FLIGHT RESEARCH for
REVOLUTIONARY
AERONAUTICAL CONCEPTS

NASA RESEARCH ANNOUNCEMENT
SOLICITING RESEARCH PROPOSALS
FOR THE PERIOD ENDING SEPTEMBER 30, 1999

NRA 99-LaRC-3

July 28, 1999
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Langley Research Center
Hampton VA 23681-2199

Please refer to Attachment 1 for a summary of the Government’s response to the
comments and questions received regarding the draft release of this NRA.
REVCON: Flight Research for Revolutionary Aeronautical Concepts

This NASA Research Announcement (NRA) solicits proposals for the flight research of advanced vehicle concepts that accelerate the exploration of high-risk, breakthrough technologies in order to enable revolutionary departures from traditional approaches to air vehicle design. This NRA focuses solely on aeronautics vehicles and technology, rather than space access or space transportation. Through this NRA process, it is NASA’s intent to enhance U.S. aerospace competitiveness by supporting a continuous series of advanced vehicle concept development and flight research activities that achieve the following Enterprise objectives:

- Revolutionize traditional approaches to aerospace technology evolution and maturation
- Develop methods to reduce time to develop and certify new flight vehicles and flight vehicle systems
- Develop new methods for enhancing scale accuracy and the fidelity of simulation techniques
- Expand the current portfolio of technology investigations into non-traditional arenas
- Provide early validation of the concepts in a relevant environment, specifically flight, to demonstrate breakthrough technology

Awards will be initiated in FY2000 as the first in a continuous series of advanced vehicle maturation, development, and flight demonstration activities. NASA is seeking experiments and demonstrations that will allow on-going REVCON initiatives every 24 to 48 months. NASA Dryden Flight Research Center is the Lead Center for this project, although this NRA is released through the Langley Research Center.

The focus of the Revolutionary Concepts Project (REVCON) is to develop a robust project with multiple, consecutive flight-test elements that are responsive to civil, commercial, and Department of Defense (DoD) needs. Mission areas that may be targeted by REVCON studies and research vehicles include advanced general aviation and personal air transportation vehicles, supersonic and subsonic transports, rotorcraft, and advanced military air vehicles. REVCON studies and demonstrators are expected to leverage from and be synergistic with the Flight Research, Airframe Systems, Rotorcraft, Information Technology, and Propulsion Systems Base Program technology development activities, as well as any appropriate focused programs, to the fullest extent possible.

The REVCON Project consists of flight research of advanced vehicle concepts preceded by systems analysis studies to select the best concepts. The projects within REVCON may include, but are not limited to the following: systems analysis studies; project planning; rapid maturation of a concept and/or enabling technologies; design, development, fabrication, integration and testing of vehicles or experiments. The technology-driven REVCON research may consist of government-led or industry-led efforts to assure a broad coverage of technologies and applications. Flight research will be focused on technology demonstrations with short development times and must
demonstrate high-payoff technologies that significantly advance the state-of-the-art. REVCON projects may include new research vehicles and/or advanced technology experiments on new or existing test platforms. Examples from past flight research projects include the X-36 and Actuated Nose Strakes for Enhanced Rolling (ANSER) on the F-18. Demonstrators must use representative hardware in a relevant environment to significantly advance the Technology Readiness Level and to validate the technologies through flight testing. Innovative research partnerships with NASA, utilizing a range of contractual mechanisms as described in Appendix B, are highly encouraged.

The selection process will be conducted using a two-phase approach. Phase 1 will be composed of systems studies to identify the benefits and challenges of new advanced vehicle concepts. If significant potential benefits are established via the Phase 1 systems analysis, and if a valid need for flight research is also identified, then the concept will be considered for Phase 2, the development and execution of a flight research project. NASA reserves the right to make the determination of whether the project evolution will occur based on the system analysis studies (Phase 1), Agency/Program/Project priorities, and the availability of sufficient funding. All proposals shall address both Phase 1 and Phase 2 activities (see Appendix A).

REVCON will migrate technologies from the laboratory into “real world” operating environments, raising the Technology Readiness Level of concepts and technologies that can dramatically contribute to the Office of Aero-Space Technology (OAT) Pillar Goals (see http://www.hq.nasa.gov/office/aero/). The prospect of flight requires an understanding of how each component technology must function properly when integrated into the overall flight system, thereby providing a maturity level which cannot be achieved in any other test environment. This gives greater assurance of the technology application to existing and future vehicle systems. Flight testing is justified only when needed to advance technology.

Participation in this NRA is open to all organizations or teams of organizations from industry, educational institutions, nonprofit organizations (includes not-for-profit organizations), and U.S. Government agencies (acting independently or as part of a team). Multiple awards are anticipated as a result of this NRA. Communications concerning this NRA, from receipt of proposals through selection announcement, between the parties submitting proposals and the Government shall be made through the contracting officer. Notwithstanding the above, Government organizations and industry collaborating to submit a joint proposal (under Appendix B, paragraph f) may communicate with each other as needed. A proposal that is scientifically and programmatically meritorious, but cannot be accepted during its initial review under an NRA because of funding constraints or uncertainties, may be included in subsequent reviews unless the offeror requests otherwise. The REVCON Intercenter Evaluation Board (ICEB), supported by systems analysts and technical domain experts, will review proposals. All or part of a proposal may be selected for negotiations leading to possible award unless the offeror requests otherwise. Evaluation and selection of proposals for Phase 1 may occur for a period of one year following the receipt of proposals in response
to this NRA. Phase II awards can be made for a period of one year upon completion of Phase I activities.

This NRA and related documents may be obtained over the Internet, in Microsoft Office Suite format, at http://procurement.nasa.gov/EPS/LaRC/class.html.

