



**National Aeronautics and Space Administration
Johnson Space Center
Human Exploration and Operations Mission Directorate
Human Research Program
Houston, TX 77058**

Human Exploration Research Opportunities (HERO)

Appendix D

Differential Effects on Homozygous Twin Astronauts Associated with Differences in Exposure to Spaceflight Factors

**Response Period: July 30, 2013 – September 17, 2013
Proposals Due: September 17, 2013, 5 PM Eastern Time
Estimated Selection Announcement: January 2014**

Proposals that do not conform to the standards outlined in this solicitation and the solicited research response area appendix of interest will be declared noncompliant and declined without review. You must read and understand this solicitation in its entirety to prepare a competitive proposal. Key requirements are identified here:

- The information in this NRA supersedes and provides additional direction to that found in the Guidebook for Proposers the NASA FAR Supplement Provision. Proposals that do not conform to these standards will be declared noncompliant and declined without review.
- You and your organization must be registered with NSPIRES. Your proposal must be submitted by an authorized representative of your organization. All team members listed on the proposal must be registered with NSPIRES.
- Your specific aims must address the research emphases in this solicitation, and must be clearly outlined in the project description of your proposal.
- Proposals must identify Integrated Research Plan (IRP) risks and gaps addressed by the research.
- The length of the project description of the proposal cannot exceed 5 pages using standard (12 point) type.
- Investigators submitting a proposal in response to this solicitation, and whose most recent submission that included similar specific aims to any NASA or NSBRI sponsored research announcement was not accepted, must address prior review comments (2 pages maximum).
- Investigators resubmitting a proposal in response to this solicitation may only submit a proposal with similar hypothesis(es) and aims a total of three times (original submission plus two resubmissions). Significant changes must be made to the proposal hypothesis(es) and specific aims for consideration after the third attempt or the proposal will be declined without further review.
- If you have received past NASA or NSBRI supported research within the last three years, you must provide specifics (2 pages maximum) to the productivity of your research in a section separate from the project description.
- If using vertebrate animals, your proposal must meet requirements of the Vertebrate Animal Scientific Review section of this solicitation.
- Your proposal must meet requirements of the Compliance Review section of this solicitation.
- NASA HRP has adopted the National Institutes of Health (NIH) policy concerning salary limitations on grants.
- NASA HRP has adopted the NIH policy concerning the sharing of software produced through grants.
- Step-1 and Step-2 selection decision information can be accessed after the selection announcement date listed in this solicitation. After logging in, the PI selects the "Proposals" link, the "Submitted Proposals/NOIs" link, and then clicks on the proposal submitted to the solicitation identified above. The document(s) provided by NASA will be displayed under the heading "PI Information Package" located at the bottom of the "View Proposal" page.

Appendix D

Differential Effects on Homozygous Twin Astronauts Associated with Differences in Exposure to Spaceflight Factors

A. Funding Opportunity Description

1. Introduction

There is a singular opportunity to propose limited, short-term investigations examining the differences in genetic, proteomic, metabolomics, and related functions in twin male monozygous astronauts associated with differential exposure to spaceflight conditions. This opportunity has emerged from NASA's decision to fly veteran NASA astronaut Scott Kelly aboard the International Space Station (ISS) for a period of one year commencing in March 2015, while his identical twin brother, retired NASA astronaut Mark Kelly, remains on Earth. Scott Kelly, a veteran of two Space Shuttle flights as well as a six-month ISS mission, will have a cumulative duration of 540 days in low Earth orbit at the conclusion of the one-year flight, while Mark Kelly, a veteran of four Space Shuttle flights, has a cumulative duration of 54 days in low Earth orbit. This opportunity originated at the initiative of the twin astronauts themselves.

To capitalize on this unique opportunity, NASA's Human Research Program (HRP) and the National Space Biomedical Research Institute (NSBRI) are initiating a pilot demonstration project focused on the use of integrated human -omic analyses to better understand the biomolecular responses to the physical, physiological, and environmental stressors associated with spaceflight. As currently conceived, this project will center on established plans for blood sampling on the flying twin at regular intervals before, during and after the one-year ISS mission, and will obtain corresponding samples from the non-flying twin, who will otherwise maintain his normal lifestyle. Limited additional sampling (blood, saliva, buccal cheek swabs, and stool) or tests of psychological or physical performance will also be considered if: 1) they do not interfere with the previously scheduled HRP ISS flight experiments and 2) they require monozygous twins to illuminate one or more aspects of transient or long-term effects of spaceflight on humans.

The HRP Program Requirements Document (PRD) (http://www.nasa.gov/pdf/579466main_Human_Research_Program_Requirements_DocumentRevF.pdf) lists the crew health and performance risks that the Program must understand and mitigate. HRP's Integrated Research Plan (IRP) describes the requirements and notional approach to understanding and reducing the human health and performance risks to address the needs of human space exploration and serve HRP customers. The IRP illustrates the HRP's research plan through the timescale of early lunar missions of extended duration. The Human Research Roadmap (<http://humanresearchroadmap.nasa.gov>) is a web-based version of the IRP that allows users to search HRP risks, gaps, and tasks.

It is expected that proposals for investigations on the twin astronauts will contribute to HRP's goals of risk reduction for human space exploration missions as well as identify new avenues for human health investigations in spaceflight.

The purpose of this Human Exploration Research Opportunities (HERO) program element is to solicit proposals for investigations to be teamed to maximize the scientific return within the limitations presented by this opportunity. This will be the only opportunity for such measurements on identical twins for the foreseeable future, and complex interventions will be impossible due to the constraints of spaceflight. However, positive results from this pilot demonstration project may lead to future opportunities to involve genetic, proteomic, metabolomic and related –omic analyses of larger populations of non-related astronauts.

Proposals must be responsive to the research emphases outlined below in order to be reviewed as significant to the goals of this document. The proposed research approach must adhere to all constraints and guidelines outlined in this document.

2. Research Emphases

This HERO program element welcomes submission of research proposals that will implement integrated –omics studies, employing a plurality of the following methodologies:

1. Genomic studies to investigate the effects of the space environment (in particular space radiation) on the DNA (i.e., the exome, genome or specific targeted genes or loci) of Scott Kelly (compared to Mark Kelly) over the period of the one-year mission. In particular there is strong interest in investigating the possible occurrence of genetic mosaicism due to possible radiation induced spontaneous somatic mutations.
2. Transcriptomic studies to investigate the effects of “G transitions” (i.e., weightlessness and return to terrestrial gravity), immediately before and after the launch and landing phases of the spaceflight - on RNA constructs (i.e., both messenger RNA and non-coding RNA) of Scott Kelly (compared to Mark Kelly) during the period of the one-year ISS mission.
3. Epigenomic alterations (viz. longitudinal temporal monitoring of methylated cytosine bases, CpG islands, or histone modifications) to probe the transient effects of the space environment (in particular radiation, weightlessness, stress, and a confined environment, etc.) on the dynamic epigenomes of Scott Kelly (compared to Mark Kelly) during the period of the one-year ISS mission.
4. Plasma, saliva or urine based proteomic profiling using either mass spectrometric based proteomics or multiplexed immunoassays to investigate the effects of “G-transitions”, space radiation, stress and confinement on Scott Kelly (relative to Mark Kelly) immediately before and after launch and landing, as well as periodically during the period of the one-year ISS mission. These proteomic studies should perform surveillance on both protein expression levels, as well as the occurrence of informative post-translational modifications (e.g., phosphorylation, ubiquitination, glycosylation, etc.).
5. Metabolomic sampling to investigate changes in the concentrations of metabolites and other small molecules within the blood, saliva, urine or stool samples of Scott Kelly (compared to Mark Kelly) that may be perturbed a result of the astronaut diet, stress, weightlessness and unique responses to the spaceflight environment.

