Exploration Systems Mission Directorate Higher Education:
Development of an Engineering Senior Design Course

on behalf of

National Aeronautics and Space Administration
Exploration Systems Mission Directorate
Higher Education: ESMD Space Grant Project

Release Date: November 3, 2010
Proposals Due: January 18, 2011
Anticipated Award Date: February 28, 2011
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1. Introduction

On behalf of NASA’s Exploration Systems Mission Directorate (ESMD) the National Space Grant Foundation is soliciting proposals for a higher education opportunity to develop an ESMD Engineering Senior Design Course. Senior design projects are intended to stimulate undergraduate research on current NASA activities and to bring out innovative and novel ideas that can be used to complement those currently under development at respective NASA Centers. Additionally, such academic involvement would improve the prospects for graduating seniors to pursue graduate studies and to seek careers in the Space industry. The senior design course to be developed for this solicitation must be in one of the four ESMD-related areas: propulsion, lunar and planetary surface systems, spacecraft or ground operations (see Background and Purpose Section for more information).

In 2007, NASA announced the first solicitation for the development of ESMD senior design courses. Three courses have been pilot-tested at Auburn University, Michigan Technological University and Utah State University. Louisiana State University is currently pilot-testing the fourth ESMD Senior Design Course. Additional information about these courses is located at the following URL: http://education.ksc.nasa.gov/ESMDspacegrant/CoursesIndex.htm.

We invite university faculty who teach engineering senior design courses to submit a proposal to develop a two-semester senior design course based on a project from the approved list found at http://education.ksc.nasa.gov/ESMDspacegrant/Sr_Design.htm. Each proposal must include a signed commitment from the NASA Technical Expert to ensure their commitment to the project. To obtain the name of the NASA Technical Expert for a specific project contact Diane Ingraham at Zola.D.Ingraham@nasa.gov.

The Foundation anticipates that one award for $50,000 will be made under this solicitation.

2. Eligibility

Proposals will be accepted from U.S. citizens whom are currently employed faculty teaching an engineering senior design course at a university affiliated with The National Space Grant College and Fellowship Program.

Historically Black Colleges and Universities, Tribal Colleges and other minority serving educational institutions are particularly encouraged to apply. Proposals from women, members of under-represented minorities groups, and persons with disabilities are highly encouraged.

3. Funding Opportunity Description

NASA is requesting proposals for the development of an ESMD senior engineering design course that adheres with the Accreditation Board for Engineering and Technology (ABET) quality standards. The course will span an academic year (approximately 32 weeks) and be developed in conjunction with a current NASA ESMD project. The end product will be a “packaged” senior design course that can easily be incorporated into universities across the nation.

University engineering professors who are interested should propose an ESMD senior design course that they would like to develop. They must choose from the current list of senior design projects and contact the NASA Technical Expert to ensure their commitment to the project. To obtain the name of the NASA Technical Expert for a specific project contact Diane Ingraham at Zola.D.Ingraham@nasa.gov.

The selected professor will develop the course during the spring/summer 2011 semesters and pilot test the course during the 2011-2012 academic year. All applicants must provide proof that the course has
been approved to be taught at their institution in 2011-2012 academic year. The developed course will be implemented at other universities during the 2012-2013 academic year. The selected professor must be available for technical assistance to the implementing universities during the 2012-2013 academic year.

The course will be reviewed by a panel consisting of the NASA Project Manager, NASA Systems Engineers, and Space Grant Consortia Senior Design Faculty. The course review will take place via a web conference in July 2011, prior to the pilot test in the 2011-2012 academic year. The selected professor will conduct a two day faculty workshop in the summer of 2012 for the implementing university faculty.

Applicants are required to apply a systems engineering approach for the senior design course. See the NASA Systems Engineering Handbook referenced in Section 5.

3.1. Background and Purpose

The Exploration Systems Mission Directorate (ESMD) is dedicated to creating new capabilities, supporting technologies and foundational research that enables sustained and affordable human and robotic exploration.

NASA delivers a comprehensive Agency education portfolio, implemented by the Office of Education, the mission directorates, and the NASA field centers. Through the portfolio, NASA contributes to our Nation’s efforts in achieving excellence in science, technology, engineering and math (STEM) education. Three outcomes serve to align all Agency education activities. This announcement maps to Outcome 1: Contributing to the development of the STEM workforce in disciplines needed to achieve NASA’s strategic goals.

The purpose of the ESMD Space Grant Project is to train and develop the highly skilled scientific, engineering, and technical workforce of the future needed to implement the U.S. Space Exploration Policy.