NRA Number: NRA 99-LaRC-3

Proposals Due: September 30, 1999

Submit Proposals to: NASA Langley Research Center
ATTN: NRA 99-LaRC-3
9A Langley Blvd Room 125
MS 144
Hampton VA 23681-2199

Copies Required: 25, plus the original signed copy

Selecting Official: Mr. Kevin L. Petersen
Director
NASA Dryden Flight Research Center

Obtain additional information from the following sources:

Technical: Mr. Gerald Malcolm
NASA Dryden Flight Research Center
P.O. Box 273
Edwards, CA  93523
(661) 258-7402
gerald.malcolm@dfrc.nasa.gov

Contracting: Sharon D. DeBerry
(757) 864-7928
9A Langley Blvd
MS 126
Hampton VA 23681-2199
s.d.deberry@larc.nasa.gov

Mary Jane Yeager
(757) 864-2473

Appendix A provides technical information for the general areas for which research proposals are sought, including goals and objectives, phase definitions, funding guidelines, evaluation factors, and specific supplemental instructions for this NRA. Appendix B, general instructions for all NRAs, provides basic guidance needed for preparation of proposals. Appendix C provides a list of Government points of contact.
Appendix D describes policy on foreign participation. Appendix E provides a sample letter for NASA Center resource commitments, plus templates for the proposal letter of intent, as well as a cover sheet and a summary page to be included in all proposals.

Your interest in participating in this effort is appreciated.

Dr. Jeremiah F. Creedon  
Director, NASA Langley Research Center

Kevin L. Petersen  
Director, NASA Dryden Flight Research Center

Six Enclosures:  
1. Appendix A  
2. Appendix B  
3. Appendix C  
4. Appendix D  
5. Appendix E  
6. Attachment 1
APPENDIX A

NRA 99-LaRC-3
REVCON: Flight Research for Revolutionary Aeronautical Concepts

TECHNICAL DESCRIPTION and PROPOSAL INSTRUCTIONS

NASA supports flight research through sponsorship of technology programs primarily conducted at the NASA Dryden Flight Research Center. Dryden Flight Research Center, Langley Research Center, Glenn Research Center, and Ames Research Center sponsor research for the development of advanced vehicle technologies to dramatically contribute to the OAT Pillar Goals (see http://www.hq.nasa.gov/office/aero/).

This NASA Research Announcement (NRA) solicits proposals for the first series of REVCON advanced technology flight demonstrators and supporting systems analysis studies that offer new and innovative technologies to enable safe, environmentally friendly, high-performance, low-cost military and civil air vehicles while maintaining U.S. leadership for the long term. The Government's goal is significant vehicle improvements through development and integration of advanced technologies applicable to future defense and transportation systems. This NRA’s focus is aeronautical flight research. All concepts and technologies demonstrated must contribute to improving the safety, performance, capacity, reducing the emissions and/or noise, and development, production, or operating costs of future air vehicle systems. Projects should include innovative use of design, concept trades, and technology integration and must make effective use of flight research to advance the readiness levels of the selected technologies.

1.0 Flight Research Goal and Objectives

The goal of REVCON flight research is to develop new aeronautical vehicle concepts that accelerate the exploration of high-risk, breakthrough technologies in order to enable revolutionary departures from traditional approaches to air vehicle design. REVCON has the following project objectives:

- Develop concepts that are revolutionary departures from traditional approaches to aeronautical design
- Utilize next generation design tools to produce substantial benefits in concept development
- Change fundamentally the way systems are designed
- Provide early validation of concepts in a relevant environment

REVCON is expected to accelerate these high-risk technologies through joint efforts with industry, academia, other government agencies, and the NASA Aeronautics Enterprise. REVCON is intended to provide early demonstrations of concept feasibility in a relevant environment (flight) and enhance or create opportunities for reduced emissions, noise,
travel time or cost of air travel, increased safety or system throughput, and improvement of next generation design tools. REVCON projects should provide opportunities for increased economic competitiveness of the U.S. aerospace industry or increased national security.

2.0 Phase Definition

REVCON project efforts will include system analyses, rapid maturation of key enabling technologies, vehicle/hardware design, fabrication, instrumentation, assembly, ground test, flight test, and documentation. The activities under this solicitation by this NRA will consist of the following two phases:

Phase 1, or the screening phase, will be focused on evaluating the system benefits of the technology through system studies, establishing the feasibility of the flight vehicle experiment, and a detailed definition of the proposed flight research project. Selected offerors will be expected to support NASA independent evaluation of the technology concept through a NASA system benefit analysis, as well as conduct feasibility studies and develop details of the proposed flight research experiment, during this 6-8 month phase. Within the funding limitations described below, limited maturation activities are also possible in this phase, such as wind tunnel testing or additional analysis. Multiple selections for Phase 1 are expected. Phase 1 deliverables will include a final report that describes the potential benefits identified in Phase 1, scientific and technical feasibility of Phase 2, updated cost and schedule estimates, and a Phase 2 project definition.

Phase 2, or the implementation phase, will be focused on the planning, maturation, development, and flight test of vehicles and/or technology demonstrations leading to an assessment of the readiness of the technology. The Phase 2 portion of the NRA proposals shall be a detailed description of the concept maturation, development, implementation, and flight test activities. Flight research may be accomplished on new or existing test platforms. Phase 2 selections will be made after Phase 1 studies are complete. Phase 2 selections will be based on the results of Phase 1, as detailed in the final report and all Phase 1 deliverables. One or more awards for flight test of vehicles or technology demonstrators are anticipated, spanning 3 to 4 years.

