C.8 LUNAR DATA ANALYSIS PROGRAM

NOTICE: Proposals to this program will be taken 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 2.3 for details.

1. Scope of Program

1.1 Program Overview

The Lunar Data Analysis Program (LDAP) program funds research on the analysis of recent lunar missions in order to enhance their scientific return. LDAP broadens scientific participation in the analysis of mission data sets and funds high-priority areas of research that support planning for future lunar missions.

LDAP supports scientific investigations of the Moon using publicly available (released) data. These include the following missions:

Lunar Crater Observation and Sensing Satellite (LCROSS),
Moon Mineralogy Mapper (M3),
Lunar Reconnaissance Orbiter (LRO)
Gravity Recovery and Interior Laboratory (GRAIL),
Acceleration, Reconnection, Turbulence, and Electrodynamics of the Moon's Interaction with the Sun (ARTEMIS),
Lunar Atmosphere and Dust Environment Explorer (LADEE),
Non-U.S. missions: Kaguya, Chang'e 1, Chang'e 2, Chandrayaan-1, Chang'e 3.

Any proposal may incorporate the investigation of data from more than one mission.

An investigator may propose a study (e.g., scientific, landing site science, cartographic, topographic, geodetic research, etc.) based on analysis of lunar data collected by spacecraft at the Moon (listed above). Proposals may incorporate the analysis of data from more than one mission. Moreover, data analyses that require the use of older mission data sets (e.g., Apollo, Clementine) are allowable in the context of enhancing the analysis and understanding of the data from the missions listed above. The use of older data sets as complementary/supplementary data sets to the missions listed above for the purpose of creating a needed data product (e.g., maps) for analysis is allowable. Additional information about NASA and other lunar missions can be found at NASA's National Space Science Data Center (NSSDC) at: http://nssdc.gsfc.nasa.gov/planetary/planets/moonpage.html.

Investigations are welcome in the following high priority areas of lunar research:

- Identification and/or characterization of potential landing sites of high lunar science return (e.g., geomorphology, regolith, radiation, and compositional properties);
- Modeling of the lunar gravitational field, global topography, and global lunar figure;
- Enhancement of the lunar geodetic network to enable precision lunar landing;
- Identification, distribution, transport, and characterization of volatiles in and on the Moon;
- Determination of the size and state of the lunar core;
- Determination of lunar lithospheric thickness;
- Lunar "change detection" (i.e., detection of surface or atmospheric changes as a function of time);
- Characterization of the global variability and structure of the lunar exosphere and/or dust environment;
- Identification/characterization of lunar mineralogy as a function of location and depth.

A description of science research priorities for lunar exploration can be found in the documents: *The Scientific Context for Exploration of the Moon (2007),* obtained at http://books.nap.edu/catalog.php?record_id=11954, and *Vision and Voyages for Planetary Science in the Decade 2013-2022 (2011),* obtained at http://www.nap.edu/catalog.php?record_id=13117. Both documents are published by the Space Studies Board of the National Research Council.

LDAP will consider requests for support of new ground-based observations and field/laboratory measurements provided that the requests are clearly described and that the observations or measurements are essential to the success of the work proposed. Requests to support such tasks are only allowable in the context of enhancing the analysis and understanding of the data from the missions listed above. Requests to perform new ground-based observations or field/laboratory measurements will be considered only if their cost (including full-time equivalents [FTEs], travel, etc.) does not exceed 20% of the proposal's total effort.

Investigators interested in proposing mostly theoretical, modeling, laboratory, or field studies that do not directly use spacecraft data, or proposals whose data analysis components are only a small portion of the total work effort proposed, are advised that such studies are not appropriate for LDAP, but may be suitable for submission to the C.2 Emerging Worlds or C.3 Solar System Workings Programs.

1.2 Sources of Information and Data

The LDAP program supports research investigations relevant to the scientific interpretation of lunar mission data that are now in the public domain. LDAP supports investigations that use only publicly available and released data. Data to be used in proposed investigations must be available in the Planetary Data System (PDS) (http://pds.nasa.gov) or other publicly accessible archive at least 30 days prior to the submission due date for LDAP proposals. Spacecraft data that have not been placed in the public domain may not be proposed for use in LDAP investigations. (Once a proposal has been awarded, investigators are free to augment the proposed dataset under analysis

with data deposited in the PDS (or other publically available archive) subsequent to 30 days prior to the LDAP submission date.)

Whether from the PDS or another source, if the data to be analyzed are not certified or otherwise have issues that might represent an obstacle to analysis, the obligation is on the proposer to clearly demonstrate that such potential difficulties can be overcome. Likewise, this requirement applies to proposals that make use of planetary data from international missions that do not have their data deposited in the PDS.