The following are areas critical to the future of space exploration. All senior design projects are linked to one of the four areas:

- **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, throttleable propellants, high performance, and descent.

- **Lunar and Planetary Surface Systems**- Precision landing hardware, software, in-situ resource utilization (ISRU), navigation systems, extended surface operations, robotics, (specifically environmental scouting prior to human arrival, outpost maintenance with and without humans present, and assist astronaut with geologic exploration) environmental analysis, radiation protection, spacesuits, life support, power systems.

- **Ground Operations**- Pre-launch, launch, mission operations, command and control software systems, communications, landing and recovery.
3.2. Responsibilities of the selected professor

The professor will create and compile all materials for the course. The professor will produce a “packaged” senior design course. University faculty will receive the course at a later date to easily integrate into their institutions. All initial course materials must be completed and submitted electronically to NASA by July 11, 2011. All equipment purchased and course materials created will belong to NASA. The professor must enter a report into the NASA Education database for metrics. The professor will produce all deliverables defined below.

3.3. Deliverables:

Monthly Reporting
- Written status of course development and testing
- Teleconference status of course development and testing

Course Materials
- Handbook detailing the course and background information
- PowerPoint lectures for the senior design course for an academic year
- Related research articles (.pdf)
- List of related websites
- List of vendors and cost of materials needed for others to use to implement the course
- Proposal for University Regulatory Committee (a clear description of the course along with milestones, timelines, budget)

Revised Course Materials
- Any changes required to the course materials need to be submitted after the pilot test year and again after the implementation year.

Webpage
- All materials required by students during the pilot year need to be provided via web at the professor’s university.
  * Note: Final materials required by implementing universities will be provided via NASA website.

Final Report
- Purpose of ESMD senior design course development
- Defining senior design projects and their significance to engineering programs
- Overview of ESMD senior design course developed
- Systems engineering process, documentation, reviews and activities
- Assessment results
- Definition of International Traffic in Arms Regulations (ITAR) & Export Administration Regulations (EAR) regulations and their applicability to the chosen topic
- Lessons learned
- Suggestions for changes and improvements for future implementation

Travel
- Meet with the NASA Technical Expert as required.
- Conduct a two day faculty workshop in the summer of 2012 for the implementing university faculty.
3.4. Schedule of Deliverables:

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Date/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Course Materials:</td>
<td>July 11, 2011</td>
</tr>
<tr>
<td>Pilot Test:</td>
<td>2011/2012 Academic Year</td>
</tr>
<tr>
<td>Revised Course Materials:</td>
<td>June 4, 2012</td>
</tr>
<tr>
<td>Two-Day Workshop:</td>
<td>Summer 2012</td>
</tr>
<tr>
<td>Tech Assistance to Faculty at Implementing Universities:</td>
<td>2012/2013 Academic Year</td>
</tr>
<tr>
<td>Final Course Materials:</td>
<td>June 3, 2013</td>
</tr>
<tr>
<td>Final Report:</td>
<td>June 30, 2013</td>
</tr>
</tbody>
</table>

3.5. General Requirements for the Senior Design Course

1. The project must present a significant ESMD design challenge to the students in the class.

2. The project must incorporate knowledge from three or more engineering disciplines. Systems engineering process is required. See the NASA Systems Engineering Handbook.

3. The design and fabrication work on the project must be of a level that is worthy of 6 hours of coursework credit. The project should take approximately 250 hours for students to complete.

4. The project must require creativity, and deductive reasoning should be applied in the solution of the design task and supporting analysis. There should also be a significant involvement of appropriate computer-aided tools in its design solution.

5. The overall design framework must incorporate realistic constraints covering economic, environmental, sustainability, manufacturability, ethical, human health and safety, social, and societal constraints.

3.6. Period of Performance

The period of performance for this award will be March 1, 2011 to June 30, 2013.

4. Proposal and Submission Information

4.1. Proposal Format and Content

Proposals should be single-spaced on standard 8 ½ x11 paper, no smaller than 12 point font and with one inch margins throughout. All proposals must be prepared in the following format:

1. Title Page (not included in the page count) - Title of senior design course, name and contact information of proposing faculty (address, university affiliation, email address, phone number), name of NASA Technical Expert associated with senior design course, and the local Space Grant Consortium in which faculty is affiliated.

2. Body of Proposal (6 pages maximum)
   - Proposal Synopsis – description of the chosen ESMD senior design project, design challenge to the students, and complexity.
   - Significance- description of the need and relevancy of the proposed senior design project for NASA, and how this course will benefit the university.
   - Content – description of the course outline and structure and the faculty workshop outline. Applicants should also describe the involvement of appropriate computer-aided tools in its design solution. Applicants should also describe how the NASA Systems Engineering process will be applied.
• **Mechanisms for integration**- description of how the course will be integrated and pilot tested at the affiliated university in academic year 2011-2012. Applicants should also describe the feasibility of implementing the project into other universities.