Proposals should include technical and cost information for both Phase 1 and Phase 2 activities at initial submittal and will be limited to 20 pages, as described in Appendix A (4.0, paragraph 1). The Phase 1 information will be considered a firm proposal, while the Phase 2 information, which will be considered preliminary, will be used to understand the overall scope of the proposed effort and will be a factor in the Phase 1 selection. Proposal updates may be requested for selected Phase 2 efforts. Cost sharing is encouraged during both Phase 1 and Phase 2.
3.0 Funding

The following budget information, while tentative, is provided for planning purposes only. Any award will be subject to the availability of funds and appropriate technical evaluation. The approximate near term funding plan for Phase 1 (system analysis, feasibility, and project definition) is $1.8M, to be divided among about six awards in fiscal year 2000. The Government reserves the right to defer funds to Phase 2. The total anticipated multiple-project funding for Phase 2 is $50M from fiscal years 2001 through 2003, to be distributed over one to three awards.

In accordance with NASA FAR Supplement (NFS) 1835.016-70(c)(2), “Funds are not currently available for awards under this NRA. The Government’s obligation to make award(s) is contingent upon the availability of appropriated funds from which payment can be made and the receipt of proposals that NASA determines are acceptable for award under this NRA.”

4.0 Supplemental Proposal Instructions

Proposals shall conform to the guidelines in Appendix B, “Instructions for Responding to NASA Research Announcements.” The following supplemental instructions are provided in addition to Appendix B:

1. A separate proposal is required for each technology demonstration (flight vehicle or technology demonstrator). An offeror may submit more than one proposal. Each proposal is limited to 20 pages as indicated below. Proposals shall describe the proposed efforts in both Phase 1 and Phase 2. The Phase 2 portion of the proposal should provide sufficient detail to clearly describe the flight research phase of the project that would follow the Phase 1 activities. If selected for Phase 2, NASA may request that the Phase 2 portion of the proposal be updated at the end of Phase 1 activity, based on the Phase 1 final report. The initial award of Phase 1 projects will be based on both the Phase 1 and Phase 2 portions of the proposals. The total length of the technical portion of the proposal shall not exceed 20 pages. Proposal pages exceeding the 20-page limit will not be evaluated and will be returned to the offeror. Key personnel descriptions will count in this total. There is no restriction on the required cost information (subparagraph 8, paragraph (c), Appendix B); however, the Summary Cost Breakdown required by paragraph 5.2 below is included within the 20-page limit. Pages are 8.5” x 11” paper with foldouts not to exceed 11” x 17”, and each foldout will be counted as two pages. There shall be a maximum of 52 lines per page using uncompressed font point sizes of 12 or larger, normal leading (space between lines), and 1-inch margins. Proposals should be written concisely in English. Text embedded in graphics or figures must be 8-point font size or greater. The following are excluded from the page limitations: proposal cover sheet; proposal summary sheet; transmittal letter and letters of commitment; detailed cost information; table of contents; lists of acronyms and abbreviations; and the information required by Appendix A, paragraph 4.0, subparagraph 7.
2. NASA requests that each proposal include a concise (one page), non-proprietary summary describing the concept or technology, including a drawing, photo, or illustration (see Proposal Summary Sheet, page E-6). These summaries will be used for dissemination to the stakeholders (NASA-HQ, Program Managers, Congress, Office of Management & Budget, etc.), other project advocates, the public, and other REVCON NRA proposers.

3. Government installations may provide resources (including analysis, design, test, fabrication, facilities, flight vehicles, and other resources) within the capabilities and resources of the various field centers to support the proposed activities of non-governmental organizations. The proposal must include documentation of the installation’s agreement to provide the planned services in the form of a letter of commitment for Phase 1 from the installation’s director or designee. A conditional letter of commitment or a plan for reaching commitment pending award of Phase 2 is also required. The letters and/or plan may be combined into a single document if desired. This letter of commitment (reference Appendix E) must describe the tasks to be performed, key milestones, assumptions made and a cost summary broken down by civil service labor, support contractor labor, materials and other costs by FY. Appendix C provides a list of installation leads. The installation lead is the single entry and exit point to the installation. The lead is responsible for coordination with the appropriate laboratory, facility, etc., within the installation.

4. Non-government partners may also provide resources. A letter of commitment for Phase 1 concerning furnished resources (e.g., flight test vehicles, facilities, manpower, materials, etc.) provided by industry or other non-government sources must be included. A conditional letter of commitment or a plan for reaching commitment pending award of Phase 2 is also required. The letters and/or plan may be combined into a single document if desired. The letter(s) must describe the resources to be supplied, assumptions made, availability, schedule, and cost information. The letter(s) must be addressed to the proposer and signed by the provider of the resources. It is the proposer’s responsibility to identify, negotiate and come to agreement(s) with resource providers.

5. The offeror’s proposal shall include support of final reviews of the Phase 1 activities, and Phase II midterm, final, and annual reviews. Additionally, annual reviews to the REVCON Lead Center Program Management Council and an independent annual NASA review team may be required.

6. Many types of research agreements are appropriate for use in NRA awards, including but not limited to Space Act Agreements (SAA), cooperative agreements, and various contractual mechanisms. In general, cost sharing is highly encouraged, and it is permitted under contracts in which there is no profit. Cost sharing is required for cooperative agreements (see paragraph 7, below).

7. Offerors proposing to be awarded a “cooperative agreement to for-profit firms” in accordance with the “Grant and Cooperative Agreement Handbook” (NHB 5800.ID),
shall provide the following additional information with their proposal for evaluation purposes:

(a) In accordance with NHB 5800.1D, Section 1274.202(c) (3) and (4), a schedule of fixed funding milestones must be generated as a result of the cooperative agreement award. In order to fully explain the technical approach in the proposal, offerors shall propose a schedule of fixed funding milestones for the entire proposal. The milestones should be performance-based and verifiable and include the NASA and recipient resource share on each milestone.

(b) In accordance with NHB 5800.1D, Section 1274.903 Responsibilities, NASA and the recipient must collaborate on the effort under the proposed agreement. As part of the proposal, offerors shall propose how they plan to collaborate with NASA on the effort. In addition, offerors should prepare draft recipient and NASA responsibility statements, in accordance with Section 1274.903, to be used in the award agreement.

