NASA Airborne Research Experience for Educators (AREE) Application Supporting Statement

NASA Dryden Flight Research Center is requesting approval for the collection of data for the Airborne Research Experiences for Educators (AREE) project and the AREE - Virtual Network. The collection process will consist of an application, resume, and letters of reference. Collected data will be used to select pre-service and in-service educators, who specialize in science, technology, engineering, or mathematics (STEM), to participate in either a six week end-to-end airborne science research experience or Curriculum Design Challenge to develop data-inquiry based activities using an online interactive environment called the Virtual Network.

A. Justification

1. Explain the circumstances that make the collection of information necessary. Identify any legal or administrative requirements that necessitate the collection. Attach a copy of the appropriate section of each statute and regulation mandating or authorizing the collection of information.

NASA's founding legislation, the Space Act of 1958, directs the agency to expand human knowledge of Earth and space phenomena and to preserve the role of the United States as a leader in aeronautics, space science, and technology. High achievement in science, technology, engineering, and mathematics (STEM) education is essential to the accomplishment of NASA's mission. The Strategic Management of Human Capital initiative under the President's Management Agenda requires agencies to "build, sustain, and effectively deploy the skilled, knowledgeable, diverse, and high-performing workforce needed" to meet agency core competencies. NASA's education investments will contribute to the agency's human capital needs.

All of NASA's education efforts are part of an integrated agency-wide approach to human capital management. Within the NASA Strategic Plan, education is identified as a cross-cutting function that supports all of the agency's strategic goals and objectives. NASA delivers a comprehensive agency education portfolio—a collection of investments and strategies, such as research and development, managed to further common goals—implemented by the Office of Education, the NASA mission directorates, and the NASA centers. Through the portfolio NASA contributes to our nation's efforts in achieving excellence in STEM education. Three outcomes serve to align all agency education activities:

- **Outcome 1: Strengthen NASA and the nation's future workforce**—NASA will identify and develop the critical skills and capabilities needed to achieve the Vision for Space Exploration. To help meet this demand, NASA will continue contributing to the development of the nation's future STEM workforce through a diverse portfolio of education initiatives that target America's students at all levels, especially those in traditionally underserved and underrepresented communities.
- **Outcome 2: Attract and retain students in STEM disciplines**—To compete effectively for the minds, imaginations, and career ambitions of America's young people, NASA will focus on engaging and retaining students in STEM education programs to encourage

their pursuit of educational disciplines critical to NASA's future engineering, scientific, and technical missions.

- **Outcome 3: Engage Americans in NASA's mission**—NASA will build strategic partnerships and linkages between STEM formal and informal education providers. Through hands-on, interactive, educational activities, NASA will engage students, educators, families, the general public, and all agency stakeholders to increase Americans' science and technology literacy.

As the United States begins the second century of flight, the nation must maintain its commitment to excellence in STEM education to ensure that the next generation of Americans can accept the full measure of their roles and responsibilities in shaping the future.

NASA requires the voluntary collection of information from the public to support the NASA Airborne Research Experience for Educators (AREE) program and the AREE - Virtual Network. The information collected consists of an application, a resume, and letters of reference. Information will be used to competitively select approximately 15 – 20 pre- and in-service educators to participate in the programs.

The AREE project will select 10 pre-service educators, who specialize in science, technology, engineering, or mathematics (STEM), to participate in a six week end-to-end airborne science research experience. The project was developed at Dryden to support the Education Flight Projects program under the auspices of the Teaching From Space (TFS) program. TFS is a NASA Education office co-located with the Astronaut Office at the NASA Johnson Space Center. Education Flight Projects and its associated activities are under the TFS umbrella and are managed by the JSC Education Office. Education Flight Projects provide opportunities for K-12 students and educators to gain hands-on experience as investigators using NASA flight platforms. Activities are national in scope.