• **Diversity** - description of effort to attract a diverse group of students, including underrepresented and underserved minorities, women, and students with disabilities. Applicants should also describe the effort to attract a diverse group of engineering disciplines.

• **Assessment Plan** – plan for evaluation approach of senior design course, lessons learned, and potential impacts.

• **Past Performance**- demonstration of successful implementation of senior engineering design courses that met ABET quality standards. Applicants should also demonstrate experience with a systems engineering process.

• **Other Resources (optional)** – including leveraging opportunities, unique capabilities, matching funds, and in-kind support.

3. **Schedule (not included in the page count)** - one-page overview of the proposed schedule including deliverables, expected dates of tangible outcomes, travel dates and final report to NASA.

4. **Budget (not included in the page count)** - total funding requested cannot exceed $50,000. Specific information should be given for salary, detailed expenses for supplies and materials for the course and for the project, expenses for travel to collaborate with NASA Technical Expert, expenses for workshop including travel to Kennedy Space Center in summer of 2012 for workshop.

5. **Appendix (not included in the page count)**-
   • **Mandatory** - a signed confirmation of support from the NASA Technical Expert that is matched with the selected ESMD senior design project.
   • **Mandatory** - a signed confirmation from the university stating that the faculty is a US citizen and that the senior design course will be pilot tested in the 2011-2012 academic year.
   • **Mandatory** - Faculty CV – 4 pages maximum.

4.2. **Proposal Evaluation Criteria**

The following criteria will be used in the evaluation process:

**Mandatory Logistics**

• Signed confirmation from university provided in appendix stating faculty’s US citizenship and commitment to implement course in 2011/2012 academic year at university
• Identify affiliated Space Grant Consortium.
• Identify NASA Technical Expert and provide signed statement of commitment in appendix.

**Merit**

• Demonstrate alignment with NASA ESMD objectives.
• Describe plan to integrate course into university.
• Demonstrate alignment with ABET quality standards.
• Include systems engineering process in the course.
• Include appropriate computer-aided tools in the course.
• Provide evidence of past performance of senior design courses that meet ABET quality standards.
• Provide feasibility of implementation at other universities.

**Contribution to NASA Workforce Development**

• **Content**: Demonstrate ability to develop a meaningful, challenging, realistic hands-on ESMD-relevant senior design project.
• **Continuity**: Demonstrate ability to create interest in NASA while connecting and preparing students for the workforce.

• **Diversity**: Demonstrate effort to attract a diverse group of student participants, including underrepresented and underserved minorities, women, and students with disabilities, along with multiple engineering disciplines.

• **Evaluation**: Provide assessment plan including appropriate quantitative metrics and qualitative outcomes.

**Budget**

• Provide adequate, appropriate, reasonable, and realistic budget.

**4.3. Proposal Submission**

Electronic copies of proposals must be received no later than: **January 18, 2011, midnight Pacific Time**. Late proposals will not be considered. The proposal will be submitted online at https://secure.spacegrant.org/proposals/esmdsg/

FAQ’s will be posted often on the following website and it is the responsibility of the applicant to check for updates. [http://education.ksc.nasa.gov/ESMDspacegrant/Course_Development.htm](http://education.ksc.nasa.gov/ESMDspacegrant/Course_Development.htm).

Applicants will be advised by electronic mail when selections are made. The award will be announced in February 2011.

Diane Ingraham will be the point of contact for questions on this solicitation. Diane can be reached at: zola.d.ingraham@nasa.gov.

**5. Resources**

ESMD Approved Project List:

Previous ESMD Space Grant Engineering Senior Design Courses
[http://education.ksc.nasa.gov/ESMDspacegrant/CoursesIndex.htm](http://education.ksc.nasa.gov/ESMDspacegrant/CoursesIndex.htm)

NASA Systems Engineering Handbook

Frequently Asked Questions
[http://education.ksc.nasa.gov/ESMDspacegrant/Course_Development.htm](http://education.ksc.nasa.gov/ESMDspacegrant/Course_Development.htm)

Proposal Submission Site
[https://secure.spacegrant.org/proposals/esmdsg/](https://secure.spacegrant.org/proposals/esmdsg/)

Code of Federal Regulations (CFR)

NASA Grant and Cooperative Agreement Handbook

Office of Management and Budget (OMB) Circulars
[http://www.whitehouse.gov/omb/circulars/](http://www.whitehouse.gov/omb/circulars/)
## Appendix A: Budget Summary