(c) In accordance with NHB 5800.1B, Section 1274.202 c, the “expenditure of Government funds by the Recipient and the allowability of costs recognized as a resource by the Recipient shall be governed by the FAR cost principles, 48 CFR part 31.” Offerors shall indicate in their proposal cover letter the extent of compliance with this requirement.

8. See the following web sites for guidance on NRA’s and the latest version of the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1D): http://www.hq.nasa.gov/office/procurement/regs/1835.htm#1835.016-70 for NRA’s; http://procure.msfc.nasa.gov/grcover.htm for NPG 5800.1D.

9. This activity will produce data to advance air vehicle development. It is the goal of this NRA to develop technologies for use by the U.S. Therefore, proposals requiring restrictions on distribution of data concerning any aspect of the completed and resulting technology must include a justification for the restriction and the time period for which the restriction would apply. Restrictions on the distribution of data are discouraged and will be evaluated accordingly. The data generated will be subject to applicable export control laws

10. If a proposal requires the evaluation of classified information, the Langley Research Center point-of-contact (see Appendix C) shall be notified within 14 calendar days after the NRA release date (7 calendar days if there are any special classification issues). The Langley POC will work with the Langley security office to provide instructions on how and where to submit classified attachments. Classified technical information shall be properly labeled and submitted under separate cover as an attachment to the proposal. Classified attachments, less cover material, will count against the page limitations set forth above in Appendix A, Section 4.0, Paragraph 1.
11. The items or services acquired under any resulting contracts/agreements may include the processing of date and date-related data. If that is the case, those items and services are required to include accurate processing of the date and date-related data (including but not limited to calculating, comparing, and sequencing) by all hardware, software, and firmware products delivered under this contract, individually and in combination, upon installation. This also includes the manipulation of data with dates prior to, through, and beyond January 1, 2000, and shall be transparent to the user. Those hardware, software, and firmware products provided under any resulting contract shall, individually, and in combination, successfully transition into the Year 2000 with the correct system date, without human intervention, including leap year calculations. Such products shall also provide correct results when moving forward or backward in time across the Year 2000 or subsequent years.

5.0 Proposal Content

The proposal should be organized in accordance with the outline provided in Appendix B, paragraph (c).

5.1 Project Description

Commensurate with the scope of the proposal and as a part of the information requested in Appendix B, offerors shall provide the following key information as part of the Project Description, Appendix B, paragraph (c)(4):

a) Clear description of the technology to be demonstrated
b) Anticipated system benefits and customers for the technology
c) Flight vehicle(s) anticipated to be used during the flight test project
d) Justification for the need for flight testing
e) Readiness of the technology for flight research and detailed description of the scientific data to be acquired during the flight test
f) Concept and/or technology maturation efforts required for flight
g) Plans and milestones for both Phase 1 and Phase 2
h) Description of responsibilities of the various partners
i) Work breakdown structure for major project elements

5.2 Proposed Costs

In addition, the following shall be provided as part of the Proposed Costs, Appendix B, paragraph (c)(8):

A summary cost breakdown in tabular format (as shown on the next page) in real year thousands of dollars. Note that the summary table shall be a part of the proposal (and count within the 20-page limit).
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For NASA installations, full cost estimates are required and must conform to the National Aeronautics and Space Administration Full Cost Initiative Agency-wide Implementation Guide (February, 1999, see [http://ifmp.nasa.gov/codeb/initiatives/standard.htm](http://ifmp.nasa.gov/codeb/initiatives/standard.htm)). All full cost estimates must be coordinated through the appropriate Center point-of-contact (POC) noted in Appendix C. The Center POC’s will direct proposers to the Service Activity Managers for resource discussions. All proposals must include separate cost estimates for salaries and benefits for direct staffing; equipment; expendable materials and supplies; services (by Service Activity for NASA installations); domestic and foreign travel; consultants; subcontracts; and other miscellaneous identifiable direct costs. In addition, they must include indirect costs such as G&A, and Service Pool Costs. Salaries and benefits must be listed in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, technicians, administrative professionals, clericals, as well as other contract personnel). Provide an estimate of each of the above staffing categories in terms of full-time-equivalents (FTE’s) or fractions thereof. For inflation rates, use 3.2% in FY2000 and 3.1% in FY2001 and outyears.

### 6.0 Evaluation Factors

Goals and objectives of this NRA are noted throughout the document. This section summarizes the evaluation factors that will be applied to REVCON proposals. Responses to this NRA will be evaluated on the criteria in Appendix B section (i), supplemented by the criteria below.

Proposals will be individually reviewed by the REVCON Inter Center Evaluation Board (ICEB) as well as by relevant domain experts. Reviewers have been sequestered from NRA proposal development activities. The individual review comments will be utilized by the ICEB to develop a proposal ranking of Excellent, Very Good, Good, Fair, or Poor. The definitions for the proposal ratings used here are as follows:
Excellent – A comprehensive and thorough proposal of exceptional merit with one or more major strengths. No weaknesses or only minor weaknesses exist.

Very Good – A proposal which demonstrates overall competence. One or more major strengths have been found, and the strengths outweigh any weaknesses that exist.

Good – A proposal which shows a reasonably sound response. There may be strengths or weaknesses or both. As a whole weaknesses, that are not offset by strengths, do not significantly detract from the offeror’s response.

Fair – A proposal that has one or more weaknesses. Weaknesses have been found that outweigh any strengths that exist.

Poor – A proposal that has one or more major weaknesses that demonstrate a lack of overall competence, or would require a major proposal revision to address.

The ICEB proposal ratings and a summary of pertinent strengths and weaknesses will be used to rank the proposals and determine award recommendations. The ICEB rankings and pertinent summary information will be forwarded to the selecting official.