6. Metagenomic sequencing to investigate changes in the microbiome or bacteriome residing within the gastrointestinal tract of Scott Kelly (relative to Mark Kelly) as a result of dietary differences and responses to the spaceflight environment such as elevated levels of radiation and stress.
7. Physiologically based experiments to study and catalog the effects of the space environment over an extended one-year period of time on key organs and systems such as the heart, blood vessels, lungs, muscles, bones, senses, brain, balance organs, eyes etc. Where-ever possible, physiological experiments and observations should be synchronized with relevant bio-specimen sampling, to enable analyzed –omics data to be directly compared to physiological measurements.
8. Psychosocial and neurobehavioral experiments to investigate and characterize any differences between Scott and Mark Kelly in cognition, decision making ability, alertness levels, stress, and overall emotional well-being, as a result of the spaceflight environment, i.e. confinement, weightlessness, stress, and space radiation. Where-ever possible, psychosocial and neurobehavioral experiments and observations should be synchronized with relevant bio-specimen sampling, to enable analyzed –omics data to be directly compared to psychosocial and neurobehavioral measurements.

A plurality of time correlated –omic readouts will generate a systems biology view of the biomolecular perturbations experienced by Scott Kelly (in space) relative to his twin brother, Mark Kelly (on Earth). Merit will therefore be given to investigations that propose well designed, multiple, connected experimental types, drawn from the above list of -omics modalities. Consortia of –omics scientists are particularly encouraged to submit proposals in response to this solicitation.

Investigators should also carefully specify which physiological and psychological meta-data (e.g. blood pressure, pulse rate, body temperature, alertness levels as measured by Psychomotor Vigilance Test or PVT, mood, the occurrence of any illnesses or injuries, etc.), should be concomitantly collected along with the –omics data, so that genotype can be precisely mapped to phenotype.

In addition, it is important that over the time course of experiments, the space radiation field(s) on board and external to the International Space Station – as well as in Mark Kelly’s home in Tucson, AZ – be as completely characterized as possible, particularly in regards to lineal energy, particle fluence, particle species, particle energy and other microdosimetry parameters.

Proposers should consider that the –omics proposals will be secondary to the primary set of joint US-Russian investigations planned for one-year flight of the American astronaut (Scott Kelly) and the Russian cosmonaut (Mikhail Kornienko). In addition, the –omics investigations should leverage the primary investigations as much as permissible, and should require the minimum of new or dedicated interventions, such as bio-sampling requirements. The primary investigations are still in final selection by NASA and the Russian Space Agency, but may include some or all of the following activities:

- Before, during, and after the one-year ISS mission
 - Periodic blood and saliva sampling for surveillance of biochemical parameters including immune function

- Periodic sleep-wake monitoring and Actigraphy
- Journaling
- Periodic psychomotor vigilance testing
- Periodic assessment of cardiovascular function and fluid volume redistribution with and without acute regional blood volume sequestration
- Periodic assessment of ocular function and cerebrovascular status
- Periodic assessment of aerobic exercise capacity
- Before and after the one-year ISS mission, but not during
 - Assessment of regional bone architecture and cerebral functioning by non-invasive imaging
 - Integrated sensorimotor and cardiovascular function during gross movements

Please note that a maximum of \$50,000 per year for three years per award is available for this solicitation.

Principal Investigators (PIs) at institutions in countries outside the U.S. are free to propose to this solicitation on a no-exchange-of-funds basis.

3. Education and Public Outreach

Research projects funded by NASA present an opportunity for NASA to enhance and broaden public knowledge, understanding of and appreciation for biological and biomedical research, and the value of this research in space environments. Individuals participating in NASA research projects have a responsibility to foster the development of a scientifically informed public. Therefore, all participants in this NRA are strongly encouraged to promote general scientific literacy and public understanding of biological and biomedical sciences, space environments, and the HRP research projects through formal and informal education opportunities.

4. NASA Safety Policy

Safety is NASA's highest priority. Safety is the freedom from those conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment. NASA's safety priority is to protect: 1) the public, 2) astronauts and pilots, 3) the NASA workforce (including employees working under NASA instruments), and 4) high-value equipment and property. All research conducted under NASA auspices shall conform to this philosophy.

5. Availability of Funds for Award

Funds are not currently available for awards under this NRA. The Government's obligation to make award(s) is contingent upon the availability of the appropriated funds from which payment can be made and the receipt of proposals that are determined acceptable for NASA award under this NRA.

6. Additional Funding Restrictions

The construction of facilities is not an allowed activity unless specifically stated so in the program description. For further information on the allowability of costs, refer to the cost principles cited in the *NASA Federal Acquisition Regulations (FAR) Supplement Provision* and the *Guidebook for Proposers*. Travel, including foreign travel, is allowed as may be necessary for the meaningful completion of the proposed investigation, as well as for publicizing its results at an appropriate professional meeting.

This solicitation will result in grant awards only. Profit to commercial organizations under grants is not allowed.

Regardless of whether functioning as a team lead or as a team member, personnel from NASA Centers must propose budgets based on Full Cost Accounting (FCA). Non-NASA U.S. Government organizations should propose based on FCA unless no such standards are in effect; in that case such proposers should follow the Managerial Cost Accounting Standards for the Federal Government as recommended by the Federal Accounting Standards Advisory Board. For further information, see <http://www.hq.nasa.gov/fullcost/>.

7. Salary Limitation

For this NRA, HRP will limit the amount of direct salary for an investigator on a grant to Executive Level II of the Federal Executive Pay scale. The Executive Level II salary is \$179,700 per year. HRP grant awards for proposals that request direct salaries of individuals in excess of the applicable rate per year will be adjusted in accordance with the \$179,700 cap.

NASA grant awards for proposals that request salaries of individuals in excess of the applicable RATE per year will be adjusted in accordance with the legislative salary limitation and will include a notification such as the following: None of the funds in this award shall be used to pay the salary of an individual at a rate in excess of the applicable salary cap.

