NASA Institute for Advanced Concepts

NIAC CP 98-01

CALL FOR PROPOSALS

1998 PHASE I ADVANCED AERONAUTICAL/SPACE CONCEPT STUDIES

Proposals Due:	**July 31, 1998**

INTRODUCTION

The Universities Space Research Association (USRA) has established the National Aeronautics and Space Administration (NASA) Institute for Advanced Concepts (NIAC) under contract from NASA Headquarters through the Goddard Space Flight Center. The NIAC has been formed for the explicit purpose of being an independent source of revolutionary aeronautical and space concepts that could dramatically impact how NASA develops and conducts its mission. The institute is to provide a highly visible, recognized and high-level entry point for outside thinkers and researchers.

The purpose of the NIAC is to provide an independent, open forum for the external analysis and definition of space and aeronautics advanced concepts to complement the advanced concepts activities conducted within the NASA Enterprises. The NIAC will have advanced concepts as its sole focus. It shall focus on revolutionary concepts - specifically systems and architectures - that can have a major impact on missions of the NASA Enterprises in the time frame of 10 to 40 years in the future. It will generate ideas for how the current NASA Agenda can be done better; it will expand our vision of future possibilities. The scope of the NIAC is based on the National Space Policy, the NASA Strategic Plan, the NASA Enterprise Strategic Plans and future mission plans of the NASA Enterprises, but it will be bounded only by the horizons of human imagination.

A Science, Exploration and Technology Council of experienced and respected experts, who, along with NASA, have formulated visionary, broad-based Grand Challenges for the new institute. The finalized list of Grand Challenges for 1998 is included as Appendix B and is the cornerstone for this Call for Proposals (CP).

Normal development of the NIAC advanced concepts will be carried out through issuance of research grants or subcontracts in a two-phased approach. Phase I awards of $50K-$75K will be for 6 months to validate the viability of the proposed concept and definition of major feasibility issues. Phase II award(s) of up to $500K and 2 years would study the major feasibility issues associated with cost, performance, development time and key technology issues. Both Phase I and Phase II awards will be competitively selected by the NIAC based on an independent peer review.

Phase II award(s) will only be made based on a down select from successfully completed Phase I efforts.

Phase I awards based on proposals received from this CP (CP 98-01) are planned for the fall of 1998. A Phase II CP will be issued in the spring of 1999. Also at this time, a new Phase I CP will be issued thereby beginning a new cycle.

This NIAC CP is a solicitation for advanced aeronautical and/or space concept studies. Participation in these studies is open to all categories of organizations, domestic or foreign, including educational institutions, profit and nonprofit organizations. However, financial support is offered only to U.S. investigators. Minority and disadvantaged institutions are encouraged to respond to this CP. NASA organizations are excluded from receiving funding for this effort. Proposals may be submitted according to the schedule contained in Appendix A and will be evaluated by a peer review panel.

A peer review process shall be used to competitively award grants or contracts based on proposals with the highest technical merit. The NIAC staff and participants in peer reviews will follow a Conflict of Interest Avoidance Plan developed by USRA. All participants will certify as to their adherence to the Plan.

One of the NIAC goals is to become a virtual institute relying very heavily on the potential of the Internet to share ideas. As an example, the complete text of this CP, along with other potentially relevant information, are available through the World Wide Web on the NIAC homepage at the URL address http://www.niac.usra.edu/.

All interested parties need to be aware that the NIAC intends to publicly make available the results of all funded advanced concept studies. This being the case, the institute actively discourages the use of proprietary data and/or trade secrets (see Appendix C).

The NIAC is functionally independent of NASA and the concepts it selects for government support will be the result of an external review by respected technical experts. NASA intends that the best products of the institute will be infused into NASA's and the nation's future programs, within the constraints of budget realities. The NIAC will attract revolutionary ideas from a greatly expanded community and will create a dynamic interchange of competing future options. This interchange will be a completely open debate and discussion; participation will be limited only by the quality of proposer's ideas. The NIAC appreciates your interest and cooperation in the 1998 Phase I study program.

INSTRUCTIONS FOR RESPONDING TO NIAC CALL FOR PROPOSALS

A. General

1. Proposals received in response to a NIAC CP will be used only for evaluation purposes. The NIAC does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to a NIAC CP to be used as the basis for a solicitation or in negotiation with other organizations, nor is a pre-award synopsis published for individual proposals.