6.1 Relevance to NASA Objectives

To what extent:

a) Does the concept involve aeronautics (as opposed to space or launch vehicles)?

b) Is the concept a revolutionary departure from traditional approaches (i.e., a fundamental and significant change from present day aeronautical technology)?

c) Does the concept involve flight (X-plane or tech demonstration)?

d) Is flight inherent in the acceleration of the Technology?

6.2 Intrinsic Merit

a) How does the concept align with the Aeronautics Enterprise Pillars I & II, Goals 1–8? To which goal(s) is the concept most closely aligned?

b) To what degree will the technology fundamentally improve aeronautical systems design methodology (faster, more accurate, cheaper, etc.)?

c) Would the flight research provide early validation or maturation of the technology in a relevant environment? Why and how?

d) What research data does flight-testing provide that cannot be obtained via other testing methods? Why is it unique?

e) What is the research value/scientific merit of the project?

f) Is the technical implementation of the project research feasible (i.e., are there any breakthroughs “scheduled”)? What is the risk of failure?

g) Does the concept enhance and/or create opportunities for increased U.S. economic competitiveness or National security? Is the potential
practical application of the technology clearly identified and understood?

h) The technology research shall not duplicate other previous or current efforts in government or U.S. industry. To what degree can the project leverage existing or previous research activities?

i) To what degree does the proposal allow access to data? Does the proposal encourage technical interchange within the U.S. aerospace industry?

j) Does the project plan address social benefits (i.e., educational outreach, technology transfer, small disadvantaged businesses, etc.)?

6.3 Cost

a) What is the degree of Partnering? What is the percentage of cost sharing?

b) What is the probability of meeting projected cost and schedule? Is the project implementation plan feasible?

c) Will the project meet REVCON resource and schedule guidelines?
APPENDIX B

INSTRUCTIONS FOR RESPONDING TO
NASA RESEARCH ANNOUNCEMENTS

(a) General.

(1) Proposals received in response to a NASA Research Announcement (NRA) will be used only for evaluation purposes. NASA 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 NRA to be used as the basis of 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 NASA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or material that NASA and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act.

(3) NRAs contain programmatic information and certain requirements which apply only to proposals prepared in response to that particular announcement. These instructions contain the general proposal preparation information which applies to responses to all NRAs.

(4) A contract, grant, cooperative agreement, or other agreement may be used to accomplish an effort funded in response to a NRA. NASA will determine the appropriate instrument. Contracts resulting from NRAs are subject to the Federal Acquisition Regulation and the NASA FAR Supplement. Any resultant grants or cooperative agreements will be awarded and administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1).

(5) NASA does not have mandatory forms or formats for responses to NRAs; however, it is requested that proposals conform to the guidelines in these instructions. NASA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposers’ most favorable terms.

(6) To be considered for award, a submission must, at a minimum, present a specific project within the areas delineated by the NRA; contain sufficient technical and cost information to permit a meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate a more specific current or pending NASA solicitation.
(b) **NRA-Specific Items.** Several proposal submission items appear in the NRA itself: the unique NRA identifier; when to submit proposals; where to send proposals; number of copies required; and sources for more information. Items included in these instructions may be supplemented by the NRA.

(c) The following information is needed to permit consideration in an objective manner. NRAs will generally specify topics for which additional information or greater detail is desirable. Each proposal copy shall contain all submitted material, including a copy of the transmittal letter if it contains substantive information.

1. **Transmittal Letter or Prefatory Material.**
   
   (i) The legal name and address of the organization and specific division or campus identification if part of a larger organization;
   
   (ii) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;
   
   (iii) Type of organization: e.g., profit, nonprofit, educational, small business, minority, women-owned, etc;
   
   (iv) Name and telephone number of the principal investigator and business personnel who may be contacted during evaluation or negotiation;
   
   (v) Identification of other organizations that are currently evaluating a proposal for the same efforts;
   
   (vi) Identification of the NRA, by number and title, to which the proposal is responding;
   
   (vii) Dollar amount requested, desired starting date, and duration of project;
   
   (viii) Date of submission; and
   
   (ix) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization (unless the signature appears on the proposal itself).

2. **Restriction on Use and Disclosure of Proposal Information.** Information contained in proposals is used for evaluation purposes only. Offerors or quoters should, in order to maximize protection of trade secrets or other information that is confidential or privileged, place the following notice on the title page of the proposal and specify the information subject to the notice by inserting an appropriate identification in the notice. In any event, information contained in proposals will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the notice.
Notice: Restriction on Use and Disclosure of Proposal Information

The information (data) contained in [insert page numbers or other identification] of this proposal constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed other than for evaluation purposes; provided, however, that in the event a contract (or other agreement) is awarded on the basis of this proposal the Government shall have the right to use and disclose this information (data) to the extent provided in the contract (or other agreement). This restriction does not limit the Government’s right to use or disclose this information (data) if obtained from another source without restriction.

(3) Abstract. Include a concise (200-300 word if not otherwise specified in the NRA) abstract describing the objective and the method of approach.

(4) Project Description.

(i) The main body of the proposal shall be a detailed statement of the work to be undertaken and 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 statement should outline the plan of work, including the broad design of experiments to be undertaken and a description of experimental methods and procedures. The project description should address the evaluation factors in these instructions and any specific factors in the NRA. Any substantial collaboration with individuals not referred to in the budget or use of consultants should be described. Subcontracting significant portions of a research project is discouraged.

(ii) When it is expected that the effort will require more than one year, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principal emphasis should be on the first year of work, and the description should distinguish clearly between the first year’s work and work planned for subsequent years.

(5) Management Approach. For large or complex efforts involving interactions among numerous individuals or other organizations, plans for distribution of responsibilities and arrangements for ensuring a coordinated effort should be described.