An individual's base salary, per se, is NOT constrained by the legislative provision for a limitation of salary. The rate limitation simply limits the amount that may be awarded and charged to NASA grants. An institution may pay an individual's salary amount in excess of the salary cap with non-federal funds.

The salary limitation does NOT apply to payments made to consultants under a NASA grant although, as with all costs, those payments must meet the test of reasonableness and be consistent with institutional policy.

The salary limitation provision DOES apply to subawards or subcontracts for substantive work under a NASA grant.

Example:

Individual's institutional base salary for a FULL-TIME calendar year appointment: \$200,000

Research effort requested in proposal: 6 months (50%)

If a grant is to be funded, the amount included for the above individual will be \$89,850 instead of \$100,000 due to the salary limitation.

For further information, please see NIH Notice NOT-OD-12-035 (<http://grants.nih.gov/grants/guide/notice-files/NOT-OD-12-035.html>).

B. Award Information

The selected proposal is expected to be funded as a research grant in one-year increments for activities typically lasting three years; however, activities lasting two years will be considered if justified by the proposer's research plan. The mechanism for funding each successful proposal will be a single grant, with funding allocations to participating investigators based on the submitted budget, available funds and project review. The funding duration will depend on proposal requirements, review panel recommendations, and continuing progress of the activity. Proposals will be evaluated as described in Section E. Proposals to continue or supplement existing grants, if selected, will result in a new grant.

Depending on available funding and the results of the scientific merit peer review, up to ten investigations may be selected by NASA. Unless otherwise stated, it is anticipated that NASA awards will average \$40,000 per year (total cost) and **cannot exceed \$50,000** per year. NASA does not provide separate funding for direct and indirect costs; thus, the amount of the award requested is the total of all costs submitted in the proposed budget. It is estimated that the initial selections will be announced by December 2014 and the grant will be awarded in a reasonable timeframe thereafter.

C. Eligibility Information

1. Eligibility of Applicants

All categories of United States (U.S.) institutions are eligible to submit proposals in response to this NRA. Principal Investigators may collaborate with universities, Federal Government laboratories, the private sector, and state and local government laboratories. In all such arrangements, the applying entity is expected to be responsible for administering the project according to the management approach presented in the proposal.

The applying entity must have in place a documented base of ongoing high quality research in science and technology, or in those areas of science and engineering clearly relevant to the specific programmatic objectives and research emphases indicated in this NRA. Present or prior

NASA support of research or training in any institution or for any investigator is not a prerequisite to submission of a proposal.

2. Guidelines for International Participation

a. Guidelines for International Team Members on U.S. Proposals

The HRP welcomes international team members on U.S. proposals. International collaborations that demonstrate clear scientific benefits or cost savings are particularly encouraged.

Services and direct purchases provided by international team members are allowable as subcontracts on U.S. proposals. Additional information on international participation can be referenced at: http://www.hq.nasa.gov/office/procurement/regs/1835.htm#35_016-70.

b. Guidelines for International Proposals

NASA welcomes proposals from outside the U.S. However, foreign entities are generally not eligible for funding from NASA. Therefore, unless otherwise noted in the NRA, proposals from foreign entities should not include a cost plan unless the proposal involves collaboration with a U.S. institution, in which case a cost plan for only the participation of the U.S. entity must be included. Proposals from foreign entities and proposals from U.S. entities that include foreign participation must be endorsed by the respective government agency or sponsoring institution in the country from which the foreign entity 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.

All foreign proposals must be typewritten in English and comply with all other submission requirements stated in the NRA. All foreign proposals will undergo the same evaluation and selection process as those originating in the U.S. All proposals must be received before the established closing date. Those received after the closing date will be treated in accordance with NASA FAR Supplement Provision 1852.235-72, paragraph (g). Sponsoring foreign government agencies or funding institutions may, in exceptional situations, forward a proposal without endorsement if endorsement is not possible before the announced closing date. In such cases, the NASA sponsoring office should be advised when a decision on endorsement can be expected.

Successful and unsuccessful foreign entities will be contacted directly by the NASA sponsoring office. Copies of these letters will be sent to the foreign sponsor. Should a foreign proposal or a U.S. proposal with foreign participation be selected, NASA's Office of External Relations will arrange with the foreign sponsor for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency or funding institution will each bear the cost of discharging their respective responsibilities.

Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

- (i) An exchange of letters between NASA and the foreign sponsor; or
- (ii) A formal Agency-to-Agency Memorandum of Understanding (MOU).

NASA's policy is to conduct research with non-U.S. organizations on a cooperative, no exchange-of-funds basis. Although Co-Investigators or collaborators employed by non-U.S. organizations may be identified as part of a proposal submitted by a U.S. organization, NASA funding through this NRA may not be used to support research efforts by non-U.S. organizations at any level; however, the direct purchase of supplies and/or services that do not constitute research from non-U.S. sources by U.S. award recipients is permitted. See NASA FAR Supplement Part 1835.016-70 for additional information on international participation, which can be referenced at: http://www.hq.nasa.gov/office/procurement/regs/1835.htm#35_016-70.

Also see NASA Policy Directive 1360.2B Initiation and Development of International Cooperation in Space and Aeronautics Programs, which is located at: http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PD_1360_002B_&page_name=main

c. Assurance of Compliance – China Funding Restriction

All proposals submitted to this NRA must comply with the following: Assurance of Compliance with The Department of Defense and Full-Year Appropriation Act, Public Law 112-10 Section 1340(a); The Consolidated and Further Continuing Appropriation Act of 2012, Public Law 112-55, Section 539; and future-year appropriations herein after referred to as “the Acts”, whereas:

- a) NASA is restricted from using funds appropriated in the Acts to enter into or fund any grant or cooperative agreement of any kind to participate, collaborate, or coordinate bilaterally with China or any Chinese-owned company, at the prime recipient level and at all subrecipient levels, whether the bilateral involvement is funded or performed under a no-exchange of funds arrangement.
- b) Definition: “China or Chinese-owned Company” means the People’s Republic of China, any company owned by the People’s Republic of China, or any company incorporated under the laws of the People’s Republic of China.
- c) The restrictions in the Acts do not apply to commercial items of supply needed to perform a grant or cooperative agreement.
- d) By submission of its proposal, the proposer represents that the proposer is not China or a Chinese-owned company, and that the proposer will not participate, collaborate, or coordinate bilaterally with China or any Chinese-owned company, at the prime recipient level or at any subrecipient level, whether the bilateral involvement is funded or performed under a no-exchange of funds arrangement.

d. Export Control Guidelines Applicable to Proposals Including Foreign Participation

Proposals including foreign participation must include a section discussing compliance with U.S. export laws and regulations, e.g., 22 CFR Parts 120-130 and 15 CFR Parts 730-774, as

applicable to the circumstances surrounding the particular foreign participation. The discussion must describe in detail the proposed foreign participation and is to include, but not be limited to, whether or not the foreign participation may require the prospective investigator to obtain the prior approval of the Department of State or the Department of Commerce via a technical assistance agreement or an export license, or whether a license exemption/exception may apply. If prior approvals via licenses are necessary, discuss whether the license has been applied for or, if not, the projected timing of the application and any implications for the schedule. Information regarding U.S. export regulations is available at: <http://www.bis.doc.gov/>.