2. A solicited proposal that results in a NIAC award becomes part of the record of that transaction. It is envisioned that the final report will be available to NASA and the public through the NIAC web page; however, information or material that the NIAC and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law.

3. A grant, subcontract or other agreement may be used to accomplish an effort funded in response to a NIAC CP. The NIAC and USRA will determine the appropriate instrument. Subcontracts resulting from NIAC CP's are subject to the Federal Acquisition Regulation (FAR) and the NASA FAR Supplement (NFS). Any resultant grants or cooperative agreements will be awarded and administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1) and USRA Procurement Policies.

4. The NIAC does not intend to hold discussions as part of the award process so proposals should be as complete as possible in the initial submission. However, should a question arise after release of this CP and prior to the proposal due date, questions will be entertained under the following ground rules:

a. Questions may be E-Mailed to the Director of NIAC at questions@niac.usra.edu.

b. The question(s) and answer(s) will be available to the public only through the NIAC web pages (http://www.niac.usra.edu).

c. The Director of NIAC reserves the right to answer only those questions deemed necessary to clarify a given situation of interest to most or all proposers.

5. As mentioned in the Introduction, the NIAC is chartered to operate as a virtual institute. The NIAC is equipped with the latest office communications systems, electronic technology and staffed at a much lower level than that employed in traditional paper-based operations. This fact necessitates that

proposal transmissions in response to this CP conform to the following requirements:

a. The proposer's technical and cost proposal shall be attached as separate files to one E-Mail and sent to phase1@niac.usra.edu. Both proposals shall be converted by the proposer to a portable document format (.pdf) prior to transmission. Information regarding .pdf is located at http://www.adobe.com.

1) The technical proposal .pdf file name shall be the principal investigators (see D.2.e.) first initial and last name "_t.pdf" (Example: The principal investigator's name is Thomas Carter. The technical proposal file name is tcarter_t.pdf). If the proposer's computer operating system limits the number of characters to eight (8) in the file name, then use the first initial and up to the first five (5) characters of the last name (Example: tcarte_t.pdf).

2) The cost proposal .pdf file name shall contain "_c.pdf" following the principal investigators first initial and last name. Example: The principal investigator's name is Thomas Carter. The cost proposal file name is tcarter_c.pdf. If the proposer's computer operating system limits the number of characters to eight (8) in the file name, then use the first initial and up to the first five (5) characters of the last name (Example: tcarte_c.pdf).

b. Proposals transmitted by any other method and/or format than that specified above shall not be considered by the NIAC for award.

6. To be considered for award, a submission must present a specific area of study containing sufficient technical and cost information to permit a meaningful evaluation. Also, it must not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate research pursuant to a more specific or pending solicitation.

7. See Appendix A for the proposal submission schedule applicable to this CP.

B. <u>Schedule and Deliverables</u>

1. Phase I efforts will be for approximately six months. The period of performance will commence upon award of the appropriate contractual instrument.

2. Phase I deliverables:

a. Monthly written status reports to the NIAC Director.

b. A final written report at the conclusion of the effort.

c. Principal investigator participation and presentation of the final report at the annual NIAC Conference. This three-day conference is tentatively scheduled to take place in Atlanta, GA in March 1999.

C. Letter of Intent (LOI)

1. All individuals and organizations anticipating submittal of a proposal are required to forward to the NIAC an LOI. This letter shall not exceed one page in length and as applicable contain the following information:

a. Name
b. Address
c. Telephone
d. E-Mail address
e. Concise summary/abstract of proposal (not to exceed one readable 8.5 by 11 inch page with 1 inch margins)

2. The LOI shall be attached to an E-Mail and sent to loi1@niac.usra.edu. The attached LOI shall be converted by the proposer to ".pdf" format prior to transmission. The LOI .pdf file name shall be the principal investigators (see D.2.e.) first initial and last name "_l.pdf" (Example: The principal investigator's name is Thomas Carter. The LOI file name is tcarter_l.pdf). If the proposer's computer operating system limits the number of characters to eight (8) in the file name, then use the first initial and up to the first five (5) characters of the last name (Example: tcarte_l.pdf).