(6) Personnel. The principal investigator is responsible for supervision of the work and participates in the conduct of the research regardless of whether or not compensated under the award. A short biographical sketch of the principal investigator, a list of principal publications and any exceptional qualifications should be included. Omit social security number and other personal items, which do not merit consideration in evaluation of the proposal. 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.

(7) Facilities and Equipment.

(i) Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required. Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use. Include evidence of its availability and the cognizant Government points of contact.

(ii) Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative. Where such arrangements cannot be made, the proposal should so state. The need for items that typically can be used for research and non-research purposes should be explained.

(8) Proposed Costs.

(i) Proposals should contain cost and technical parts in one volume: do not use separate “confidential” salary pages. 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 identifiable direct costs; and indirect costs. List salaries and wages in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, graduate students, research assistants, and technicians and other non-professional personnel). Estimate all staffing data in terms of staff-months or fractions of full-time.

(ii) 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; 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. List estimated expenses as yearly requirements by major work phases.

(iii) 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).

(9) Security. Proposals should not contain security-classified material. If the research requires access to or may generate security-classified information, the submitter will be required to comply with Government security regulations.
(10) Current Support. For other current projects being conducted by the principal investigator, provide title of project, sponsoring agency, and ending date.

(11) Special Matters.
(i) 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 current Government-wide guidelines.

(ii) 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.

(d) Renewal Proposals.

(1) Renewal proposals for existing awards will be considered in the same manner as proposals for new endeavors. A renewal proposal should not repeat all of the information that was in the original proposal. The renewal proposal should refer to its predecessor, update the parts that are no longer current, and indicate what elements of the research are expected to be covered during the period for which support is desired. A description of any significant findings since the most recent progress report should be included. The renewal proposal should treat, in reasonable detail, the plans for the next period, contain a cost estimate, and otherwise adhere to these instructions.

(2) NASA may renew an effort either through amendment of an existing contract or by a new award.

(e) Length. Unless otherwise specified in the NRA, effort should be made to keep proposals as brief as possible, concentrating on substantive material. Few proposals need exceed 15-20 pages. Necessary detailed information, such as reprints, should be included as attachments. A complete set of attachments is necessary for each copy of the proposal. As proposals are not returned, avoid use of “one-of-a-kind” attachments.

(f) Joint Proposals.

(1) Where multiple organizations are involved, the proposal may be submitted by only one of them. 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 would be made.

(2) Where a project of a cooperative nature with NASA is contemplated, describe the contributions expected from any participating NASA investigator and agency facilities or equipment which may be required. The proposal must be confined
only to that which the proposing organization can commit itself. “Joint” proposals which specify the internal arrangements NASA will actually make are not acceptable as a means of establishing an agency commitment.

(g) **Late Proposals.** A proposal or modification received after the date or dates specified in an NRA may be considered if doing so is in the best interests of the Government.

(h) **Withdrawal.** Proposals may be withdrawn by the proposer at any time before award. Offerors are requested to notify NASA if the proposal is funded by another organization or of other changed circumstances which dictate termination of evaluation.

(i) **Evaluation Factors**

(1) Unless otherwise specified in the NRA, the principal elements (of approximately equal weight) considered in evaluating a proposal are its relevance to REVCON’s objectives, intrinsic merit, and cost.

(2) Evaluation of a proposal’s relevance to NASA’s objectives includes the consideration of the potential contribution of the effort to NASA’s mission.

(3) Evaluation of its intrinsic merit includes the consideration of the following factors of equal importance:

(i) Overall scientific or technical merit of the proposal or unique and innovative methods, approaches, or concepts demonstrated by the proposal.

(ii) Offeror’s capabilities, related experience, facilities, techniques, or unique combinations of these which are integral factors for achieving the proposal objectives.

(iii) The qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel critical in achieving the proposal objectives.

(iv) Overall standing among similar proposals and/or evaluation against the state-of-the-art.

(4) Evaluation of the cost of a proposed effort may include the realism and reasonableness of the proposed cost and available funds. It will also consider the degree of partnering.

(j) **Evaluation Techniques.** Selection decisions will be made following peer and/or scientific review of the proposals. Several evaluation techniques are regularly used within NASA. In all cases proposals are subject to scientific review by discipline specialists in the area of the proposal. Some proposals are reviewed entirely in-house, others are evaluated by a combination of in-house and selected external reviewers, while
yet others are subject to the full external peer review technique (with due regard for conflict-of-interest and protection of proposal information), such as by mail or through assembled panels. The final decisions are made by a NASA selecting official. A proposal which is scientifically and programmatically meritorious, but not selected for award during its initial review, may be included in subsequent reviews unless the proposer requests otherwise.

(k) Selection for Award.

(1) When a proposal is not selected for award, the proposer will be notified. NASA will explain generally why the proposal was not selected. Proposers desiring additional information may contact the selecting official who will arrange a debriefing.

(2) When a proposal is selected for award, negotiation and award will be handled by the procurement office in the funding installation. The proposal is used as the basis for negotiation. The contracting officer may request certain business data and may forward a model award instrument and other information pertinent to negotiation.