In all cases, it is the responsibility of the LDAP investigator to acquire any necessary data; therefore, before submitting a proposal, proposers must demonstrate in their proposal that the necessary data are available. Proposers who wish to use photographic and cartographic materials may access such data through the nearest Regional Planetary Image Facility (RPIF). RPIF locations are listed on the RPIF home page at http://www.lpi.usra.edu/library/RPIF.

1.2.1 Flight Team Member Requirements

Members of current spacecraft flight teams who wish to apply to the LDAP program must clearly demonstrate that their proposed investigation will use only released and publicly available data. Flight team members must scrupulously comply with the 30 days prior to submission rule (above). Additionally, proposals from current flight team members must rigorously demonstrate how the proposed LDAP research does not overlap – and is not redundant with – data analysis duties/responsibilities already funded within their respective mission. This requirement applies to all members of the proposal team.

1.3 Data Products and Data Archiving and Map Publication

Investigators may propose to produce data products (e.g., cartographic products, such as geologic, topographic, or mineral maps, and/or calibration data). Such investigations must have associated scientific tasks. Proposers interested in producing data products that do not have associated scientific tasks are directed to the Planetary Data Archiving Restoration and Tools Program (C.7, PDART). A plan for archiving and making products readily available must be included in any proposed investigation that will result in the production of data products. NASA reserves the option to require the archiving in the Planetary Data System (http://pds.nasa.gov/) of any data products resulting from LDAP selected proposals. Proposers are strongly advised to read C.1, The Planetary Science Division Research Program Overview, for information on the new mandatory data management plans. Proposed investigations that will result in a geologic map suitable for publication 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.

Proposers should refer to the most recent versions of the following documents for information on PDS compliance:

Document	Hyperlink
Proposer's Archive Guide	http://pds.nasa.gov/documents/pag/index.html
Standards Reference	http://pds.nasa.gov/documents/sr/index.html

Additional information on the PDS may be obtained from the following individuals:

Contact	Title	E-mail
William Knopf	Program Executive	william.knopf@nasa.gov
Edwin Grayzeck	Program Manager	edwin.j.grayzeck@nasa.gov

2. Programmatic Information

2.1 Early Career Fellowship Program

Early career researchers are encouraged to apply for the Early Career Fellowships (ECF) Program. The purpose of the ECF program (see C.16) is to support the development of individual research programs of outstanding scientists early in their careers and to stimulate research careers in the areas supported by the Planetary Sciences Division. This Program is based on the idea that supporting key individuals is a critical mechanism for achieving high impact science that will lead the field forward with new concepts, technologies, methods, and more.

Applicants requesting consideration for ECF may include an additional page to their Curriculum Vitae to provide information that can be used by reviewers to evaluate the Principal Investigator's (PI's) future research contributions and the potential for leadership within the scientific community. Please see Appendix C.16 of ROSES for more information on the two-step process for the ECF program and the criteria for evaluating candidates.

2.2 NASA Provided High-End Computational (HEC) Facilities

Those investigators whose research requires high-performance computing should refer to the *ROSES Summary of Solicitation*, Section I(d), "NASA-provided High-End Computing Resources." This section describes the opportunity for successful proposers to this program to apply for computing time on either of two NASA computing facilities at the Goddard Space Flight Center's Computational and Information Sciences and Technology Office or at the Ames Research Center's Advanced Supercomputing Division.

2.3. 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.

2.3.1 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.

2.3.2 Step-2 Proposal

All proposals submitted to ROSES must strictly conform to the formatting rules in Chapter 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: The *NASA Guidebook for Proposers* requires that you use a 12-point or larger font. The selected font must meet the requirement of having, on average, no more than 15 characters per inch (e.g., Times New Roman and Arial). You 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. Do not adjust line-spacing settings for your 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.

2.4 Duration and Size of Awards

The maximum duration of awards from C.8 is four years (not including no cost extensions). It is anticipated that most proposals will seek funding for up to three years. 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 budget for next Fiscal Year.

When the 2014 LDAP selections are made that data will be spreadsheet on the SARA grant stats web page and summarized here. We do know that awards made in the past from the Lunar Advanced Science and Exploration Research program averaged ~$120-130 K per year, but with a wide range, depending on the nature of the work proposed. Proposers are encouraged to request specifically what is needed to conduct the proposed research.

3. Summary of Key Information

Expected program budget for first year of new awards	~$1M
Number of new awards pending adequate proposals of merit	See Section 2.4
Maximum duration of awards	Four years, but see also Section 2.4
Due date for Step-1 proposals	See Tables 2 and 3 in the *ROSES Summary of Solicitation*.
Due date for Step-2 proposals	See Tables 2 and 3 in the *ROSES Summary of Solicitation*.
Planning date for start of investigation	6 months after the Step-2 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 proposals 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-LDAP
NASA points of contact concerning this program	Robert A. Fogel Planetary Science Division Science Mission Directorate NASA Headquarters Washington, DC 20546-0001 Telephone: (202) 358-2289 E-mail: rfogel@nasa.gov