C.7 PLANETARY DATA ARCHIVING, RESTORATION, AND TOOLS

NOTICE: Amended March 27, 2015. Throughout this program element, the text has been modified to strengthen the requirements on proposers to make data products available. For example, in Section 1.1, data products "must" be made available, Section 1.7 now requires that software tools be archived at Github, and Section 4.3 requires rather than encourages that certain data products be archived. In addition, PDART specific evaluation criteria are presented in Section 2.1, the definition of an equivalent archive is given in Section 2.2, and updated average award sizes are presented in Section 2.4. New text is in bold, deleted text is struck through. The due dates remain unchanged.

Proposals to this program will be submitted by a two-step process in which the Notice of Intent is replaced by a required Step-1 proposal submitted by an organization Authorized Organizational Representative. No PDF upload is required for the Step-1 proposal. Step-1 proposers merely must fill in the Proposal Summary text box on the NSPIRES cover pages. Only proposers who submit a Step-1 proposal are eligible to submit a Step-2 (full) proposal. See Section 3 for details. Proposers to this program do not need to submit a data management plan via the NSPIRES cover pages.

1. Scope of Program

1.1 Programmatic Overview

The Planetary Data Archiving, Restoration, and Tools (PDART) **program** solicits proposals to generate higher-order data products, archive and restore data sets or products, create or consolidate reference databases, generate new reference information, digitize data, and develop or validate software tools.

The objective of this program element is to increase the amount and quality of digital information and data products available for planetary science research and exploration, and to produce tools that would enable or enhance future scientific investigations. Although it is expected that a small amount of data analysis, interpretation, or modeling may be performed to validate any generated products, this program element does not accept proposals in which the main focus is hypothesis-based science.

For all types of proposals, ~~it is expected~~ the products of selected proposals ~~will~~ **must** be made available to the scientific community. Data products must be archived in the NASA Planetary Data System (PDS) or an equivalent archive **(see Section 2.2 for a definition of an equivalent archive)**. All proposals will be evaluated on the perceived impact of the new products, datasets, or tools on future planetary science research and exploration.

Proposers to this program element will not provide a data management plan via the NSPIRES cover pages. Instead, that is superseded by instructions in the sections below that place more detailed descriptions into the body of the Scientific/Technical/Management section of proposals.

1.2 Data Product Generation

Proposals to generate higher-order data products than those that currently exist are encouraged. Source data may be derived from NASA or other spaceflight missions, astronomical observations, sample analyses, or other sources. The new data products may include, but are not limited to, cartographic products and calibrated or corrected datasets.

1.3 Data Set Restoration and Archiving

Proposals to archive complete datasets and/or to restore and archive incomplete datasets (e.g., to reextract, rereduce, and/or recalibrate data to fill in fragmentary datasets) will be considered. Such proposals ~~should~~ **must** include: 1) an archiving plan (see Section 4.3); 2) a description of how the data will be obtained; 3) a detailed plan for how the data will be restored, if relevant; and 4) a description of documentation, calibration data, and related software necessary to read and interpret the original and new datasets.

1.4 Reference Database Creation

Proposals that create or consolidate reference databases useful for planetary science research will be considered. These databases may include, but are not limited to, spectral libraries, chemical and physical properties of materials, and photographic catalogs. The burden is on the proposer to demonstrate the demand for a proposed database and its likelihood of advancing the current state of knowledge or resolving a significant planetary question or problem.

1.5 Generation of New Reference Information

Proposals to make laboratory measurements, conduct experiments, or otherwise generate new reference information that is intended for general use in planetary science will be considered. Examples may include, but are by no means limited to, spectral data, phase diagrams and equations of state, physical laws, optical constants, partition coefficients, and thermodynamic properties of materials. Where the main product of the proposal is a reference dataset, the proposal must include a plan to deposit the data in the NASA PDS or an equivalent archive. The burden is on the proposer to demonstrate the demand for a proposed reference product and its likelihood of advancing the current state of knowledge or resolving a significant planetary question or problem.

