mission but would be available to community users upon request, could be operated and maintained by trained NCAR/ATD staff, with likely some level of involvement of the originating Principal Investigator (PIs). *The expected level of performance risk (project outcome uncertainty) associated with such instrumentation is expected to be low to moderate.*

RESEARCH: Developing technologies that require a continued R&D effort (i.e., they are primarily "PI-driven" and push the innovation envelope) yet are likely to fulfill community research needs. Such instrumentation, requiring extensive PI involvement in development and evaluation will likely not be ready to be turned over to NCAR - ATD for routine operations for several years after the initiation of instrument development. While under development, these investigator equipment packages would likely require continued involvement of a PI or research group for a particular mission deployment and during data interpretation and analysis. *The expected level of performance risk (project outcome uncertainty) associated with such instrumentation is expected to be moderate to high.*

Geometries of Investigator Equipment Packages

Based the community workshop discussions, the HAC further suggested an instrumentation categorization according to the engineering geometries which could be physically integrated on board the HIAPER platform. The instrumentation geometries suggested by the HAC are listed below as a guide.

EQUIPMENT RACK MOUNTING: For standard rack mountable instrumentation and subsystems, design attention should be paid to rack weight, size, power, cooling, data system connectivity, gas/hydraulic (inlet/exhaust) connectivity etc requirements. *The expected level of aeronautical engineering input associated with such instrumentation is expected to be low.*

CABIN INTERIOR ATTACHMENT: For non-standard equipment rack mounts or specialized instrumentation with non-standard footprints or placements, additional attention may be required to consider structural stress analyses and load restrictions. *The expected level of aeronautical engineering input associated with such instrumentation is expected to be low to moderate.*

WING POD INTERIOR SPECIFICATIONS: For 'standard' wing pod mounted instrumentation systems, appropriate attention must be paid to pod interior specifications, power, connectivity, dimension and weight restrictions. *The expected level of aeronautical engineering input associated with such instrumentation is expected to be low to moderate, given accepted wing pod module design.*

EXTERNALLY MOUNTED PROBES: For externally (fuselage or wing mounted) exposed probes and inlets aerodynamic load analyses may be required, as will consideration of optimum probe and inlet siting in the aircraft's aerodynamic skin. *The expected level of aeronautical engineering input associated with such instrumentation is expected to be moderate to high, given accepted probe design.*

FUSELAGE MODIFICATION: For instrumentation systems that require access to aperture pads and or plates, optical view ports other than those initially specified in the modified HIAPER airframe at time of delivery, several design considerations and certification issues accrue. *The expected level of aeronautical engineering input associated with such instrumentation systems is expected to be high and, while not prohibited, are not encouraged under this solicitation.*

Additional Information

All proposers are encouraged to contact the HIAPER Project Office to obtain information on specific infrastructure requirements of the certified Gulfstream V airframe. Proposers are also encouraged to contact the Design and Fabrication Services Division of the Atmospheric Technology Division (NCAR-ATD), through the HIAPER Project Office, to ensure design engineering will be compatible with the Gulfstream V (see Section VIII for contact information).

Under current FAA and ICAO guidelines, aircraft certification requires more stringent design and development processes than a non-certified aircraft. If proposers plan to request the support of NCAR's Design and Fabrication Services these costs should be explicitly included and budgeted for in the proposal.

III. ELIGIBILITY INFORMATION

Organizational Limit: Proposals may be submitted by U.S. institutions of higher education and independent non-profit research organizations including NSF-supported Federally Funded Research and Development Centers (FFRDCs) (e.g. NCAR). A consortium may also submit a proposal through a U.S. institution of higher education for instrumentation to be developed at a non NSF-supported FFRDC. Small businesses are eligible for instrument development support as subawards through submitting U.S. organizations.

PI Eligibility Limit: By prior agreement, staff from the NCAR Atmospheric Technology Division (ATD), including the Research Aviation Facility (RAF), are not eligible as PIs to this solicitation.

Limit on Number of Proposals: An organization may submit up to five proposals as the lead organization with the following restriction. An organization may submit no more than 3 proposals for instrument acquisition. Any additional proposals must be for instrument research and development. Investigators at a non-lead institution may be included as a member of a research team put together on a proposal by a lead organization without it counting toward the total number of proposals that the non-lead organization may submit.

IV. AWARD INFORMATION

The total anticipated funding amount is \$12.5 million subject to the availability of funds. Estimated program budget, number of awards and average award size/duration are also subject to the availability of funds. As a guide, from 7–15 awards for 3-5 years each are expected to result from this solicitation.

Funding for the HIAPER project is appropriated to NSF as Major Research Equipment Facilities and Construction (MREFC) funds, and under the terms of their use are awarded to University Corporation for Atmospheric Research (UCAR) as part of an overall award for the acquisition and integration of the HIAPER platform. As a consequence, awards approved by NSF for investigator equipment packages for the HIAPER aircraft will be made through UCAR as sub-awards to proposing organizations under UCAR's Cooperative Support Agreement with NSF. UCAR will issue and administer these sub-awards in accordance with UCAR's standard terms and conditions for subawards. It should be noted that NSF will provide and be responsible for technical monitoring of the performance of the instruments developed under these sub-awards and that UCAR shall bear no responsibility for the technical performance of these instruments.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions:

Proposals submitted in response to this program announcement/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/cgi-bin/getpub?gpg>. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

The terms and conditions of the NSF Cooperative Agreement with UCAR require that proposals submitted to UCAR be prepared under guidelines consistent with NSF standard [GPG guidelines](#).