3. Cost Sharing or Matching

If an institution of higher education, hospital, or other non-profit organization wants to receive a grant from NASA, cost sharing is not required. However, NASA can accept cost sharing if it is voluntarily offered. If a commercial organization wants to receive a grant, cost sharing is required unless the commercial organization can demonstrate that they are unlikely to receive substantial compensating benefits for performance of the work. If no substantial compensating benefits are likely to be received, then cost sharing is not required but can be accepted. Acceptable forms of cost sharing are located at: http://www.hq.nasa.gov/office/procurement/regs/1816.doc#OLE_LINK3.

4. Data Accessibility

All research data resulting from NASA HRP funded studies must be submitted to NASA. These data are then archived in the NASA Life Sciences Data Archive (LSDA) (<http://lsda.jsc.nasa.gov/>) for the benefit of the greater research and operational spaceflight community. Archival data products may include but are not limited to low-level (raw) data, high-level (processed) data, and data products such as calibration data, documentation, related software, and other tools or parameters that are necessary to interpret the data. Once a grant is awarded, the PI and the supporting NASA HRP Element Scientist shall work with LSDA to outline specific archiving requirements in an LSDA Data Submission Agreement. These requirements shall include which data are to be included, the format of the data, and the timeframe in which the data is expected to be submitted for archiving. Per the NASA Grant and Cooperative Agreement Handbook (<http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=5800&s=1E>), the Government has the right to use and disclose all data generated from this grant:

“As a Federal Agency, NASA requires prompt public disclosure of the results of its sponsored research and, therefore, expects significant findings from supported research to be promptly submitted for peer reviewed publication with authorship(s) that accurately reflects the contributions of those involved. Likewise, as a general policy and unless otherwise specified, NASA no longer recognizes a “proprietary” period for exclusive use of any new scientific data that may be acquired through the execution of the award; instead, all data collected through any of its funded programs are to be placed in the public domain at the earliest possible time following their validation and calibration.”

The NASA HRP recognizes the importance of the right of first publication in demonstrating and maintaining the scientific credentials of its funded investigators. In general, the NASA HRP intends to continue its discretionary policy of allowing the funded principal investigator(s) a period of one (1) year after final data collection from subjects or acquisition of final specimen in spaceflight or ground-based investigations, before making the data available to other investigators through release from the LSDA. The details and any exceptions or special circumstances of this policy will be documented in each investigation's Data Submission Agreement. However, the NASA HRP Chief Scientist has the prerogative, at any time, to include all extant results, whether published or unpublished, in HRP's internal analyses as needed for decisions pertaining to astronaut safety, health and performance and programmatic scope and direction. These analyses will not be published within the one-year period described above unless required by law or NASA policy.

5. Software Sharing Policy

The HRP has adopted the National Institute of Health's (NIH) policy concerning the sharing of software produced through NASA grants. A software dissemination plan, with appropriate timelines, is expected in the application only if software development is a part of the application. There is no prescribed single use license for software produced through grants responding to this announcement. In accordance with federal law, NASA will protect the privacy and ownership rights of software developers. However, NASA HRP does have goals for software dissemination, and reviewers will be instructed to evaluate the dissemination plan relative to these goals:

1. The software should be freely available to biomedical researchers and educators in the non-profit sector, such as institutions of education, research institutions, and government laboratories.
2. The terms of software availability should permit the dissemination and commercialization of enhanced or customized versions of the software, or incorporation of the software or pieces of it into other software packages.
3. To preserve utility to the community, the software should be transferable such that another individual or team can continue development in the event that the original investigators are unwilling or unable to do so.
4. The terms of software availability should include the ability of researchers to modify the source code and to share modifications with other colleagues. An applicant should take responsibility for creating the original and subsequent "official" versions of a piece of software.
5. To further enhance the potential impact of their software, applicants are expected to propose a plan to manage and disseminate the improvements or customizations of their tools and resources by others. This proposal may include a plan to incorporate the enhancements into the "official" core software, may involve the creation of an infrastructure for plug-ins, or may describe some other solution.

The plan for software sharing will be evaluated during peer review together with any other resource sharing plans.

The adequacy of the software sharing plans will be considered by NASA when making recommendations about funding applications as appropriate. In making such considerations, prior to funding, NASA may negotiate modifications of software sharing plans with the PI. Any software dissemination plans represent a commitment by the institution (and its subcontractors as applicable) to support and abide by the plan.

D. Proposal and Submission Information

1. Source of Application Materials

All information needed to submit an electronic proposal in response to this announcement is contained in this NRA and in the companion document entitled “Guidebook for Proposers Responding to a NASA Research Announcement (NRA)” (hereafter referred to as the *Guidebook for Proposers*) that is located at:

<http://www.hq.nasa.gov/office/procurement/nraguidebook/>.

Additionally, applicants shall prepare proposals in accordance with the “Instructions for Responding to NASA Research Announcements,” NASA Federal Acquisition Regulations (FAR) Supplement (NFS), Part 1852.235-72 (November 2004), hereafter referred to as the *NASA FAR Supplement Provision*, that is located at:

http://www.hq.nasa.gov/office/procurement/regs/5228-41.htm#52_235-72.

The information in this NRA **supersedes** and provides additional direction to that found in the *Guidebook for Proposers* and provides additional direction consistent with the *NASA FAR Supplement Provision*. Proposals that do not conform to the standards outlined in this solicitation will be declared noncompliant and will be handled in accordance with the *NASA FAR Supplement Provision*.

Proposal submission questions received will be answered and published in a Frequently Asked Questions (FAQ) document. This FAQ will be posted on the NSPIRES solicitation download site alongside this NRA, and will be updated periodically between submission release and the proposal due date. Any supplemental information will also be posted alongside this NRA.

2. Content and Form of Proposal Submission

a. Registration in NASA Proposal Data System

This NRA requires that the proposer register key data concerning their intended submission with the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES) located at <http://nspires.nasaprs.com>. **Potential applicants are urged to access this site well in advance of the proposal due date(s) of interest to familiarize themselves with its structure and enter the requested identifier information. It is especially important to note that every individual named on the proposal’s Cover Page (see further below) must be registered in NSPIRES and that such individuals must perform this registration themselves. Team members will be asked to confirm their organization affiliation when added to a proposal.** No one may register a second party, even the Principal Investigator (PI) of a proposal in which

that person is committed to participate. This data site is secure and all information entered is strictly for NASA's use only.