3. An LOI transmitted by any other method than that specified above shall not be considered by the NIAC for award.

4. This information is required to ensure Phase I peer review panel(s) contain qualified technical representation for the proposed area of study.

D. Proposal Content and Format

1. Transmittal Letter or Prefatory Material

a. The legal name and address of the organization and specific division or campus identification, if part of a larger organization.

b. A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press.

c. Type of organization: e.g., profit, nonprofit, educational, small business, minority, woman-owned, etc.

d. Name, telephone number, fax number and E-Mail address of the principal investigator and business personnel who may be contacted during evaluation and negotiation.

e. Identification of other organizations that are currently evaluating a proposal for the same effort.

f. Identification of this Call for Proposal by number and title.

g. Dollar amount requested, desired starting date and duration of project.

h. Date of submission.

2. Technical Proposal

a. Abstract

Include a 150-300 word abstract. This abstract should address the evaluation criteria in these instructions.

b. Advanced Concept Description

This section of the technical proposal shall be a detailed description of the concept to be investigated. It should include objectives and expected significance, relation to the present state of knowledge, and relation to previous work done on the project and to related work in progress elsewhere. The concept description should address the evaluation factors in these instructions.

c. Advanced Concept Development Work Plan

This section of the technical proposal should outline the plan of work and a description of analysis methods and procedures. Also, any substantial collaboration with individuals not referred to in the budget or use of consultants should be described.

d. Management Approach

In the event large or complex efforts involving interactions among numerous individuals or other organizations are proposed, plans for distribution of responsibilities and arrangements for ensuring a coordinated effort should be described.

e. Personnel

The principal investigator (PI) is responsible for supervision of the work and participates in the conduct of the research regardless of whether or not compensated under the award. Include a short biographical sketch of the PI, a list of any publications relevant to the proposed concept and any exceptional qualifications. Omit social security numbers and other personal items that do not merit consideration in evaluation of proposals. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.

3. Cost Proposal (See Appendix D)

a. The cost proposal shall be submitted as a separate proposal from the technical proposal. As applicable, include separate cost estimates for salaries and wages, fringe benefits, equipment, expendable materials and supplies, services, domestic and foreign travel, ADP expenses, publication or page charges, consultants, subcontracts, other miscellaneous direct costs and indirect costs. Do not use separate “confidential” salary pages. List salaries and wages in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, graduate students, research assistants and technical and other non-professional personnel). Estimate all staffing data in terms of staff-months or fraction of full-time.

b. Explanatory notes should accompany the cost proposal to provide identification and estimated cost of major capital equipment items to be acquired, purpose and estimated number and lengths of trips planned. Also include basis for indirect cost computation (including date of most recent negotiation and cognizant agency) and clarification of other items in the cost proposal that are not self-evident.

c. At the conclusion of your cost proposal section, include a projected total monthly funding profile. The grand total of this monthly funding profile should very closely approximate the total proposed cost in the cost section.

d. Allowable costs are governed by FAR Part 31 and the NASA FAR Supplement Part 1831 (and OMB Circulars A-21 for educational institutions and A-122 for nonprofit organizations).

4. Classified Material

Proposals shall not contain any classified material.

5. Special Matters

a. Include any required statements of environmental impact of the research, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other Government-wide guidelines.

b. Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency and administrative contracting officer, when applicable.

E. Length

A concerted effort should be made to keep proposals as brief as possible, concentrating on substantive material. The maximum technical proposal size is 12 pages. The cost proposal has no page limit. The entire proposal must be in a font size that is readable, in a 8.5 by 11 inch format and contain a minimum of 1 inch margins.

F. Representations/Certifications (See Appendix E)

The representations/certifications contained in Appendix E are not to be submitted with either the technical or cost proposals. Should a proposal be selected by the NIAC for a Phase I award, the proposer must supply fully executed originals of these representations/certifications prior to award.

G. Joint Proposals

Where multiple organizations are involved, the proposal must be submitted by only one organization. It should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated. In other instances, simultaneous submission of related proposals from each organization might be appropriate, in which case parallel awards could be made.