Supplemental Instructions. To qualify for an award, investigators are asked to explicitly address operation of the requested equipment packages safely, effectively and economically on board the HIAPER platform. This may extend to provision of detailed standard operating procedures or specified training to support qualified researchers from the atmospheric and broader geosciences communities to use the proposed investigator equipment packages. Appropriate quality control of calibration and validation issues, shared use instrumentation access, and technical support procedures must be planned for during development, installation and eventual transition of the investigator equipment packages to the HIAPER facility operators.

Because of the nature of instrument integration and potential impact on FAA certification of the aircraft, all proposals selected by NSF may be further evaluated for technical feasibility/compatibility for integration into or onto the Gulfstream V airframe. This screening will be accomplished by NSF and a non-conflicted technical team from NCAR, the organization that will maintain and operate HIAPER for NSF.

Proposers are reminded to identify the program announcement/solicitation number (04-517) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing:

Cost sharing is not required in proposals submitted under this Program Solicitation.

C. Due Dates

Proposals must be submitted by the following date(s):

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

February 18, 2004

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: <http://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 announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

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. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: <http://www.fastlane.nsf.gov>

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 ([NSB 97-72](#)). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued [Important Notice 127](#), Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the [Grant Proposal Guide](#) Chapter III.A for further information). 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 he/she is qualified to make judgments.

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 and original 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?

NSF staff 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:

To qualify for an award, investigators are asked to explicitly address operation of the requested equipment packages safely, effectively and economically on board the HIAPER platform. This may extend to provision of detailed standard operating procedures or specified training to support qualified researchers from the atmospheric and broader geosciences communities to use the proposed investigator equipment packages. Appropriate quality control of calibration and validation issues, shared use instrumentation access, and technical support procedures must be planned for during development, installation and eventual transition of the investigator equipment packages to the

HIAPER facility operators.

Because of the nature of instrument integration and potential impact on FAA certification of the aircraft, all proposals selected by NSF may be further evaluated for technical feasibility/compatibility for integration into or onto the Gulfstream V airframe. This screening will be accomplished by NSF and a non-conflicted technical team from NCAR, the organization that will maintain and operate HIAPER for NSF.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Ad Hoc Review followed by Panel Review.

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.

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 Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In most cases, proposers will be contacted by the Program Officer after his or her recommendation to award or decline funding has been approved by the Division Director. This informal notification is not a guarantee of an eventual 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 date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements 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 Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division 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.A. 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 (NSF-GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at <http://www.gpo.gov>.

Special Award Conditions:

Awards will be made as subawards to the Cooperative Support Agreement with UCAR for the management of NCAR. Otherwise, standard NSF award conditions apply.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Additional Reporting Requirement

It is expected that awardees will have regular dialogue and/or status reviews with NCAR-ATD technical staff to ensure compatibility and timely integration of equipment packages into or onto the HIAPER airframe. These reports will be shared with cognizant NSF Program Officers.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. 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. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, 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.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- James R. Huning, Facilities Coordinator, Directorate for Geosciences, Division of Atmospheric Sciences, 775 S,

telephone: (703) 292-8521, email: jhuning@nsf.gov

- Clifford A. Jacobs, Section Head, Directorate for Geosciences, Division of Atmospheric Sciences, 775 S, telephone: (703) 292-8521, fax: (703) 292-9022, email: cjacobs@nsf.gov
- Peter J. Milne, Program Coordinator, Directorate for Geosciences, Division of Atmospheric Sciences, 775 S, telephone: (703)292-8521, fax: (703) 292-9022, email: pmilne@nsf.gov

Specific enquiries regarding the performance, technical characteristics, and specification of the HIAPER aircraft should be made to the HIAPER Project Office:

- Carla Hassler, HIAPER Project Office, PO Box 3000, Boulder, CO, telephone: (303) 497-2005; fax: (303) 497-2026

All proposers are encouraged to contact the HIAPER Project Office to obtain information on specific infrastructure requirements of the certified Gulfstream V airframe. Carla Hassler will direct your inquiries to the appropriate technical person. Proposers are also encouraged to contact the Design and Fabrication Services Division of the Atmospheric Technology Division (NCAR-ATD), through the HIAPER Project Office, to ensure design engineering will be compatible with the Gulfstream V.

Under current FAA and ICAO guidelines, aircraft certification requires more stringent design and development processes than a non-certified aircraft. If proposers plan to request the support of NCAR's Design and Fabrication Services these costs should be explicitly included and budgeted for in the proposal.

For questions related to the use of FastLane, contact:

- Ruth E. Joel, Program Assistant, Directorate for Geosciences, Division of Atmospheric Sciences, 775 S, telephone: (703) 292-8522, fax: (703) 292-9022, email: rjoel@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at <http://www.nsf.gov/cgi-bin/getpub?gp>. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF *E-Bulletin*, which is updated daily on the NSF Website at <http://www.nsf.gov/home/ebulletin>, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's *Custom News Service* (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

Related Programs:

- Major Research Instrumentation Program ([NSF 04-511](#))

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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.

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