Every organization that intends to submit a proposal to NASA in response to this NRA, including educational institutions, industry, nonprofit institutions, NASA Centers, the Jet Propulsion Laboratory, and other U.S. Government agencies, **must be registered in NSPIRES**, regardless of the electronic system used to submit proposals. Such registration must be performed by an organization's electronic business point-of-contact (EBPOC) in the Central Contractor Registry (CCR).

b. Electronic Submission

Proposals must be submitted electronically. Proposals must be submitted electronically by one of the officials at the PI's organization who is authorized to make such a submission. All team members must be registered in NSPIRES and confirm their organizational affiliation when added to a proposal before the PI organization official can submit. It is strongly recommended that the PI work closely with his/her team members and organization official to ensure the proposal is submitted by the due date and time listed in this solicitation. **Proposals submitted after the listed due date and time will be declared noncompliant and will be handled in accordance with the NASA FAR Supplement Provision.**

Proposers can use either NSPIRES (<http://nspires.nasaprs.com>) or Grants.gov (<http://www.grants.gov/>) for proposal submission. All proposers, team members, and agency officials must be registered before proposal submission with NSPIRES regardless of the electronic system used to submit proposals.

NSPIRES accepts fully electronic proposals through a combination of data-based information (e.g., the electronic *Cover Page* and its associated forms) and uploaded PDF file(s) that contain the body of the proposal. The website will provide a list of all elements that make up an electronic proposal, and the system will conduct an element check to identify any item(s) that is(are) apparently missing or incomplete. Proposers are particularly encouraged to begin their submission process early.

Requests for assistance in accessing and/or using this Website may be directed by E-mail to nspires-help@nasaprs.com or by telephone at 202-479-9376 Monday through Friday, 8:00 AM – 5:00 PM Eastern Time. Frequently Asked Questions (FAQs) may be accessed through the Proposal Online Help site at <http://nspires.nasaprs.com/external/help.do>. Tutorials of NSPIRES are available at: <http://nspires.nasaprs.com/tutorials/index.html>.

3. Proposal Process

Proposals solicited through this NRA will use a one-step proposal process. The following information **supersedes** that provided in the *Guidebook for Proposers* and provides additional direction consistent with the *NASA FAR Supplement Provision*.

The NSPIRES system will guide proposers through submission of all required proposal information. **Failure to include any of the key components may result in return of your proposal without review.**

To initiate a proposal:

- Log in using your NSPIRES user name and password.
- Click on Proposals/NOIs under the NSPIRES Options.
- Click on the Create Proposal button in the upper right hand corner of the screen.
- Select “Solicitation” to prepare a new proposal.
- Click the button for “Differential Effects on Homozygous Twin Astronauts Associated with Differences in Exposure to Spaceflight Factors” (NNJ13ZSA002N-TWINS).
- Follow the step-by-step instructions provided in NSPIRES to complete your proposal.

Proposals submitted in response to this opportunity are limited to a synopsis of the intended research, not to exceed five 8½ by 11 inch pages including references, using a standard 12-point font and one-inch margins. This synopsis will be provided as a PDF proposal document upload, and must not be password protected or locked in any way. Required elements of the five-page proposal include: 1) the specific aims; 2) an outline of the plan to accomplish the specific aims; and 3) a brief budget summary. A single cover page containing the proposal title, investigator team names, roles (i.e., PI, co-I, consultant, etc.) and affiliations as well as a brief abstract (not to exceed 200 words) should also be attached (but will not be included in the 5 page limit).

Proposals are prepared by the PI or a designated representative of the PI. **Proposals are submitted by an official of the PI’s organization after the PI has released the prepared proposal to the institution official.** It is strongly recommended that the PI work closely with his/her organization official to ensure the proposal is submitted by the due date and time listed in this solicitation. Proposals will not be accepted after the listed due dates except for as provided in the *NASA FAR Supplement Provision*.

Instructions for submitting proposals to NASA via Grants.gov may be found on the Grants.gov portal at: <http://www.grants.gov/>.

Proposals shall be electronically submitted by the due date and time listed in Section G. Electronic submission of proposals will be open during the period listed in Section G.

There is a recommended 10 MB size limit for proposals (Section 2.3(c) of the NASA Guidebook for Proposers). Large file sizes can impact the performance of the NSPIRES system. Most electronically submitted proposals will be less than 2 MB in size.

NSPIRES accepts electronic proposals through a combination of data-based information (e.g., the electronic Cover Page) and the uploaded PDF file that contains the proposal as outlined above. The NSPIRES proposal submission process ensures that a minimum set of required proposal cover page fields are completed. Provision of the proposal summary and business data elements of the cover page will be necessary in order for the Authorized Organizational Representative (AOR) to submit the proposal to NASA. If either of these two proposal elements is incomplete, the "View Proposal/ Check Elements" function of NSPIRES will display red "error" flags and messages to alert the user to the information that is required but missing, and the "Submit Proposal" button will not be available. Although the PI will be able to release the proposal to the AOR, the proposal cannot be submitted by the AOR to NASA until these

required fields are complete. Any additional information that is missing will be identified by yellow "warning" flags. Proposers are reminded to check the solicitation instructions to ensure compliance with all instructions, as adherence to these two element validation checks alone is insufficient to guarantee a compliant proposal. Additionally, in those cases where instruction in the NRA contradicts an NSPIRES warning, the NSPIRES yellow "warning" may be ignored. Proposers should follow the NRA instructions closely to help ensure submission of a compliant proposal.

The NSPIRES system is limited in the character sets that can be used in filling out on-line forms. Please refer to the on-line tutorials when using special characters. Alternatively, spell out special characters where possible (such as micro rather than the Greek symbol). Applicants are encouraged to preview their proposal prior to releasing the proposal to their designated Organization by clicking the "Generate" button at the bottom of the View Proposal Screen in NSPIRES. The "Generate" feature allows applicants to preview their entire proposal in a single PDF file prior to submittal, but it is not a required step in the submission process. Please contact the NSPIRES Help Desk for assistance with this feature (e-mail nspires-help@nasaprs.com or by Telephone at 202-479-9376).

The following supersedes the information provided in the *Guidebook for Proposers* and is required in addition to the *NASA FAR Supplement Provision*:

a) Human Research Program Human Research Roadmap

The investigator must examine and understand the research emphases outlined in this NRA and the risks identified in the HRP Human Research Roadmap (HRR) (<http://humanresearchroadmap.nasa.gov>). Proposers must include a description as part of their proposal of how their research aims map to the identified IRP risks, gaps and deliverables. This description is limited to two pages and does not count towards the 20-page limit of the project description.

b) Special Matters

For proposals employing human subjects and, or animals, assurance of compliance with human subjects and/or animal care and use provisions is required. In addition, the application must include a statement from the applicant institution certifying that the proposed work will meet all Federal and local human subject requirements and animal care and use requirements.

Policies for the protection of human subjects in NASA sponsored research projects are described in the NASA Policy Directive (NPD) 7100.8E "*Protection of Human Research Subjects*" (<http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=7100&s=8E>).