<table>
<thead>
<tr>
<th>From ________________</th>
<th>To ________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funds Requested from Sponsor</td>
<td>Proposed Cost Sharing (if any)</td>
</tr>
</tbody>
</table>

1. **Direct Labor**
   - $ ________________

2. **Other Direct Costs:**
   - a. Subcontracts: $ ________________
   - b. Consultants: $ ________________
   - c. Equipment: $ ________________
   - d. Supplies: $ ________________
   - e. Travel: $ ________________
   - f. Other: $ ________________

3. **Indirect Costs**
   - $ ________________

4. **Other Applicable Costs**
   - $ ________________

5. **Total**
   - $ ________________

6. **Total Estimated Costs**
   - $ ________________
Budget Narrative

If the proposal contains cost sharing separate budget narratives should be included for the funds requested from the sponsor and the proposed cost sharing.

1. **Direct Labor** (salaries, wages, and fringe benefits): Should list numbers and titles of personnel, amount of time to be devoted to the grant, and rates of pay.

2. Other Direct Costs:
   a. **Subcontracts** - Describe the work to be subcontracted, estimated amount, recipient (if known), and the reason for subcontracting this effort.
   b. **Consultants** - Identify consultants to be used, why they are necessary, the time they will spend on the project, and rates of pay (not to exceed the equivalent of the daily rate for Level IV of the Executive Schedule, exclusive of expenses and indirect costs.)
   c. **Equipment** - List separately and explain the need for items costing more than $1,000. Describe basis for estimated cost. General purpose equipment is not allowable as a direct cost unless specifically approved by the sponsor.
   d. **Supplies** - Provide general categories of needed supplies, the method of acquisition, estimated cost. (For Example: Office Supplies, Lab Supplies, etc.)
   e. **Travel** - List proposed trips individually and describe their purpose in relation to the award. Also provide dates, destination, and number of people where known. (For example: Airfare, Hotel, Per Diem, Registration, Car Rental, etc.)
   f. **Other** - Enter the total direct costs not covered by 2.a through 2.e. Attach an itemized list explaining the need for each item and the basis for the estimate.

3. **Indirect Costs**

4. **Other Applicable Costs** - Enter the total of other applicable costs with an itemized list explaining the need for each item and basis for the estimate.

5. **Total** – The sum of lines 1 through 4.

6. **Total Estimated Costs** – The sum of the funds requested from the sponsor and the proposed cost sharing (if any)
Appendix A: Standard Education Grant/Cooperative Agreement

The following provisions of the Federal Code of Regulations are incorporated by reference:

<table>
<thead>
<tr>
<th>REFERENCE</th>
<th>TITLE</th>
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</thead>
<tbody>
<tr>
<td>§ 1260.21</td>
<td>Compliance with OMB Circular A-110</td>
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<tr>
<td>§ 1260.22</td>
<td>Technical Publications and Reports</td>
</tr>
<tr>
<td>§ 1260.23</td>
<td>Extensions</td>
</tr>
<tr>
<td>§ 1260.24</td>
<td>Termination and Enforcement</td>
</tr>
<tr>
<td>§ 1260.25</td>
<td>Change in Principal Investigator or Scope</td>
</tr>
<tr>
<td>§ 1260.26</td>
<td>Financial Management</td>
</tr>
<tr>
<td>§ 1260.27</td>
<td>Equipment and Other Property</td>
</tr>
<tr>
<td>§ 1260.28</td>
<td>Patent Rights</td>
</tr>
<tr>
<td>§ 1260.29</td>
<td>Reserved</td>
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<tr>
<td>§ 1260.30</td>
<td>In full text</td>
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<tr>
<td>§ 1260.31</td>
<td>National Security</td>
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<tr>
<td>§ 1260.32</td>
<td>Nondiscrimination</td>
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<tr>
<td>§ 1260.33</td>
<td>Subcontracts</td>
</tr>
<tr>
<td>§ 1260.34</td>
<td>Clean Air and Water</td>
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<tr>
<td>§ 1260.35</td>
<td>Investigative Requirements</td>
</tr>
<tr>
<td>§ 1260.36</td>
<td>Travel and Transportation</td>
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<tr>
<td>§ 1260.37</td>
<td>Safety</td>
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<tr>
<td>§ 1260.38</td>
<td>Drug-Free Workplace</td>
</tr>
<tr>
<td>§ 1260.39</td>
<td>Buy American Encouragement</td>
</tr>
<tr>
<td>§ 1260.40</td>
<td>Investigation of Research Misconduct</td>
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</tbody>
</table>