The AREE- Virtual Network will extend the Airborne Research Experiences for Educators (AREE) model of educator-as-researcher by selecting approximately 5 - 10 pre- and in-service secondary educators for an online professional development and curriculum design challenge using a virtual flight control room. The virtual flight control room would extend NASA Earth Science missions to classrooms across the country through an extensible interactive environment designed to give educators access to remote data collected during airborne science research campaigns. Data will be accessible on the web from a network specific server; data sets will include prior and/or real-time flight data from instruments, flight tracks, aerial and satellite imagery, and video (i.e. nadir view, falcon view, take-off and landing). From the web, educators will have access to live or simulated live interactive environments that provide students with hands-on, innovative, and engaging virtual representations of NASA airborne science missions. Classroom activities will become an augmentation of real flight mission(s) and provide technology-based learning experiences to supplement K-12 science and math curricula.

NASA Airborne Research Experience for Educators (AREE) Application Supporting Statement

The AREE project and AREE – Virtual Network will provide education opportunities for pre- and in-service educators to engage in hands-on, inquiry-based, learning experiences using NASA's airborne science platforms. The projects supports NASA's strategic mission to streamline individuals into a seamless pipeline to pursue careers in science, technology, engineering, and mathematics, or STEM, by engaging participants in experiences relating to flight test research and airborne science.

As part of the NASA Education Elementary and Secondary Education Program, Education Flight Projects serves as a major link in the student pipeline and maps to NASA Education Outcome 2:

> ***Attract and retain students in science, technology, engineering, and mathematics (STEM) disciplines through a progression of educational opportunities for students, teachers, and faculty.***

Education Flight Projects at Dryden uses NASA's unique content and experiences for K-12 students and educators to inspire and engage them in STEM subjects. Effort is focused to meet three goals:

1. Develop education opportunities that use NASA Dryden flight platforms to provide educators with the skills and knowledge to attract and retain students in STEM disciplines.
2. Facilitate flight and science research experiences at Dryden that provide unique opportunities to inspire, engage, and educate the Nation's future workforce.
3. Expose participants to NASA-related content, knowledge, people, and facilities to invigorate their commitment and understanding in STEM disciplines.

These goals provide the basis to support the strategic goal, objectives and outcomes of the Elementary and Secondary Education Program.

The three Elementary and Secondary Program Objectives that Education Flight Projects supports are:

2.1 Educator Professional Development – Short Duration
Objective (Engage)

> Provide short duration professional development and training opportunities to educators, equipping them with the skills and knowledge to attract and retain students in STEM disciplines.

2.3: Curricular Support Resources
Objective (Engage)

> Provide curricular support resources that use NASA themes and content to enhance student skills and proficiency in STEM disciplines; and/or inform students about STEM career opportunities; and/or communicate information about NASA's mission activities.

NASA Airborne Research Experience for Educators (AREE) Application Supporting Statement

2.4 Student Involvement K-12

Objective (Engage)

Provide K-12 students with authentic, first-hand opportunities to participate in NASA mission activities, thus inspiring interest in STEM disciplines and careers.

NASA Airborne Research Experience for Educators (AREE) and AREE - Virtual Network will collect information to determine the eligibility of applicants to participate in the programs. Pre- and in-service educators will be selected to participate based on their experience and educational background. Educators will translate their experiences into a secondary school learning environment.

2. Indicate how, by whom, and for what purpose the information is to be used. Except for a new collection, indicate the actual use the agency has made of the information received from the current collection.

The application to apply for the NASA Airborne Research Experience for Educators (AREE) and AREE – Virtual Network will be accessible from the NASA web portal. Information will be submitted voluntarily by individuals including information that includes, but is not limited to, name permanent mailing and school address, e-mail, personal and work telephone number, employment history, and education background. Information will be used to competitively select pre- and in-service educators for the program(s). Individuals will submit their information electronically to the Education Flight Projects Specialist at Dryden Flight Research Center via a PDF application form located on the NASA web portal.

3. *Describe whether, and to what extent, the collection of information involves the use of automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submission of responses, and the basis for the decision for adopting this means of collection. Also describe any consideration of using information technology to reduce burden.*

Applicants will complete an online application hosted on the NASA web portal. The application can be downloaded using Adobe software and submitted electronically using the e-mail submit button located on the form. The submission of the application form, resume, and letters of reference will all occur electronically.

4. Describe efforts to identify duplication. Show specifically why any similar information already available cannot be used or modified for use for the purposes described in Item 2 above.

No duplication is involved. Application to participate in the NASA Airborne Research Experience for Educators (AREE) and AREE – Virtual Network is unique.