Animal use and care requirements are described in Title 14 of the Code of Federal Regulations (CFR) 1232 (<http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=bfa206b4f69a18a5f49213e623cc213f&rgn=div5&view=text&node=14:5.0.1.1.21&idno=14>).

NASA and the NSBRI utilize just-in-time practices for approval of the use of human subjects or animals. For proposals employing human subjects and/or animals, assurance of compliance with human subjects or animal care and use provisions is required within 90 days after notice of award. If the Institutional Review Board (IRB) or Institutional Animal Care and Use Committee (IACUC) certification is already approved at proposal submission, attach a copy of the certification as part of the proposal upload and select “approved” on the proposal cover page. Otherwise, select “pending.”

After award, a statement must be provided from the Applicant institution which identifies the selected proposal by name and which certifies that the proposed work will meet all Federal and local requirements for human subjects or animal care and use. This includes relevant documentation of IRB approval or approval by the IACUC. NASA and NSBRI will require current IRB and IACUC certification prior to each year’s award.

For delivery of any certifications received after the proposal due date, please contact Kevin Willison (kwillison@nasaprs.com; Telephone: 202-479-9030 x242) at NASA Research and Education Support Services (NRESS).

c) Revised Proposals

Investigators who are submitting a proposal in response to this NRA, and whose most recent submission that included similar specific aims to any NASA or NSBRI sponsored research announcement was not accepted, are required to submit an explanation of how the current proposal addresses criticisms from previous review cycles. This explanation shall be presented preceding the research description as part of the main proposal upload and is limited to two pages. This explanation should include changes to the current proposal as a result of peer review comments and, or explanation as to why prior peer review comments are not applicable to the current proposal.

These two pages are not considered part of the 20-page project description. Proposal reviewers will be provided with the evaluations of prior submissions. Proposers must respond to prior criticisms relevant to any portion of the new proposal under consideration. Proposers who have questions concerning their response to a prior review are encouraged to contact Kevin Willison (kwillison@nasaprs.com; Telephone: 202-479-9030 x242) at NRESS.

d) Productivity of NASA- or NSBRI-Funded Research

Proposers currently funded by or who have received funding within the last three (3) years from NASA or NSBRI must provide specifics to the productivity of the supported research including progress in experiments, completion of milestones and deliverables, research publications, and new findings. This explanation should be presented preceding the research description as part of the main proposal upload and is limited to two pages. These two pages are not considered part of the 20-page project description. Related impacts, if any, to the proposed research plan should be highlighted in the body of the project description. **Proposers that request continued support that do not include this productivity section will be returned to the submitter without panel review and will not be considered for funding.**

e) Reprints and Appendices

Reprints and appendices, if any, do not count toward the project description page limit, and are to be included following all other sections of the proposal (**reviewers are not required to consider information presented in proposal appendices**).

E. Proposal Evaluation Process

1. Proposal Intrinsic Scientific and Technical Merit

To be responsive to this NRA, proposed studies should produce research product(s) that address the research emphases stated in this NRA, and lead to new knowledge within accepted scientific and technology standards.

All of the following criteria will be used in determining the merit score.

Significance:

Does this study address a research emphasis stated in this solicitation? Does the study test a significant hypothesis or produce data that would enable a significant hypothesis to be generated? If the study is non-hypothesis driven, are the data produced needed to understand or reduce the risk addressed by the research emphasis? If the task will produce a software model or tool, how will it serve to better quantify or mitigate a risk? If the aims of the application are achieved, how well will the product(s) address the research emphases? If the aims of the application are achieved, how will scientific knowledge or technology advance?

Approach:

Are the conceptual framework, design, methods, and analyses adequately developed, well integrated, and appropriate to the aims of the project? Is the proposed approach likely to yield the desired results? Does the applicant acknowledge potential problem areas and consider alternative tactics? Is the proposed study conducive to teaming to maximize the scientific return within the limitations presented by this opportunity?

Risk Mitigation:

For a study quantifying risks to crew health or performance; does the study adequately improve the understanding of the adverse consequences, the probability of its occurrence, or the timeframe in which the risk must be addressed? For a study developing countermeasures, will the proposed countermeasure reduce a risk to crew health or performance, reduce the impact of the risk or reduce the resources required to mitigate it? For a study developing technology, will the research product reduce the risk to crew health or performance, reduce its impact or better define it and is the technology feasible within the confines of the operational environment?

Investigators:

Are the investigators appropriately trained and well suited to carry out this work? Is the work proposed appropriate to the experience level of the principal investigator and any co-

investigators? Is the evidence of the investigators' productivity satisfactory?

Environment:

Does the scientific environment in which the work will be performed contribute to the probability of success? Do the proposed experiments take advantage of unique features of the scientific environment or employ useful collaborative arrangements? Is there evidence of institutional support?

2. Proposal Review and Selection Processes

a. Compliance Matrix

All proposals must comply with the general requirements of the NRA as described in this solicitation, the *Guidebook for Proposers*, and the *NASA FAR Supplement Provision*. Upon receipt, proposals will be reviewed for compliance with these requirements including:

- 1) Proposals will not be accepted after the due dates and times listed in this announcement except for as provided in the *NASA FAR Supplement Provision*.
- 2) The proposal must be no more than five (5) pages in length.
- 3) Submission of appropriate IRB or IACUC certification for all proposals using human or animal test Subjects in accordance with the Special Matters requirements listed in Section D.3.b.
- 4) Submission of an appropriate and justified budget for a funding period not exceeding that described in the NRA.
- 5) Investigators who are submitting a proposal in response to this solicitation, and whose most recent submission to any NASA or NSBRI supported NRA within the last three years was not accepted, are required to submit an explanation of how the current proposal addresses criticisms from previous review cycles. This explanation should be presented in a separate form of no more than two pages. Related changes to the research plan should be highlighted in the body of the project description as described in Section D.3.c.
- 6) A description of how the research aims map to the identified IRP risks and gaps as described in Section D.3.a.
- 7) A description that provides specifics to the productivity of the previously supported research including progress in experiments and research publications and new findings as described in Section D.4.d.
- 8) Submission of all other appropriate information as required by this NRA.

Note: At NASA's discretion, non-compliant proposals may be withdrawn from the review process and declined without further review. Compliant proposals submitted in response to this NRA will undergo an intrinsic scientific or technical merit peer review. Only those proposals most highly rated in the merit peer review process will undergo additional reviews for program balance and cost.

b. Scientific and Programmatic Reviews

The overall evaluation process for proposals submitted in response to this NRA will include a First Tier Merit Review and a Second Tier Program Alignment Review. The **First Tier Review** will be a merit peer review by a panel of scientific or technical subject matter experts. The number and diversity of experts required will be determined by the response to this NRA and by the variety of disciplines represented in the proposals relevant to the research emphases described in this NRA. The merit review panel will assign *a score from 0-100, or assign a Not Recommended for Further Consideration (NRFC)* based upon the intrinsic scientific or technical merit of the proposal. The final score or NRFC designation will reflect the consensus of the peer review panel. After the merit review is complete the panel will be asked to include in their critique of each proposal any comments they may have concerning the proposal's budget. Proposals that are highly rated in the merit review process will undergo a second tier review for program alignment.

