

A.4.2 IN-SPACE PROPULSION TECHNOLOGIES

1. Scope of Program

The goal of the In-Space Propulsion (ISP) program of the NASA Office of Space Science is to develop advanced propulsion technologies for use beyond Earth orbit that reduce trip times, mass, and/or cost associated with NASA science missions to the outer planets, satellites, small bodies, and other solar system destinations. This offering of the In-Space Propulsion Technologies (ISPT) program is the second in what is anticipated to be a series of solicitations to support the ISP program (Note: the first such solicitation, for the next Generation Ion Engine Technology, was issued as an amendment to the ROSS-2001 NRA 01-OSS-01, which may be accessed by linking through "Amendments" at URL http://research.hq.nasa.gov/code_s/nra/current/NRA-01-OSS-01/index.html).

This ISPT program specifically solicits proposals for the development of the following four advanced in-space propulsion technologies that are expected to enable or enhance a wide variety of NASA's science missions:

- Aerocapture;
- High Power Electric Propulsion for Near-Term Nuclear Systems;
- Power Conversion Technologies for Nuclear Electric Propulsion (NEP); and/or
- Solar Sails.

Expanded definitions of the technologies identified above are further provided in the ISP Program Proposal Information Package (PIP) that may be accessed on line at URL http://www.spacetransportation.com/code_s/inspaceannounce.html.

Note that the intent of this ISP Technologies program is not to provide flight hardware that may be used by any specific missions but to develop technologies that may enable missions to be planned that might otherwise be considered untenable. Each submitted proposal may address only one of these technologies, although there is no restriction on the number of proposals that may be submitted by a given organization either by itself or as the lead of a team of organizations.

Teaming arrangements of all kinds is encouraged by all types of proposing organizations, including nonprofit and for-profit, private and governmental. If a non-NASA organization wishes to team with a NASA Center, such negotiations must be accomplished prior to submission of the proposal and all associated costs must be included in the cost section of the proposal. Note that no preference will be given to proposals that seek to team with a NASA Center, nor for proposals that come from a NASA Center. However, for those wishing to consider teaming with a NASA Center the points of contact are:

- NASA Ames Research Center: Mr. Dan Rasky (phone: 650-604-1098, E-mail: drasky@mail.arc.nasa.gov)
- NASA Glenn Research Center: Mr. William Taylor (phone: 216-433-6568, E-mail: william.j.taylor@grc.nasa.gov)
- NASA Johnson Space Flight Center: Mr. Tri Nguyen (Phone: 281-483-0468, E-mail: tri.x.nguyen1@jsc.nasa.gov)
- NASA Langley Research Center: Mr. Jerry Kegelman (phone: 757-864-8022, E-mail: j.t.kegelman@larc.nasa.gov).
- NASA Marshall Space Flight Center: Mr. James Wyckoff (phone: 256-544-7922, E-mail: james.wyckoff@msfc.nasa.gov)
- Jet Propulsion Laboratory: Mr. Dave Vaughan (phone: 818-393-6338, E-mail: david.a.vaughn@jpl.nasa.gov)

2. Programmatic Information

2.1 General Provisions

The technology areas included in this solicitation are only those four given in Section 1 above.

All activities selected through this Program Element will be funded solely through multiyear contracts having a base period of performance of one year or less. Proposals for efforts greater than one year must be structured with a one year initial period with options for extension in time increments not to exceed one year each. The total proposed period of performance may not exceed three years. Proposals must define clearly measurable milestones (a minimum of two per year) to be achieved in order to justify continuation of funding. Funding approval for the subsequent year(s) will be based on achievements toward milestones for the first year and the continued program need and funds thereafter. Exercise of contract options will be based on performance and there is no guarantee that any options will be funded for the remaining performance timeframe. The following budget information is tentative and is provided for planning purposes only and is subject to the availability of funds. In general it is expected that the first year funding will be modest and then grow substantially in the second and third years.

- Aerocapture

The anticipated budget for this technology area for the initial selections is \$2.25M for no more than four awards. Total funding available for Fiscal Years (FY's) 2003 and 2004 is anticipated but not guaranteed to be in the range of \$4M to \$7M per year.

- High Power Electric Propulsion for Near-Term Nuclear Systems

The anticipated budget for this technology area for the initial selections is approximately \$575K for no more than three awards. Total funding available for FY's 2003 and 2004 in this area is anticipated to be approximately \$3M per year.