NASA Airborne Research Experience for Educators (AREE) Application Supporting Statement

5. If the collection of information impacts small businesses or other small entities (Item 5 of OMB Form 83-I), describe any methods used to minimize burden.

Small businesses will not be impacted.

6. Describe the consequence to Federal program or policy activities if the collection is not conducted or is conducted less frequently, as well as any technical or legal obstacles to reducing burden.

NASA needs certain information to determine which applicants meet required selection criteria and to what extent. Without this data collection, NASA will not be able to select approximately 15 - 20 educators to participate in the AREE project and AREE – Virtual Network education programs. An application form needs to be accessible to individuals interested in applying to the program(s) to allow for adequate time for applicants to be selected and notified prior to the completion of the school year. If applications are not received to determine who to select for the program, educators will forego a unique educational opportunity. Failure to implement this project will limit the ability for the Education Flight Project program to support NASA Outcome 2 as stated in the *Education Strategic Coordination Framework*, 2006:

> Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.

7. Explain any special circumstances that would cause an information collection to be conducted in a manner:
** requiring respondents to report information to the agency more often than quarterly;*
** requiring respondents to prepare a written response to a collection of information in fewer than 30 days after receipt of it;*
** requiring respondents to submit more than an original and two copies of any document;*
** requiring respondents to retain records, other than health, medical, government contract, grant-in-aid, or tax records, for more than three years;*
** in connection with a statistical survey, that is not designed to produce valid and reliable results that can be generalized to the universe of study;*
** requiring the use of a statistical data classification that has not been reviewed and approved by OMB;*
** that includes a pledge of confidentiality that is not supported by authority established in statute or regulation, that is not supported by disclosure and data security policies that are consistent with the pledge, or which unnecessarily impedes sharing of data with other agencies for compatible confidential use; or*
** requiring respondents to submit proprietary trade secrets, or other confidential information unless the agency can demonstrate that it has instituted procedures to protect the information's confidentiality to the extent permitted by law.*

No special circumstances exist.

8. If applicable, provide a copy and identify the date and page number of publication in the Federal Register of the agency's notice, required by 5 CFR 1320.8(d), soliciting comments on the information collection prior to submission to OMB. Summarize public comments received in response to that notice and describe actions taken by the agency in response to these comments. Specifically address comments received on cost and hour burden. Describe efforts to consult with persons outside the agency to obtain their views on the availability of data, frequency of collection, the clarity of instructions and recordkeeping, disclosure, or reporting format (if any), and on the data elements to be recorded, disclosed, or reported. Consultation with representatives of those from whom information is to be obtained or those who must compile records should occur at least once every 3 years - even if the collection of information activity is the same as in prior periods. There may be circumstances that may preclude consultation in a specific situation. These circumstances should be explained.

N/A

9. Explain any decision to provide any payment or gift to respondents, other than remuneration of contractors or grantees.

N/A

10. Describe any assurance of confidentiality provided to respondents and the basis for the assurance in statute, regulation, or agency policy.

Applicants will be required to submit public personally identifiable information electronically to the AREE project manager. The information will be used only to determine qualified applicants for the program and will not be accessible to the public. In addition to the project manager, only highly qualified individuals familiar with education and the AREE program who participate in the selection process will have access to the collected information.

A Privacy Impact Assessment is being completed and submitted by the Center Privacy Manager at Dryden.

11. Provide additional justification for any questions of a sensitive nature, such as sexual behavior and attitudes, religious beliefs, and other matters that are commonly considered private. This justification should include the reasons why the agency considers the questions necessary, the specific uses to be made of the information, the explanation to be given to persons from whom the information is requested, and any steps to be taken to obtain their consent.

Personal information such as gender or ethnicity will only requested on a voluntary basis.