H. Late Proposals

A LOI, proposal or modification received after the date specified in this Call for Proposals may be considered if doing so is deemed to be in the best interest of the NIAC as determined by the Director of NIAC.

I. Withdrawal

The proposer may withdraw their proposal(s) at any time before award. Proposers are requested to notify the NIAC if the proposal is funded by another organization or of other changed circumstances, which dictate termination of the peer review for that particular proposal.

J. Evaluation Criteria

1. The principal elements (of approximately equal weight) considered in evaluating a proposal are its relevance to NASA's and the NIAC's objectives, intrinsic merit and cost realism. Specific aspects of these elements are as follows:

a. Is the concept revolutionary rather than evolutionary?

b. Is the concept new and not duplicative of concepts being studied, or previously studied? To what extent does the proposed activity suggest and explore creative and original concepts. Has the concept been studied elsewhere?

c. Does the concept involve major systems and architecture and potentially have a major impact on how future NASA missions are accomplished?

d. Does the concept include an adequate technical description of the physics, chemistry and technology, and qualify the potential benefits?

2. Evaluation of the cost of a proposed effort may include the realism and reasonableness of the proposed cost and available funds.

K. Evaluation Techniques

1. The NIAC Director, based on recommendations from the peer review panels, will make the final selection decision. In all cases, proposals are subject to scientific review by discipline specialists in the area of the proposal.

2. Each of the Evaluation Criteria (see Section J. above) will be evaluated using the following factors that will be considered in evaluation of merit:

a. How well qualified is the proposer (individual or team) to conduct the project?

b. How well conceived and organized is the proposed activity?

L. Selection for Award

1. Following selections, all proposers will be notified by electronic or postal mail of the decision on their proposal. The NIAC may desire to select only a portion of a proposer's area of study, in which case the proposer will be given the opportunity to accept or decline such partial support.

2. When a proposal is not selected for award, the proposer will be notified. The NIAC will explain generally why the proposal was not selected. Proposers desiring additional information may contact the selecting official who will arrange a debriefing. A proposal that is scientifically meritorious, but not selected for award during this phase, may be included in subsequent reviews by explicit request of the proposer to the NIAC.

3. When a proposal is selected for award, USRA personnel will negotiate the award by the NIAC. The proposal is used as the basis for negotiation. Certain business data may be requested prior to award. USRA will forward a model award instrument and other pertinent information to the awardee at the conclusion of negotiations.

M. Cancellation of Requirement

The NIAC reserves the right to make no awards under this CP and to cancel this CP. USRA assumes no liability for canceling the CP or for any entity's failure to receive actual notice of cancellation. USRA will assume no responsibility for costs incurred by any individual or organization in the preparation of a proposal in response to this CP.

APPENDIX A

Summary/Schedule of Significant Phase I Events

Identifier:	NIAC CP 98-01
Letter of Intent Due Date:	July 10, 1998
Proposal Due Date:	July 31, 1998
Evaluation Method:	Peer Review
Selecting Official:	Director NASA Institute for Advanced Concepts

APPENDIX B

NIAC Grand Challenges

Introduction

The NIAC encourages potential proposers to focus their thoughts decades into the future and aggressively pursue concepts that will "leap-frog" the evolution of current aerospace systems. Rickenbacker observed that,

> *The very existence of aviation is proof that man, given the will, has the capability to accomplish deeds that seem impossible.*
>
> *Our progress in aviation and in space travel is limited only by the boundaries of human imagination.*

Science fact and fiction writers have often stimulated our imagination. One of the most prominent space scientists of our time was Carl Sagan.

> Carl Sagan , Pale Blue Dot: *…the continuing dance between science and science fiction, in which the science stimulates fiction, and the fiction stimulates a new generation of scientists, a process benefiting both genres.*

While the NIAC seeks concepts which stretch the imagination, these concepts should be based on sound scientific principles. **Now is your time to dream and stretch your imagination**. The **"Dreams"** supported through the NIAC funding can be the framework for future NASA missions and programs. Advanced concept proposals should be aimed well beyond the evolution technical challenges that occupy current programs and set new, **revolutionary** directions in aeronautics and space. We are seeking advanced concepts, ***specifically systems and architectures***, that are indeed "Grand" and revolutionary, and which ***will expand our vision of future possibilities***.