1.6 Data Digitization

This program element encourages proposals to recover datasets that currently are available only on media not readable by modern computing equipment, or to digitize data that are only available in analog form (e.g., printed matter, photographs, and manuscripts). PDART will consider proposals that include the rental of specialty equipment and/or the hiring of independent

expertise to accomplish those tasks. Regardless of the method, the proposal must demonstrate the capability and provide a plan to recover or digitize the data. **The burden is on the proposer to demonstrate the demand for the digitized product and its likelihood of advancing the current state of knowledge or resolving a significant planetary question or problem.**

1.7 Software Tool Development and Validation

This program element supports the development and dissemination of software tools that facilitate the use of existing datasets or that would enable or enhance future science investigations of interest to the Planetary Science Division. PDART does not support extensive application of these tools, but it is expected that the validity of the tools will be demonstrated during the course of the proposed work. Proposals are expected to include a plan to disseminate the tools for use by the planetary community. **In addition to any other dissemination mechanisms, investigators developing software tools are required to archive the source code, and all relevant documentation, at NASA's Github site (https://github.com/nasa).** ~~Investigators are encouraged, but not required, to distribute the source code for software tools.~~ It is expected that user interfaces and/or executables will be made publically available at no cost.

This program element does accept proposals to fund the development or enhancement of numerical models, with the expectation that the funded model will be made publicly available. In these instances, the proposal will be judged on 1) how the enhancement would result in an improvement in the results previously produced by this or similar models, and 2) how the enhancement would enable scientific investigations not currently possible with, or improve investigations relative to, models currently in use.

Proposals to develop tools that would enhance the usability of, and access to, the PDS4 file format are particularly encouraged. Of special interest are tools for converting PDS4-formated files into other popular file formats (*e.g.*, FITS, CDF).

2. Programmatic Information

2.1 Merit Evaluation Criterion

As PDART's goals differ from other programs, the review of proposals submitted to this program element will include Merit factors not listed in the *NASA Guidebook for Proposers* (Appendix C). In addition to the *Guidebook* criteria, all submitted proposals will be evaluated on the following PDART-specific merit factors:

1. **The perceived impact of the new products, datasets, or tools on future planetary science research and exploration. This factor includes an evaluation of the proposal's end products against the state-of-the-art.**
2. **The uniqueness and/or time criticality of the proposed new products, datasets, or tools. For this factor, historical significance may also be considered.**
3. **The credibility of the proposed plan for dissemination and archiving. This factor includes both the format that the data products/tools would be in and how they would be made available for the scientific community. For those proposals that**

would use an archive other than NASA's PDS or Github site, this factor includes an evaluation of whether the repository is a PDS-equivalent archive (Section 2.2).

4. **Any applicable work-specific factors described in Sections 1.2-1.7.**

2.2 Definition of a PDS-equivalent archive

Equivalence of an archive to the NASA PDS is defined by a number of factors that cover accessibility, reliability, usability, and other qualities.

Proposed archives are required to have the following features:

1. **The Archive shall be managed by someone other than the data provider. (Independence)**
2. **The Archive shall be managed for the long-term (25 years at least). (Sustainability)**
3. **The Archive shall be accessible to the public (lay and scientific) without preapproval. (Open Accessibility)**
4. **The Archive shall ensure that data are searchable. (Searchability)**
5. **The Archive shall ensure that data are citable. (Citability)**
6. **The Archive shall be considered by its user community as the "standard" archive for the subfield. (Preeminence)**
7. **The Archive shall require that data products be submitted in standardized formats and file types. (Standardization)**

Proposed archives are preferred to have the following features:

1. **Archive should conduct independent peer reviews of data to assess usability and completeness of data packages. (Peer Review)**
2. **Archive should include documentation for it's holding such as user guides, calibration descriptions, etc. (Documentation).**

2.3 Exclusions

PDART does not support scientific investigations whose primary emphasis is data analysis, fundamental theoretical research, or instrument development. Proposers are encouraged to consult C.1 Planetary Science Research Program Overview for the appropriate program element to which they should submit.

Proposals whose primary focus is on data to be used in investigations solicited by the Astrophysics, Heliophysics, or Earth Science Divisions are encouraged to consult Appendices A, B, and D for information on the appropriate program elements to which they should be submitted.

The PDART element does not fund proposals whose work effort is primarily to acquire new ground- or space-based observations or surveys; such proposals should be submitted to the Solar System Observations program (see C.6).

Proposals for topical conferences, workshops, or symposia related to this program element may not be proposed through this solicitation. Proposers are encouraged to pursue such submissions through ROSES-2015 E.2, Topical Workshops, Symposia, and Conferences.