12. Provide estimates of the hour burden of the collection of information. The statement should:
** Indicate the number of respondents, frequency of response, annual hour burden, and an explanation of how the burden was estimated. Unless directed to do so, agencies should not*

conduct special surveys to obtain information on which to base hour burden estimates. Consultation with a sample (fewer than 10) of potential respondents is desirable. If the hour burden on respondents is expected to vary widely because of differences in activity, size, or complexity, show the range of estimated hour burden, and explain the reasons for the variance. Generally, estimates should not include burden hours for customary and usual business practices.
** If this request for approval covers more than one form, provide separate hour burden estimates for each form and aggregate the hour burdens in Item 13 of OMB Form 83-I.*
** Provide estimates of annualized cost to respondents for the hour burdens for collections of information, identifying and using appropriate wage rate categories. The cost of contracting out or paying outside parties for information collection activities should not be included here. Instead, this cost should be included in Item 13.*

There will be approximately 15 - 20 educator participants in the AREE and AREE – Virtual Network programs. Based on the number of applicants received in the inaugural year of the AREE 2009 project and the increased visibility and recognition of the program, we expect approximately 100 applicants for the AREE project and an additional 25 applicants for the AREE – Virtual Network. The application will require no more than one hour to complete per applicant for a total of approximately 125 burden hours.

13. Provide an estimate for the total annual cost burden to respondents or recordkeepers resulting from the collection of information. (Do not include the cost of any hour burden shown in Items 12 and 14).
** The cost estimate should be split into two components: (a) a total capital and start-up cost component (annualized over its expected useful life) and (b) a total operation and maintenance and purchase of services component. The estimates should take into account costs associated with generating, maintaining, and disclosing or providing the information. Include descriptions of methods used to estimate major cost factors including system and technology acquisition, expected useful life of capital equipment, the discount rate(s), and the time period over which costs will be incurred. Capital and start-up costs include, among other items, preparations for collecting information such as purchasing computers and software; monitoring, sampling, drilling and testing equipment; and record storage facilities.*
** If cost estimates are expected to vary widely, agencies should present ranges of cost burdens and explain the reasons for the variance. The cost of purchasing or contracting out information collections services should be a part of this cost burden estimate. In developing cost burden estimates, agencies may consult with a sample of respondents (fewer than 10), utilize the 60-day pre-OMB submission public comment process and use existing economic or regulatory impact analysis associated with the rulemaking containing the information collection, as appropriate.*
** Generally, estimates should not include purchases of equipment or services, or portions thereof, made: (1) prior to October 1, 1995, (2) to achieve regulatory compliance with requirements not associated with the information collection, (3) for reasons other than to provide information or keep records for the government, or (4) as part of customary and usual business or private practices.*

a) There is no cost to applicants to apply.

b) Costs for the design and collection of the electronic applications are being covered by the Aerospace, Education, Research, and Operations Institute, a NASA Dryden Flight Research Center Partner.

14. Provide estimates of annualized costs to the Federal government. Also, provide a description of the method used to estimate cost, which should include quantification of hours, operational expenses (such as equipment, overhead, printing, and support staff), and any other expense that would not have been incurred without this collection of information. Agencies may also aggregate cost estimates from Items 12, 13, and 14 in a single table.

Annualized costs for the application and selection process for teacher participants in the AREE program to the Federal government are estimated at $4000 based on the time of the program manager and selection panel members. This is estimated to be 40 total hours at a loaded cost of $100/hour.

15. Explain the reasons for any program changes or adjustments reported in Items 13 or 14 of the OMB Form 83-I.

N/A

16. For collections of information whose results will be published, outline plans for tabulation and publication. Address any complex analytical techniques that will be used. Provide the time schedule for the entire project, including beginning and ending dates of the collection of information, completion of report, publication dates, and other actions.

The opening of the application window for the NASA Airborne Research Experience for Educators (AREE) will be publicized through the NASA web portal and via existing mechanisms used to inform the education audience of products and services available to them by NASA (e.g. e-mail list servers).

The collection of information should begin no later than March 01, 2010 and will remain open until May 2010. The process to select applicants will consist of a committee of 3-5 individuals consisting of NASA engineers and/or NASA support contractors or partners. The selection committee will use a scoring rubric to help them select qualified applicants. The selection process will occur within one – two weeks from the application deadline. Notification letters will be electronically sent to selected applicants.

17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons that display would be inappropriate.

The OMB approval number is displayed on the application form.

18. Explain each exception to the certification statement identified in Item 19, "Certification for Paperwork Reduction Act Submissions," of OMB Form 83-I.

None