For NASA, the **Second Tier Review** will evaluate the programmatic balance, feasibility and cost of proposals passing the first tier review. This review will be conducted by the HRP Chief Scientist, the HRP Element Scientists and HRP Element Managers. All applications will be reviewed with respect to:

- How relevant is the proposed work to the HRP Goals and Objectives? Is there clear added value of the proposed project to the HRP Integrated Research Plan? Does inclusion of the proposed work enhance the balance of the research portfolio?
- Does the proposed work clearly address a specific Gap in the HRP Integrated Research Plan? Is there unequivocal value of the project to the HRP?
- Does the plan have a high likelihood of progress and end-user adoption that will fill the HRP IRP Gap or make a major contribution to filling it?
- How does the value of the proposed work toward answering critical questions and achieving HRP Goals and Objectives compare to the cost?

Note that neither a high merit score alone nor a high relevance score alone will obligate NASA to select any proposal. NASA retains the option to select proposals outside of the traditional fundable range if, in its judgment, their weaknesses in either merit or relevance can be resolved or mitigated and if it is in the best interests of the Government to do so.

c. Selection

The information resulting from these two levels of review, as described above, will be used to prepare selection recommendations developed by the NASA HRP Chief Scientist and HRP Program Manager. Selection for funding will be made by the NASA HRP Program Manager or his designee.

In order to optimize resources, NASA and the NSBRI pursue the intentional formation of investigator partnerships between individual investigators whose experiments will leverage resources by addressing different facets of the same questions. NASA anticipates that such intentional teaming arrangements will result in better utilization of available resources to resolve

specific critical questions. NASA and the NSBRI strongly encourage investigators submitting applications in response to this NRA to consider identifying collaborations between individual investigators as part of the development of their individual proposals and to identify this pre-coordination in their management plan. Additional information can be referenced in the NASA FAR Supplement. Finally, NASA and the NSBRI may integrate proposals if, in their judgments, the goals, objectives or products of the proposals are similar.

For some NASA research topics, NASA is considering utilizing individual research proposals to form a Virtual NASA Specialized Center of Research (VNSCOR) where NASA aligns a set of individual awards into an NSCOR like team project. Individual proposals may be selected to become elements of a VNSCOR. Elements of the VNSCOR will also join a working group organized by NASA on the specific research topic. VNSCORs will be composed of four to six individual research elements, each with its own specific aims.

Where appropriate for analog definition or flight definition studies, NASA reserves the right to form teams of investigators whose experiments have compatible requirements for human subjects, specimens, operations, data, and treatment and sharing of biological samples. A selected investigator who becomes a member of a research team will be required to work with other team members to develop an integrated set of objectives that can be met within fiscal and analog or flight resource constraints. Development of this integrated approach may result in modification, transfer, addition or deletion of some objectives put forth in an individual proposal. Specifics associated with the definition period will be addressed with the investigator at the time of selection.

Additionally, proposals submitted in response to this solicitation found to have strong programmatic relevance and scientific merit that cannot be funded due to limited resources may be forwarded to partner programs or agencies for consideration. NASA reserves the right to select proposals submitted to the NSBRI that the NSBRI does not select; such a selection will result in the award of an NASA grant that will not be assigned to one of the seven NSBRI discipline teams. Similarly, NSBRI reserves the right to select proposals submitted to the NASA that the NASA does not select; such a selection will result in the award of an NSBRI grant and placement on one of the seven NSBRI discipline teams. In these instances, the PI will be given the opportunity to accept or decline the offer.

d. Ombudsman

A NASA ombudsman has been appointed to hear and facilitate the resolution of concerns from proposers during the pre-award and post-award phases of this solicitation. When requested, the ombudsman will maintain strict confidentiality as to the source of the concern. The existence of the ombudsman is not to diminish the authority of the selecting official. Further, the ombudsman does not participate in the evaluation of the proposals, source selection process, or the adjudication of formal disputes. Therefore, before consulting with an ombudsman, interested parties must first address their concerns, issues, disagreements, and/or recommendations to the contracting officer for resolution.

If resolution cannot be made by the contracting officer, interested parties may contact the installation ombudsman, Perri Fox, 2101 NASA Parkway, Houston, TX, 77058, 281-483-3157, E-mail perri.e.fox@nasa.gov. Concerns, issues, disagreements, and recommendations which cannot be resolved at the installation level may be referred to the NASA ombudsman, Ron Poussard, Director of the Contract Management Division, at 202-358-0445, fax 202-358-3083, E-mail agency-procurementombudsman@nasa.gov. Please do not contact the ombudsman to request copies of the solicitation, verify due date, or clarify technical requirements. Such inquiries shall be directed to the contacting officer as specified in Section H of this document.

F. Award Administration Information

1. Award Notices

At the end of the selection process, each Step-2 proposing organization will be notified of its selection or non-selection status. NASA will provide debriefings to those investigators who request one. Selection notification will be made by a letter signed by the designated NASA selecting official. The selection letters are not an authorization to begin performance. The selected organization's business office will be contacted by a NASA Grant Officer to negotiate an award. Any costs incurred by the investigator in anticipation of an award are at their own risk until contacted by NASA. The NASA Shared Services Center (NSSC) as appropriate, will determine the type of award instrument, request further business data, and negotiate the resultant action. NASA Grant Officers are the only personnel with the authority to award NASA grants and obligate government funds. NASA reserves the right to offer selection of only a portion of a proposal. In these instances, the PI will be given the opportunity to accept or decline the offer. Additional information can be referenced in the NASA FAR Supplement Provision.

2. Administrative and National Policy Requirements

All grant awards are subject to the NASA Grant and Cooperative Agreement Handbook. This handbook consists of four sections that prescribe the policies and procedures relating to the award and administration of NASA grants. Section A provides the text of provisions and special conditions and addresses NASA's authority, definitions, applicability, amendments, publications, deviations, pre-award requirements and post-award requirements currently covered by 14 CFR Part 1260. Section B relates to grants with institutions of higher education, hospitals, and other nonprofit organizations. Sections A and B, with the special considerations in subpart 1260.4(b), apply to awards with commercial firms that do not involve cost sharing. Section C adopts the administrative requirements of OMB Circular No. A-102 and relates to administrative requirements for grants to state and local governments. Section D relates to awards with commercial firms. The Handbook is located at http://prod.nais.nasa.gov/pub/pub_library/grcover.htm.