2.4 Duration and Size of Awards

The maximum duration of awards from C.7 is three years (not including no cost extensions). Proposals for funding of less than three years are highly encouraged for projects that can be completed on shorter timescales. The appropriateness of the proposed funding period will be reviewed and adjustments may be requested.

Since this is a new program with a new scope, the budget and expected number of new awards is somewhat uncertain, as it may depend on the distribution of topics proposed and the number of proposals submitted. As always, the number of new awards will also depend on the available Fiscal Year (FY) 2016 budget.

NASA does not have historical data to rely on, but the 2014 PDART selections have been made and those data have been added to the spreadsheet on the SARA grant stats web page. The average year-one award size in 2014 was ~$120K, but the award sizes spanned a very wide range, depending on the nature of the work proposed. Proposers are encouraged to request what is actually needed to conduct the proposed work.

~~Since this is a new program with a new scope we don't have historical data to rely on, but when the 2014 PDART selections are made that data will be spreadsheet on the SARA grant stats web page and summarized here. We do know that the average year one award size in the past made from the Planetary Mission Data Analysis Program (PMDAP) was ~$90K per year in FY 2013, but ~$135K per year in FY 2014 and each year the award sizes spanned a wide range, depending on the nature of the work proposed. Proposers are encouraged to request what is actually needed to conduct the proposed research.~~

3. The Two-Step Submission Process

To facilitate the early recruitment of a conflict-free review panel, and to ensure proposals are submitted to the appropriate program, this program will use a two-step proposal submission process (see Section IV. (b) vii of the ROSES Summary of Solicitation.)

A Step-1 proposal is required and must be submitted electronically by the Authorized Organizational Representative (AOR). No budget is required. Only proposers who submit a Step-1 proposal are eligible to submit a Step-2 proposal. Full (Step-2) proposals must broadly contain the same scientific goals proposed in the Step-1 proposal. The PI cannot be adjusted and proposers that want to add funded investigators between the Step-1 and Step-2 proposals must inform the point(s) of contact below and cc sara@nasa.gov at least two weeks in advance of the Step-2 due date. Submission of the Step-1 proposal does not obligate the proposer to submit a Step-2 (full) proposal later.

3.1 Step-1 Proposal

Proposers should refer to the "Instructions for Submitting a Step-1 Proposal" under "Other Documents" on the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES) web page for this program. The Scientific/Technical/Management section of the Step-1 proposal is restricted to the 4000 character Proposal Summary text box on the NSPIRES web interface cover pages and should include a description of the science goals and objectives to be addressed by the proposal, a brief description of the methodology to be used to address the science goals and objectives, and the relevance of the proposed research to this call. The Step-1 proposal may be used to determine whether the proposal was submitted to the appropriate program element. No evaluation of intrinsic merit will be performed on Step-1 proposals.

NSPIRES will notify proposers whether their Step-2 proposal is encouraged or not, at which point they will be able to submit Step-2 proposals.

3.2 Step-2 Proposal

All proposals submitted to ROSES must strictly conform to the formatting rules in Section IV of the *Summary of Solicitation* and Chapter 2 of the *NASA Guidebook for Proposers*. Those that violate the rules may be rejected without review. In previous years, problems with the following aspects of formatting proposals have been noted. Proposers should pay particular attention to:

- Length of the Scientific/Technical/Management section: 15 pages
- Margins: 1 inch on all sides, with a standard page size of 8.5 × 11 inches.
- Font: Section 2 of the *NASA Guidebook for Proposers* requires easily read fonts having, on average, no more than 15 characters per inch (e.g., 12-point Times New Roman and Arial). Proposers may not adjust the character spacing or otherwise condense a font from its default appearance.
- Line spacing: Font and line-spacing settings should produce text that contains no more than 5.5 lines per inch. Proposers may not adjust line-spacing settings for a selected font below single-spaced.
- Figure captions: Must follow the same font and spacing rules as the main text.
- Figures and tables: For text in figures and tables, font and spacing rules listed above do not apply, but all text must be judged to be legible to reviewers without magnification above 100%. Do not place expository text in tables or figures in order to gain space.