- Nuclear Electric Propulsion (NEP) Power Conversion Technologies

The anticipated budget for this technology area for the initial selections is approximately \$1M. It is anticipated that only a few (perhaps just one) initial awards will be made. Total funding available for FY's 2003 and 2004 in this area is anticipated to be approximately \$3M per year.

- Solar Sails

The anticipated budget for this technology area for the initial selections is approximately \$400K for no more than one award. Total funding available for FY's 2003 and 2004 is anticipated to be approximately \$4M per year.

2.2 *OSS Education And Public Outreach (E/PO) Program*

Consistent with Section 3 of the Summary of Solicitation of this NRA, OSS policy strongly encourages participation by the space science community in education and public outreach activities with the goal of enhancing the Nation's formal education system and contributing to the broad public understanding of science, mathematics, and technology. The baseline policy given in this Summary of Solicitation of this NRA is that proposals for E/PO activities are voluntary on the part of the selected investigators, and this policy is applicable to this ISP program since there may be unusual opportunities associated with its engineering and technology development efforts that may be of special interest to the public and educational community. However, in order to allow for E/PO activities that are appropriately scaled to the much larger awards contemplated for this ISP program element, the policy for E/PO activities is hereby amended to allow budgets of up to 5% of the proposed research activity rather than being capped at \$15K per year as specified in the Summary of Solicitation.

2.3 *Proposal Preparation and Submission Information*

IMPORTANT INFORMATION

As discussed in the *Summary of Solicitation* of this NRA, the Office of Space Science (OSS) is now using a single, unified set of instructions for the submission of proposals. This material is contained in the document entitled *NASA Guidebook for Proposers Responding to NASA Research Announcement – 2001* (or *NASA Guidebook for Proposers* for short) that is accessible by opening URL <http://research.hq.nasa.gov>, and linking through the menu item "Helpful References," or may be directly accessed online at URL <http://www.hq.nasa.gov/office/procurement/nraguidebook/>. This NRA's Summary of Solicitation also contains the schedule and instructions for the electronic submission of a *Notice of Intent* (NOI) to propose and a proposal's *Cover Page/Proposal Summary*, which now also includes the required *Budget Summary*, and the mailing address for the submission of a proposal.

Note: In addition to the page limitations stated in Section 2 of the *NASA Guidebook for Proposers* for the various sections of a proposal, ISP proposals must also contain a Statement of Work (SOW) to be performed, not to exceed

three pages in length, which is to be inserted directly after the "References" section of the proposal.

Because the awards to be made through this Program Element will be contracts with options to continue on a yearly basis, they have additional programmatic requirements including reporting, data base entries, and reviews. To support these requirements, NASA will provide a total of four days of training for all selected participants at the NASA Marshall Space Flight Center (MSFC) in the areas of Risk Management (for awards in excess of \$750K) and the Space Transportation Information Network (STIN). Therefore, proposals to this ISPT program must include an appropriate budget for this activity.

The MSFC Advanced Space Transportation Program (ASTP) Office will have responsibility for implementation of awards under this amendment. Those who receive an award under program shall provide initial task inputs to ASTP's on-line, password protected, STIN database and submit monthly updates pertaining to: the technology task overview such as technology readiness levels, technical performance measures, risk management, resources, schedule (format compatible with Microsoft Project 2000), and milestones. In addition, a monthly electronic status submittal of accomplishments, issues, and upcoming events will be required. Note that the STIN database requires only a browser to access the system; no special plug-ins are required, and the system was designed, developed, and tested for full functionality on Mac, PC, and Unix platforms. Other reporting requirements include a Final Report in a format suitable for publication as a Contractor Report. Descriptions of this type of report can be found at

http://nodis3.gsfc.nasa.gov/library/displayDir.cfm?Internal_ID=N_PG_2200_002A_&page_name=main. Finally, all selected participants in this program will be required to develop and present a technical paper at a suitable technical conference and/or publish their results in an appropriate technical journal.

Reviews will be held in conjunction with project level or task milestones, with a minimum of a kick-off and final reviews. These reviews will document the progress against Technical Performance Measures (TPM's) and other performance metrics such as, deliverables, completion of design drawings, test results, cost vs. budget statistics, and adherence to planned schedules.

Questions concerning this Program Element may be directed to the ISP Program Executive:

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