Just as was noted by Eddie Rickenbacker, at one time, human flight seemed impossible. And, as noted by Arthur C. Clarke, some **"**impossibilities**"** of today, could be the **"**possible worlds**"** of the future.

> Clarke's Second Law: *The only way of discovering the limits of the possible is to venture a little way past them into the impossible.*

These "possible worlds" are the ones that we seek in this NIAC Call for Proposals.

> Freeman Dyson, Imagined Worlds: *If we are looking for new direction in science, we must look for scientific revolutions. When no scientific revolution is under way, science continues to move ahead along old*

directions. It is impossible to predict scientific revolutions, but it may sometimes be possible to imagine a revolution before it happens.

Grand Challenges in Aeronautics and Space

The proposer should become familiar with the information supplied in the NASA webpages (http://www.nasa.gov/) which provides valuable insight into the NASA mission, current activities and future directions. The NASA Strategic Plan provides valuable background information about the visions of future aeronautics and space programs and should be considered as a starting point for the development of revolutionary concepts being sought by the NIAC. **The general thrust of the NIAC advanced concepts is to develop revolutionary ideas which have a potential for leaping well past the current plans and can enable and expand the vision of NASA's long-range strategic plans.** These proposed advanced concepts must be focused 10-40 years into the future.

To assist potential proposers in the development of advanced concepts, the NIAC has developed a list of challenges in science and engineering which, while not exclusive, are meant to give some guidance for visionary and revolutionary concept development. **These challenges in aeronautics and space listed below are examples of focus areas for proposals and are not meant to be comprehensive.** While the grouping of the challenges approximately corresponds to the NASA Enterprises, proposers are encouraged to conceive of synergistic concepts which address the challenges of more than one Enterprise or focus area. **Proposals are also encouraged in other areas which are not specifically listed, but are still within the NASA mission areas.** The NASA Enterprise areas are described in the NASA webpages.

Space Science

Solve the mysteries of the universe.

- Expand our knowledge of the universe from the Big-Bang to the present including, the first 300K years and the formation of galaxies; the interaction of stars galaxies and interstellar matter and exotic structures and phenomenon such as black holes, quasars, pulsars and mysterious ultra high energy particles.
- Devise techniques to test the physical theories and reveal new phenomenon throughout the Universe including gravitational and relativistic phenomenon, such as testing the variation of gravity with time and validating the general theory of relativity.
- Identify, characterize and quantify the invisible mass in the universe.

Explore the solar system.

- Develop an understanding of sun-earth interactions as they related to critical Earth processes.
- Define and optimize techniques, including space mission components, for detecting and characterizing near-Earth (or Earth approaching) asteroids and comets.
- Conduct comprehensive exploration of the entire solar system (including beyond the planets) through remote sensing, in-situ measurements and sample return.

Explore beyond the solar system.

- Discover, image and characterize planets around other stars and identify which, if any, may be most Earthlike.
- Observe Wolszczan planets directly and develop systems for future exploration.

Search for life beyond Earth.

- Understand the relationships and develop models to classify the relationships between life and planetary evolution.

Eliminate the barriers of extreme distance and long duration space flight.

- Increase the distance to which we can travel, our ability to observe where we cannot travel and the quality of the work we can do there.
- Develop mechanical, electrical or biological self-diagnostic and repair systems for long duration space flight.
- Develop high efficiency, high performance detectors and instruments for the entire electromagnetic spectrum.

Earth Science

Develop revolutionary cost-effective means to enable entirely new investigations to expand our understanding of the Earth system beyond current capability.

- Provide knowledge of component climate processes in a framework that allows assessments and forecasting of changes in the global earth system, including short-term severe (e.g., tornadoes, hurricanes and earthquakes) and long term (e.g., El Nino).
- Develop measurement and analytical techniques to create a comprehensive model of the Earth's biosphere with special emphasis on the ocean-atmosphere and earth-atmosphere interfaces.
- Develop micro-instrumentation for comprehensive distributed *in situ* measurements.
- Develop new techniques to manage the explosive growth of data and provide timely analysis.

Human Exploration and Development of Space

Enable human exploration and development of our solar system.

