

C.8 LUNAR DATA ANALYSIS PROGRAM

NOTICE: Amended on August 2, 2016. This amendment delays the proposal due dates for this program. Step-1 proposals are now due September 8, 2016, and Step-2 proposals are now due by November 10, 2016.

This Program Element continues to use a two-step proposal submission process described in Section 2 of Appendix C.1.

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),
Lunar Prospector (LP)
Deep Impact Lunar Flyby
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>.

LDAP solicits proposals that enhance the scientific return of lunar missions through the use of mission data. Tasks responsive to this call include 1) data analysis tasks, 2) nondata-analysis tasks that require the use of lunar mission data, and 3) nondata-analysis tasks that significantly enhance the use or facilitate the interpretation of lunar mission data. These tasks may incorporate theory, modeling, laboratory studies, correlative analyses, and/or other research. Nondata-analysis tasks that are responsive to this call are defined as tasks that are necessary to analyze (or help analyze) the lunar mission data. All proposals must include a complete science investigation. Proposals that include nondata-analysis tasks that do not incorporate the results of such tasks in the analysis of lunar mission data will not be deemed responsive to this call. Proposals whose principle objective is the production of data products for use by other researchers are appropriate for submission to C.7 Planetary Data Archiving, Restoration, and Tools (PDART).

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 of the Moon provided that such requests are clearly described and that the observations 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.

Investigators interested in proposing mostly theoretical, modeling, laboratory, or field studies that do not directly use spacecraft data 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 an equivalent 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 an equivalent 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). Proposers who plan investigations involving geologic mapping should consult Appendix C.1, Section 3.6, for guidance on submission and requirements for publication of U.S. Geological Survey (USGS) maps. The scientific goal of such a geologic map product should be clearly explained and justified.

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.

Proposals submitted to this Program Element must include a Data Management Plan (see Appendix C.1, Section 3.5). This must be placed in a special section, not to exceed two pages in length, immediately following the References and Citations section of the Scientific/Technical/Management portion 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/pds4/doc/sr/

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 Planetary Science Division Early Career Fellowship Program

Proposals to this Program Element may include an application for an Early Career Fellowships (ECF). See Program Element C.16 for a description of the application and evaluation process.

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

This Program Element uses a two-step proposal submission process described in Appendix C.1, §2.

Proposers are reminded that Step-1 proposals are mandatory and must be submitted by the proposing organization

Proposals must follow all formatting requirements that are described Appendix C.1 and in Chapter 2 of the *NASA Guidebook for Proposers*. Note that these requirements have been updated in 2016. Violation of these rules is sufficient ground for a proposal to be rejected.

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 seeking funding for 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. Please refer to Appendix C.1, §3.2, for instructions on submitting requests for more than three years.

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.

The average award size from this program in ROSES-2014 was ~\$100K per year, but with a wide range, depending on the nature of the work proposed. When the 2015 LDAP selections are made, that data will be contained on a spreadsheet on the SARA [grant stats web page](#). Proposers are encouraged to request specifically what is needed to conduct the proposed research.

2.5 Facilities and Data Sources Available to Proposers

Please refer to ROSES Appendix C.1, §4, for a detailed list of the data and astromaterials resources, and facilities available to proposers to this Program Element, and how to use them. 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.

3. Summary of Key Information

Expected program budget for first year of new awards	~\$1.3M
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 <i>ROSES Summary of Solicitation</i> .
Due date for Step-2 proposals	See Tables 2 and 3 in the <i>ROSES Summary of Solicitation</i> .
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 <i>NASA Guidebook for Proposers</i>
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 <i>ROSES Summary of Solicitation</i> .
Detailed instructions for the preparation and submission of proposals	See the <i>NASA Guidebook for Proposers</i> 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 <i>ROSES Summary of Solicitation</i> and Chapter 3 of the <i>NASA Guidebook for Proposers</i> .
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	NNH16ZDA001N-LDAP
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