3. Individual Researcher Reporting

a. Annual Reporting

The PI shall provide an annual written report to NASA. This report is due 60 days prior to the anniversary of the start of funding. Receipt of the annual report is a prerequisite for continued funding installments. This information will be used to assess the degree of progress of the project. A component of this annual report will be used for the NASA Space Life & Physical Sciences Research & Applications Division Task Book (<https://taskbook.nasaprs.com/Publication/welcome.cfm>). The Task Book includes descriptions of all peer-reviewed activities funded by the Human Exploration and Operations Mission Directorate (HEOMD). The Task Book is an invaluable source of information for NASA biological and biomedical researchers as well as the external scientific and technical communities. This information will consist primarily of:

- an abstract;
- a bibliographic list of publications;
- invention disclosures;
- a statement of progress, including a comparison with the originally proposed work schedule;
- results of periodic data reviews

Additional reporting requirements may be added to ensure timely integration of the research or technology development into NASA.

b. Intellectual Property Reporting

The PI's institution must report each invention disclosure or patent application resulting from the grant to NASA within 60 days of investigator disclosure at <https://ntr.ndc.nasa.gov>.

Submit either a hard copy of NASA Form 1679 to NASA Innovative Partnerships Office, Mail Code AF2, 2101 NASA Parkway, Houston, TX 77058 OR submit online at <https://ntr.ndc.nasa.gov>. In the field designating contract number, please cite NCC 9-58.

c. Final Report

A final report must be provided to NASA at the end of the award funding period, including a detailed listing of all peer-reviewed publications. The final report is a requirement for eligibility for future NASA/NSBRI solicitations. The information in this report will consist primarily of:

- statement of the specific objectives;
- significance of the work;
- background;
- overall progress during the performance period;
- narrative discussion of technical approaches including problems encountered;
- accomplishments related to approach; and

- an appendix with bibliography, copies of all publications and reports, and intellectual property disclosures. Any publications or other public materials containing data are particularly important to include in this section.

d. Study Archive

Ordinarily, NASA-funded research data and results are required to be archived in the NASA Life Sciences Data Archive (LSDA), the formal repository for HRP-funded research data (<http://lsda.jsc.nasa.gov>). Data archiving is an on-going activity from proposal selection through final archival of the completed study. All NRA grant or contract recipients will be contacted by an LSDA archivist to initiate the archival process. Investigators will be required to sign a Data Submission Agreement (DSA) detailing data products to be submitted to LSDA.

e. Publications

All publications (including websites, presentations, or other electronic products) of any material based on or developed under NASA sponsored projects should conclude or begin with the following acknowledgement:

“This material is based upon work supported by the National Aeronautics and Space Administration under Grant/Contract/Agreement No. <xxxxxx>.” Except for articles or papers published in peer-reviewed scientific, technical, or professional journals, the exposition of results from NASA supported research should also include the following disclaimer:

"Any opinions, findings, and conclusions or recommendations expressed in this article <or report, material, etc.> are those of the author(s) and do not necessarily reflect the views of the National Aeronautics and Space Administration."

As a courtesy, any releases of NASA photographic or illustrative data products should list NASA first on the credit line followed by the name of the PI institution, for example,

"Photograph <or illustration, figure, etc.> courtesy of NASA <or NASA Center managing the mission or program> and the <Principal Investigator institution>."

Please note that any research publications or presentations utilizing research data from Life Sciences Data Archive (LSDA) or crew medical data from Lifetime Surveillance of Astronaut Health (LSAH) must be submitted for review to ensure that no personally identifiable information data is included. In addition, recognition of either or both of these data sources must be included in the publication's or presentation's acknowledgments section if not otherwise included in the document.

HRP requires public disclosure of the results of its sponsored research within one year of the grant completion and, therefore, expects significant findings from supported research to be promptly submitted for peer reviewed publication with authorship(s) that accurately reflects the contributions of those involved. For all funded projects, HRP requests but does not require that scientific manuscripts prepared under HRP or NSBRI support be sent to the office of the HRP

Chief Scientist before submission for publication. This is to determine if there may be inadvertent release of identifiable crew information, to identify synergies between projects, and to track program status. It will not be used to otherwise control the content of such manuscripts. In addition, any published manuscript funded by HRP should be submitted to the HRP Chief Scientist or his designee within one month of publication.

4. Other Considerations

Optional Travel

Annual NASA Human Research Program Investigators' Workshop
Visits to NASA Lyndon B. Johnson Space Center
Presentation at a professional society meeting

G. Submission Dates

Solicitation Announcement Identifier: NRA NNJ13ZSA002N
Proposal Response Period: July 30, 2013 – September 17, 2013
Proposals Due: September 17, 2013, 5 PM Eastern Time
Estimated Step-2 Selection Announcement: January 2014

H. NASA Contacts

Additional technical information for the NASA programs is available from:

John B. Charles, Ph.D.
Chief, International Science Office
Human Research Program
NASA Johnson Space Center (Mail Code SA2)
Houston, Texas 77058
Telephone: 281-483-7224
Fax: 281-483-6089
E-mail: john.b.charles@nasa.gov

JSC Procurement Point of Contact:

Dana Altmon-Cary
Contracting Officer
NASA Johnson Space Center (Mail Code BH4)
Houston, Texas 77058
Telephone: 281-483-8228
Fax: 281-483-4066
Email: dana.altmon-cary-1@nasa.gov

Additional information on the proposal submission process is available from:

NSPIRES

Telephone: 202-479-9376, Monday through Friday, 8 a.m. to 6 p.m. Eastern Time.

Email: nspires-help@nasaprs.com

Frequently Asked Questions: Available through the Proposal Online Help site at <http://nspires.nasaprs.com/external/help.do>.

Tutorials of NSPIRES: Available at <http://nspires.nasaprs.com/tutorials/index.html>

I. Summary of Key Information

Selection announcements are expected no earlier than January 2014, and selected awards will begin no earlier than January 1, 2014.

Number of new awards pending adequate proposals of merit	6-10
Maximum duration of awards	3 years
First day for submission of proposals	July 30, 2013
Last day for submission of proposals	September 17, 2013
Planning date for start of investigation	January 1, 2014
Page limit for the central Science-Technical-Management section of Proposal	5 pages
Relevance to NASA	This program is relevant to the human health and performance strategic goals and subgoals in NASA's <i>Strategic Plan</i> ; see http://www.nasa.gov/news/budget/index.html#.UdDEh_1wdsc . Proposals that are relevant to this program are, by definition, relevant to NASA.
General information and overview of this solicitation	See Human Exploration Research Opportunities (HERO) Overview posted http://nspires.nasaprs.com
Detailed instructions for the preparation and submission of proposals	See NASA Guidebook for Proposers at http://www.hq.nasa.gov/office/procurement/nraguidebook/
Submission medium	Electronic proposal submission is required; no hardcopy is required. See also HERO Overview and Chapter 3 of the <i>NASA Guidebook for Proposers</i> .
Web site for submission of proposal via NSPIRES	http://nspires.nasaprs.com (help desk available at nspires-help@nasaprs.com or (202) 479-9376)
NASA point of contact concerning this program	John B. Charles, Ph.D