- Develop systems for the generation and distribution of energy anywhere in the solar system.
- Develop mechanical, electrical or biological self-diagnostic and repair systems for long duration space flight.

Transport humans comfortably between desirable habitats throughout the solar system.

- Provide reliable, safe, short transit times, low radiation exposure, low accelerations, artificial gravity, low cost, adequate amenities).
- Use knowledge from advanced genetics and biotechnology to optimize the selection and performance of human crews in prolonged missions.
- Develop compact, non-invasive methods, compatible with the space environment to assess/monitor/amplify physiological and biological processes and cognitive motor functions.

Enable human settlements beyond Earth.

- Emphasize the use of *in situ* resources for self-sufficiency including habitats, infrastructure and consumables.
- Develop techniques and facilities to enable long term human activities in space vehicles and on planetary bases.
- Develop self-reliant (e.g., self-diagnostic and repair) systems including mechanical, electrical or biological systems for humans in long duration space flight and in planetary habitats.
- Develop biological systems which assist in the support of planetary human habitats.

Use the space environment to enhance life on Earth.

- Identify how unique aspects of the space environment can be used to provide knowledge about disease, improve health and extend life on Earth.
- Use unique environments (e.g., variable gravity, microgravity and space radiation) throughout the solar system to develop a comprehensive understanding of the basic physical, chemical and biological/medical processes and human physiology.

Aeronautics and Space Transportation

Expand our use of aviation.

- Develop advances in air travel safety, affordability and environmental compatibility that would open up aviation to all people either as pilots or passengers.
- Reduce portal to portal, multi-modal, aviation transportation time on a global basis by a factor of three.

Explore innovative aviation system enablers.

- Mitigate the constraints of flight transportation systems related to cost, emissions and noise (sonic booms, jet noise and rotor noise).
- Provide broadband information/data (communication, navigation, weather, and situation awareness) to all participants in the global aviation system to dramatically improve safety.
- Develop air vehicles with unlimited flight duration for uses such as: observation and detection of earth/atmosphere/solar relationships; information relay and/or collection; solar energy collection and relay.

Revolutionize our access to space

- Devise a space transportation system where transportation and operation costs are a small fraction of the total mission costs
- Develop advances in space transportation to allow science, research, commerce, and exploration platforms to deliver payloads on rendezvous missions to the outer planets within a ten-year mission time frame and to go beyond our solar system to interstellar distances in a fifty-year horizon.
- Develop space propulsion systems capable of continuous thrust to achieve very high speed.
- Identify and develop non-propulsion means for space travel such as highly economical concepts that do not rely on an on-board propulsion system.

APPENDIX C

NASA White Paper on Property Rights

Any ideas or concepts generated during performance of a NIAC subcontract fall under either the Patent Rights clause (or New Technology clause for large businesses) or the Rights in Data - General clause, or both.

If the idea or concept has not been developed in sufficient detail to the level of an "invention" that satisfies statutory requirements, then the information or data on that idea falls exclusively under the Rights in Data - General clause and the Government obtains unlimited rights. Unlimited rights means the right of the Government to use, disclose, reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, in any manner and for any purpose, and to have others to do so.

If the idea or concept is developed to the point that it satisfies the statutory requirements for obtaining a patent, then the "invention" falls under the Patent Rights clause and the contractor can, at its option, decide to pursue patent protection on that invention. If patent protection is pursued by the contractor the contractor will own title to the invention and the Government obtains a minimum government purpose license to use for its purposes, including future procurement. If the contractor decides not to pursue patent protection on the invention then NASA can, at its option, pursue patent protection. NASA would own title to which NASA can license third parties. Due to the nature of the ideas and concepts to be generated, it was our opinion that most, if not all, of the advanced concepts would not be sufficiently developed to satisfy the patentability requirements.

If the idea or concept is software related (with actual code creation), it falls under both the Patent Rights clause and the Rights in Data – General clause. Both patent and copyright protection may be established in software. Under the Rights in Data - General clause NASA does not have to grant the contractor permission to assert claim to copyright in the software if it is the desire of NASA to make the software freely available to the public.