Provisions listed above are contained in the Code of Federal Regulation (14 CFR Part 1260). The CFR can be accessed electronically at: http://www.gpoaccess.gov/cfr/ or copies are available in most libraries and for purchase from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Provisions incorporated by reference have the same force and effect as if they were given in full text. The full text provision can be found via the NASA Grant and Cooperative Agreement Handbook website: http://prod.nais.nasa.gov/pub/pub_library/grcover.htm. OMB Circulars referenced in the provisions can be assessed electronically at: http://www.whitehouse.gov/omb/circulars/ or may be obtained from the Office of Administration, Publications Unit, New Executive Office Building, Washington, D.C. 20503. An index of existing OMB Circulars is contained in 5 CFR 1310.
Appendix B: Certifications and Assurances

CERTIFICATION REGARDING
DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS
PRIMARY COVERED TRANSACTIONS

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participants’ responsibilities. The regulations were published as Part VII of the May 28, 1988 Federal Register (pages 19160-19211). Copies of the regulations may be obtained by contacting the U.S. Department of Education, Grants and Contracts Service, 400 Maryland Avenue, S.W. (Room 3633 GSA Regional Office Building No. 3), Washington, D.C. 20202-4725, telephone (202) 732-2505.

A. The applicant certifies that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this application been convicted or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or Local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or Local) with commission of any of the offenses enumerated in paragraph A.(b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or Local) terminated for cause or default; and

B. Where the applicant is unable to certify to any of the statements in this certification, he or she shall attach an explanation to this application.

C. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lowered Tier Covered Transactions (Subgrants or Subcontracts)

(a) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principles is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department of agency.

(b) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

_____________________________________________________________________________
Organization Name

_____________________________________________________________________________
Printed Name and Title of Authorized Representative

_____________________________________________________________________________
Signature          Date

_____________________________________________________________________________
Printed Name of Principal Investigator/Program Director

_____________________________________________________________________________
Proposal Title
CERTIFICATION REGARDING LOBBYING

As required by S 1352 Title 31 of the U.S. Code for persons entering into a grant or cooperative agreement over $100,000, the applicant certifies that:

(a) No Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, in connection with making of any Federal grant, the entering into of any cooperative, and the extension, continuation, renewal, amendment, or modification of any Federal grant or cooperative agreement;

(b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting an officer or employee of any agency, Member of Congress, an or an employee of a Member of Congress in connection with this Federal grant or cooperative agreement, the undersigned shall complete Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(c) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subgrants, contracts under grants and cooperative agreements, and subcontracts), and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by S1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

________________________________________
Organization Name

________________________________________
Printed Name and Title of Authorized Representative

________________________________________  _________________________
Signature                                    Date

________________________________________
Printed Name of Principal Investigator/Program Director

________________________________________
Proposal Title
Assurance of Compliance with the National Aeronautics and Space Administration Regulations Pursuant to Nondiscrimination in Federally Assisted Programs

The ____________________________________________
(Institution, corporation, firm, or other organization on whose behalf this assurance is signed, hereinafter called “Applicant.”)

HEREBY AGREES THAT it will comply with Title VI of the Civil Rights Act of 1964 (P. L. 88-352), Title IX of the Education Amendments of 1972 (20 U.S.C. 1680 et seq.), Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and the Age Discrimination Act of 1975 (42 U.S.C. 16101 et seq.), and all requirements imposed by or pursuant to the Regulation of the National Aeronautics and Space Administration (14 CFR Part 1250) (hereinafter called "NASA") issued pursuant to these laws, to the end that in accordance with these laws and regulations, no person in the United States shall, on the basis of race, color, national origin, sex, handicapped condition, or age be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives federal financial assistance from NASA; and HEREBY GIVES ASSURANCE THAT it will immediately take any measure necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of federal financial assistance extended to the Applicant by NASA, this assurance shall obligate the Applicant, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Applicant for the period during which it retains ownership or possession of the property. In all other cases, this assurance shall obligate the Applicant for the period during which the federal financial assistance is extended to it by NASA.

THIS ASSURANCE is given in consideration of and for the purpose of obtaining any and all federal grants, loans, contract, property, discounts or other federal financial assistance extended after the date hereof to the Applicant by NASA, including installment payments after such date on account of applications for federal financial assistance which were approved before such date. The Applicant recognizes and agrees that such federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign on behalf of the Applicant.

____________________________________________________________________________
Organization Name

____________________________________________________________________________
Printed Name and Title of Authorized Representative

_____________________________          ________________
Signature                      Date

____________________________________________________________________________
Printed Name of Principal Investigator/Program Director

_____________________________
Proposal Title