4. Resources: Information, Data, and Facilities

4.1 Limits on Use of Data

For proposals that generate higher-order data products or otherwise use data in the development or testing of software, the data to be used in proposed investigations must be available in the Planetary Data System (PDS) or equivalent publicly accessible archive at least 30 days prior to the proposal submission date. Spacecraft data that have not been obtained yet (i.e., future mission data) or those that have not been accepted for distribution in approved archives are not eligible for use in investigations. Regardless of the archive(s) used, if the data to be analyzed have issues

that might represent an obstacle to analysis, the proposers must demonstrate clearly and satisfactorily how such potential difficulties will be overcome. Investigators funded by spacecraft missions who wish to apply must clearly demonstrate how the proposed research does not overlap and is not redundant with duties or responsibilities already funded by their respective mission(s). Please see Appendix C.1, The Planetary Science Division Research Program Overview, for more information.

Proposals to digitize and/or archive data not currently available in a public archive must demonstrate that the data to be used are available (such as a letter of support, if they are owned by a private entity, or a detailed plan to locate and obtain the data from a known repository), in a format suitable for the proposed work, and of sufficient quality to achieve the goals set forth in the proposal. The proposal should further demonstrate a familiarity with the data and an understanding of the work required to prepare the data for future analysis and/or delivery to an appropriate public archive.

4.2 Facilities and Data Sources Available to Proposers

Proposers are advised to read C.1, The Planetary Science Division Research Program Overview, for information on facilities and data sources that are available to supported investigators. If their use is anticipated, this should be discussed and justified in the submitted proposals (especially note the provision for such discussion in the proposal section entitled Facilities and Equipment). Also note that, per the directions in Section 2.3 of the *NASA Guidebook for Proposers*, a letter of support may be required from any facility required for the proposed effort.

4.3 Data Archiving and Map Publication

Selected investigations **are expected to** result in data products that are of broad use to the science community, including maps, data with improved calibrations, etc. ~~NASA strongly encourages~~ **PDART requires** that such data be archived in the Planetary Data System (http://pds.nasa.gov/), or **an** equivalent public archive, by the end of the award period. Proposers are advised to read C.1, The Planetary Science Division Research Program Overview, for information on including an archiving plan in the proposal. **Proposers are highly encouraged to contact the appropriate PDS discipline node during the initial phases of the proposal process to help with discerning the most efficient way to archive your proposed data.**

Proposed investigations of any planetary or satellite surface that are intended to result in the publication of a Scientific Investigations Map (SIM) by the U.S. Geological Survey (USGS) should check the relevant box on the proposal Cover Page and clearly indicate this intention in the Proposal Summary, as well as in the text of the proposal. ~~The scientific goal of such a geologic map product should be clearly explained and justified.~~ Proposers are advised to read C.1, The Planetary Science Division Research Program Overview, for the USGS' information on and requirements for map production and publication.

5. Summary of Key Information

Expected program budget for first year of new awards	~$2-2.4M
Number of new awards pending adequate proposals of merit	See Section 2.2
Maximum duration of awards	3 years
Due date for Step-1 proposals	See Tables 2 and 3 in the *Summary of Solicitation* of this NRA.
Due date for Step-2 proposals	See Tables 2 and 3 in the *Summary of Solicitation* of this NRA.
Planning date for start of investigation	~8 months after proposal due date.
Page limit for the central Science-Technical-Management section of proposal	15 pp; see also Chapter 2 of the *NASA Guidebook for Proposers*
Relevance	This program is relevant to the Planetary Science questions and goals in the NASA Science Plan. Proposals that are relevant to this program are, by definition, relevant to NASA.
General information and overview of this solicitation	See the *ROSES Summary of Solicitation*.
Detailed instructions for the preparation and submission of proposals	See the *NASA Guidebook for Proposers* at http://www.hq.nasa.gov/office/procurement/nraguidebook/.
Submission medium	Electronic proposal submission is required; no hard copy is required or permitted. See Section IV of the *ROSES Summary of Solicitation* and Chapter 3 of the *NASA Guidebook for Proposers*.
Web site for submission of proposal via NSPIRES	http://nspires.nasaprs.com/ (help desk available at nspires-help@nasaprs.com or (202) 479-9376)
Web site for submission of proposals via Grants.gov	http://grants.gov (help desk available at support@grants.gov or (800) 518-4726)
Funding opportunity number for downloading an application package from Grants.gov	NNH15ZDA001N-PDART

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