Any ideas generated at private expense, and outside the contract, that are proposed to be "further developed" under the contract, could be marked by the participant as proprietary or a trade secret. If NASA decides it is acceptable for the Institute to consider and accept proprietary ideas then that data would be delivered with a notice or legend as "limited rights data" with appropriate restrictions placed on its dissemination. NASA and the NIAC plan to disseminate all technical information reported to the Institute, accepting such limited rights data could restrict such dissemination and is not recommended.

In summary, in the private sector, ideas may be kept as trade secrets. Ideas that reach the level of inventions may also be kept as trade secrets. There is nothing mandating that someone in the private sector select patent protection as the form of intellectual property over a trade secret as the form of intellectual property. However, in the world of Government contracts, there are no trade secrets to ideas or inventions generated under contracts funded by the Government. Data on ideas can be disseminated. Patent protection is available

if the idea or concept has been sufficiently developed to satisfy statutory requirements for obtaining a patent. The patent provides its owner with the right to exclude others from making, using and selling the invention but the idea is fully disclosed in the published patent. Copyright protection, if available, protects the expression of an idea, not the idea itself.

The Patent Rights Clause (52.227-11), or the New Technology Clause (1852.227-70) where appropriate, must flow down to the NIAC subcontractors. The rights and procedures established by the Rights in Data - General clause (52.227-14) should also flow down, although this is not the data clause used in our standard grant instruments if the Institute decides to use a grant.

APPENDIX D

Cost Breakdown Format

	MONTHS					
	1	2	3	4	5	6
DIRECT LABOR						
TOTAL DIRECT LABOR						
OVERHEAD						
Fringe Benefits						
Overhead						
Subcontract						
SUBTOTAL DIRECT LABOR						
MATERIALS						
EQUIPMENT						
SUBCONTRACTS						
TRAVEL						
OTHER DIRECT COSTS						
OTHER						
TOTAL OTHER DIRECT COSTS						
G & A						
SUBTOTAL COSTS						
FEE						
TOTAL PRICE						

APPENDIX E.1.

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, 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.

(1) The prospective primary participant certifies to the best of its knowledge and belief, 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 debarment or agency;

(b) Have not within a three-year period preceding this proposal been convicted of 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 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 governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1) (b) of the 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.

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

Proposal Title:

_____

Signature: _____ Date: _____

Name and Title: _____

Institution: _____

APPENDIX E.2

Certification Regarding Drug-Free Workplace Requirements Contractors Other Than Individuals

The Contractor certifies that it will provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will taken against employees for violation of such prohibition:

(b) Establishing a drug-free awareness program to inform employees about --

(1) The dangers of drug abuse in the workplace;
(2) The Contractor's policy of maintaining a drug-free workplace;
(3) Any available drug counseling, rehabilitation, and employees assistance programs; and
(4) The penalties that may be imposed upon employees for drug abuse violations occurring

(c) Making it a requirement that each employee to be engaged in the performance of the contract be given a copy of the statement required by paragraph (a);

(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the contract, the employee will --

(1) Abide by the terms of the statement; and
(2) Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after such conviction;

(e) Notifying the agency within ten days after receiving notice under subparagraph (d) (2) from and employee or otherwise receiving actual notice of such conviction;

(f) Taking one of the following actions, within 30 days of receiving notice under subparagraph (d) (2), with respect to any employee who is so convicted --

(1) Taking appropriate personnel action against such an employee, up to and including termination; or
(2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or appropriate agency;

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e) and (f).

Proposal Title: _____

Signature: _____ Date: _____

Name and Title: _____

Institution: _____

APPENDIX E.3

ASSURANCE OF COMPLIANCE WITH THE REGULATIONS UNDER TITLE VI OF THE CIVIL RIGHTS ACT OF 1964

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) and all requirements issued pursuant to that title, to the end that in accordance with Title VI of that Act and the Regulation, no person in the United States shall, on the ground of race, color or national origin, be excluded from participation in benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives Federal financial assistance from the Government; and HEREBY GIVES ASSURANCE THAT it will immediately take any measures 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 the Government, 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 the Government.

THIS ASSURANCE is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property, discounts or other Federal financial assistance extended after the date hereof to the Applicant by the Government, 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 this assurance on behalf of the Applicant.

Proposal Title: _____

Signature: _____

Date: _____

Name & Title: _____

Organization Name & Address:

_____

_____

_____

_____