(3) Cancellation of NRA. NASA reserves the right to make no awards under this NRA and to cancel this NRA. NASA assumes no liability for canceling the NRA or for anyone’s failure to receive actual notice of cancellation.
### APPENDIX C

**NASA POINTS OF CONTACT**

**NRA 99-LaRC-3**

**REVCON: Flight Research for Revolutionary Aeronautical Concepts**

**INSTALLATION LEADS FOR POTENTIAL USE OF NASA INSTALLATION RESOURCES**

<table>
<thead>
<tr>
<th>Installation</th>
<th>Name / Telephone (FAX) / email</th>
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<tbody>
<tr>
<td>Ames Research Center (ARC)</td>
<td>Tim Naumowicz</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:tnaumowicz@mail.arc.nasa.gov">tnaumowicz@mail.arc.nasa.gov</a></td>
</tr>
<tr>
<td></td>
<td>650-604-6674</td>
</tr>
<tr>
<td></td>
<td>650-604-3489 (fax)</td>
</tr>
<tr>
<td>Dryden Flight Research Center (DFRC)</td>
<td>Dave McBride</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:David.mcbride@dfrc.nasa.gov">David.mcbride@dfrc.nasa.gov</a></td>
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<tr>
<td></td>
<td>661-258-2851</td>
</tr>
<tr>
<td></td>
<td>661-258-2298 (fax)</td>
</tr>
<tr>
<td>Langley Research Center (LaRC)</td>
<td>Dr. Richard Antcliff</td>
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<td><a href="mailto:r.r.antcliff@larc.nasa.gov">r.r.antcliff@larc.nasa.gov</a></td>
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<tr>
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<td>757-864-1700</td>
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<td>757-864-1707 (fax)</td>
</tr>
<tr>
<td>Glenn Research Center (GRC)</td>
<td>Frank Berkopec</td>
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<tr>
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<td><a href="mailto:Frank.Berkopec@lerc.nasa.gov">Frank.Berkopec@lerc.nasa.gov</a></td>
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<tr>
<td></td>
<td>216-433-3942</td>
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<tr>
<td></td>
<td>216-433-3902 (fax)</td>
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</table>
APPENDIX D

FOREIGN PROPOSALS AND PROPOSALS INCLUDING FOREIGN PARTICIPATION IN RESPONSE TO NASA RESEARCH ANNOUNCEMENTS

NRA 99-LaRC-3
REVCON: Flight Research for Revolutionary Aeronautical Concepts

a) NASA welcomes proposals from outside the U.S. However, investigators working outside the U.S. are not eligible for funding from NASA. Proposals from non-U.S. entities should not include a cost plan. Proposals from outside the U.S. and U.S. proposals that include non-U.S. participation must be endorsed by the respective government agency or funding/sponsoring institution in that country from which the non-U.S. participant is proposing. Such endorsement should indicate that the proposal merits careful consideration by NASA, and if the proposal is selected, sufficient funds will be made available to undertake the activity as proposed.

b) Successful and unsuccessful proposers will be contacted directly by the NASA sponsoring office. Copies of these letters will be sent to the sponsoring government agency. Should a non-U.S. proposal or a U.S. proposal with non-U.S. participation be selected, NASA’s Office of External Relations, Space Science and Aeronautics Division, will arrange with the non-U.S. sponsoring agency for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency will each bear the cost of discharging their respective responsibilities. Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

1. A letter of notification by NASA, and
2. An exchange of letters between NASA and the sponsoring governmental agency; or
3. A formal Agency-to-Agency Memorandum of Understanding (MOU).

c) As stated in Paragraph b) above, foreign proposals accepted under this NRA will be implemented on the customary no-exchange-of-funds basis in which NASA and the sponsoring foreign agency will each bear the cost of discharging their respective responsibilities. Additionally, NASA funding may not be used to purchase a launch service from a non-U.S. source. However, the direct purchase of goods and/or services from non-U.S. sources by U.S. Principal Investigators or U.S. Co-Investigators is permitted. Proposers are advised that international purchases must meet NASA and Federal regulations and that these regulations may place an additional burden on the successful proposer that should be explicitly included in discussions of the proposed budget.
APPENDIX E

NRA TEMPLATES: COMMITMENT LETTER, NOTICE OF INTENT, COVER PAGE, & SUMMARY PAGE

NRA 99-LaRC-3
REVCON: Flight Research for Revolutionary Aeronautical Concepts

Basic Proposal Submittal Guidelines:

Appendix A Requirements - In addition to the requirements outlined in Appendix A, under the section titled Supplemental Proposal Instructions, the following guidelines and templates are provided to further streamline proposal preparation, coordination and submittal efforts:

Commitment Letters- Proposals considering the use of NASA or other government facilities and resources should use the attached commitment letter format, or a similar format which incorporates the same information. In order to have adequate time to properly process and coordinate commitment letter requests, the following procedural requirements will apply:
- After completion of negotiations with the center, letters must be received by the installation lead for final signature NLT 3:00 PM EDT, August 30, 1999. Any letters submitted after this date will not be processed by the installation lead, and will be returned to the prospective offeror without further action.
- Faxed copies of the original signed commitment letters, for inclusion with the final submitted proposals, will be allowed.
- The rate(s) used in completing the commitment letters to determine civil service cost(s) within each NASA Center will be issued by the respective Installation Leads (see Center points-of-contact in Appendix C).

Other Templates- Proposal Notice of Intent, Proposal Cover Sheet, and Proposal Summary Sheet templates are included in this appendix. They illustrate the minimum required information for each of these elements. Proposers may add information to these elements of the proposal, but not to exceed one page for each.
Mr. Primary Point-Of-Contact  
XYZ Corp  
1200 Industry Street  
Anywhere, USA 00000

Dear Mr. POC:

Enclosed, per the NRA 99-LaRC-3, REVCON: Flight Research for Revolutionary Aeronautical Concepts, ‘government installation support’ commitment documentation requirements, are the requested facility/laboratory/asset estimates we feel are needed to adequately support your proposed NRA effort. This letter, along with the enclosure, is the result of preliminary discussions between XYZ Corp and our supporting laboratories. This conveys our initial commitment for support to the proposed effort.

This commitment is subject to availability of appropriated funds and available resources.

Sincerely,

Authorizing Official

X Enclosures
1.
2.
3.

cc (w/ enclosures)
The following is a suggested format for the “Letter of Commitment’s” supporting documentation. While format may vary from this suggested template, the information covered by this format must be provided (as a minimum) per the requirements established in the NRA 99-LaRC-3 solicitation document.

**Specific Facility/Lab/Asset Organization** (ex., LaRC/Airborne Systems Competency/Dynamics & Control Branch/Differential Maneuvering Simulator)

**Facility/Lab/Asset POC for this Task** *(include phone # and e-mail address)*

**Contractor & Industry POC Name** *(if applicable)*

**Task to be Performed** *(brief description)*

**Key Milestones**

**Cost Summary**

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<tr>
<td>Civil Service Labor Cost</td>
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<tr>
<td>Support Contractor FTEs</td>
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<td>Support Contractor Labor</td>
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<tr>
<td>Materials</td>
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<tr>
<td>Other Costs <em>(please specify)</em></td>
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</table>

**Assumptions** *(VERY IMPORTANT.... Corroborates Cost Summary Estimates)*

i.e.:
- Exactly who is doing the work?
- Who’s providing materials & test articles?
- Is the final flight testing at Dryden? Did the estimate and proposal process include DFRC?
[TITLE]
Proposal Notice of Intent

NRA 99-LaRC-3
REVCON: Flight Research for Revolutionary Aeronautical Concepts

Title:

Mailing Address of Proposing Organization:

Proposals may be submitted without previously completing this form. Communication shall be directed to the following address:

NASA LaRC
NRA 99-LaRC-3
Attn: Sharon D. DeBerry
Mail Stop 126
Hampton, VA 23681-2199
Fax: (757) 864-6131
Proposal Title:

Proposing Organization:

Mailing Address:

Endorsements:

Principal Investigator

Name:
Title:
Phone:
Fax:

Signature and date: ________________________________

Authorizing Official

Name:
Title:
Phone:

Signature and date: ________________________________
Proposal Title:

Proposing Organization:

Proposal Partners:

Synopsis *(a brief summary of the proposal content and innovation)*:

Drawing, Photo, or Illustration:
ATTACHMENT 1

SUMMARY OF COMMENTS AND QUESTIONS AND THE GOVERNMENT’S RESPONSE TO EACH

NRA 99-LaRC-3
REVCON: Flight Research for Revolutionary Aeronautical Concepts

Five comments/questions were received as a result of the draft. A summary of each comment or question and the Government response follows.

1) Re: Appendix A, Paragraph 4.0, Subparagraph 2 on page A-3: Wording limits participation only to those entities with three sources of relevant past performance.

“This position is both arbitrary and discriminatory. It usurps the ability of a start-up company to participate in the program and be fairly judged. Further, it violates the spirit of the RevCon program directive which seeks innovation. Early-stage companies historically provide more innovation than established companies.”

Response: This requirement has been removed from the NRA.

2) Re: Unmanned Aerial Vehicles (UAV’s) are not specifically mentioned in the NRA.

“One of our interests is in submitting an Unmanned Autonomous Vehicle (UAV) proposal and we were concerned that REVCON was only targeted for manned vehicles. Could the draft document be modified to add UAV flight research? Or is UAV flight research already included as part of the "aerospace technology evolution"?”

Response: Manned aircraft/flight-testing is not required for REVCON. In fact, very few manned vehicle proposals are expected simply because there is not enough money in the program to support new manned vehicle development (at least not without significant contributions from outside the agency). UAV proposals are therefore not only welcome, but expected. No change to the NRA is required.

3) Re: Cost sharing

Paraphrased: Are there any more details on cost-sharing with industry (i.e., rules, required splits, etc.).

Response: Cost sharing is highly encouraged but not required; however, it is an evaluation criterion. Details of cost sharing must be worked out between the partners in the proposal(s). All proposals that are selected for negotiation and award under this NRA must conform to the appropriate Federal Acquisition Regulations or the Grant and
Cooperative Agreement Handbook depending on the funding mechanism used for the award. No change to the NRA is required.

4) Re: NRA funding profile

“The comment cautions that the funding profile for these efforts severely limits the technology developments possible before their insertion in a flight vehicle, thereby limiting the candidate technologies pretty much to those that have already been matured in separate research efforts. This contradicts the statements in the NRA write-up itself, namely:

... it is NASA's intent to enhance U.S. aerospace competitiveness by supporting a continuous series of advanced vehicle concept development and flight research activities that achieve the following Enterprise objectives:

• Revolutionize traditional approaches to aerospace technology evolution and maturation
• Develop methods to reduce time to develop and certify new flight vehicles and flight vehicle systems
• ...
• Expand the current portfolio of technology investigations into non-traditional arenas
• Provide early validation of the concepts in a relevant environment, specifically flight, to demonstrate breakthrough technology

Only limited technology maturation efforts have been allowed for in Phase I, as the projected funding for this phase is very low. Any technology maturation then needs to be relegated to Phase II, which, if it involves flight testing on a new vehicle, will simply not allow for a timely implementation, as vehicle design, or design modification and fabrication requires freezing any hardware related to the proposed technologies fairly early on in the process.

This seems to indicate that only technologies currently at TRL 4-5 are really the targets for this effort, and that TRL 2-3 technologies are really not suitable candidates. This contradicts the statement quoted above.”

Response: REVCON is aimed primarily at flight research of vehicle concepts and technologies that would greatly benefit from flight test activities. Some level of technology maturation within REVCON is expected; however, it should not be the primary focus of a proposal. No change to the NRA is required.
5) Re: Letters of commitment

Paraphrased: Industry is not inclined to offer letters of commitment on long-term projects prior to the negotiation of the award. The particular concern is with respect to Phase 2.

Response: The wording in Appendix A, Paragraph 4.0, subparagraphs 3. & 4. has been changed. Instead of requiring a (blanket) letter of commitment for industry resources, a letter of commitment for Phase 1 plus a conditional letter of commitment or a plan for reaching commitment pending award of Phase 2 is required.