

**Guideline Narrative for
Planetary Mission Senior Review Science Evaluation
11 October 2018**

I. Overview

The Planetary Science Division (PSD) conducts periodic Senior Reviews to evaluate extended mission proposals. In the past, these reviews were held every two years. Now, in accordance with new law and Federal Advisory Committee Act (FACA) regulations, the senior review cadence is every three years, and Review Panels will report to the Planetary Advisory Committee (PAC) through the PAC Senior Review Subcommittee (SRS).

PSD will hold its next Planetary Mission Senior Review (PMSR) in FY19 to evaluate proposals for extended missions planning to operate in FY20 through FY22. Missions that have arrived at a target destination by the end of FY18, or which plan to complete prime operations before the end of FY19, will be subject to this review. Missions that do not meet these criteria, or have been previously approved through the end of mission, may be subject to a special senior review in FY20. This draft guideline narrative, and ultimately the final guideline narrative, will be posted on the Lunar and Planetary Institute (LPI) website at <http://www.lpi.usra.edu/>.

A presentation based upon the “Memorandum For The Record: Plan For The 2019 Planetary Mission Senior Review” was given to the Science Mission Directorate Management Committee (SMaC) on Thursday, September 13, 2018. Upon the recommendation of the Planetary Science Division (PSD) Division Director (DD), and the concurrence of the Science Mission Directorate (SMD) Associate Administrator (AA), the 2019 PMSR will assess the science merits and performance of the following seven missions:

- Lunar Reconnaissance Orbiter (LRO)
- Mars Atmosphere and Volatile Evolution (MAVEN)
- Mars Odyssey (ODY)
- Mars Exploration Rover (MER/Opportunity)
- Mars Express (MEX/Aspera-3)
- Mars Reconnaissance Orbiter (MRO)
- Mars Science Laboratory (MSL/Curiosity)

There are four missions that are not subject to the 2019 PMSR. In alphabetical order, these missions (and the end of their prime mission) are:

- InSight – Prime mission extends to December 2020. A special Senior Review will be conducted in spring/summer of 2020 to align InSight with the 2022 PMSR.
- Juno – New prime mission approved in April 2018 ends in July 2021. Juno will participate in the special Senior Review conducted in spring/summer of 2020 to align with the 2022 PMSR.
- New Horizons – Extended Mission – 1 in 2021 [spacecraft science ops run through April 2021 when the spacecraft reaches 50 AU]. New Horizons will participate in the special Senior Review conducted in spring/summer of 2020 to align with the 2022 PMSR.
- OSIRIS-REx – Prime mission ends late 2023 with sample return to Earth.

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NASA Research and Education Support Services (NRESS) will assist in the review process. This includes the use of the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES) for proposal submission. Information on the use of NSPIRES may be obtained at the following website:
<http://nspires.nasaprs.com/external/>.

Each of these seven operating missions subject to the PMSR will submit proposals describing three options for extended mission operation during FY20 - FY22. Submitted proposals will be evaluated for scientific merit by an independent panel, which will provide written questions to the mission teams. The mission teams will have an opportunity to answer these questions at a face-to-face review, which will be held at a location to be specified at a later date. Each project team will be scheduled for a presentation with time for questions afterwards. The amount of time for each project presentation will be determined by the Review Panel upon their initial review of each proposal. The total length of the review will cover a multi-day period and be restricted in attendance. The review is not intended to provide a lengthy opportunity for oral presentation of the proposal contents.

The PMSR Science Review Panel will be divided into two subpanels as follows:

- Subpanel 1 –LRO
- Subpanel 2 – Mars (ODY, MAVEN, MER, MEX, MRO, MSL)

SMD has changed how it structures education, communication, and public outreach activities: new education partners have been selected from the recent Science Education Cooperative Agreement Notice and communication activities are now split from education and public outreach. The new policy governing communication activities, SMD Communication Policy (SPD-26), will be provided along with the final PMSR Guideline Narrative for your reference. Missions that are granted extensions under this PMSR, will be subjected to a separate SMD Education review at a later date. Education and Communications plan are NOT being evaluated as part of the PMSR. Information on education and communications contained in the PMSR guideline narrative are intended as a “head’s up” in anticipation of that review.

II. Budget Guidelines and Mission Options

Each mission will be provided funding targets for FY19 and a budget guideline for FY20 through FY22 . For completeness, a five-year budget run-out will be provided for each mission. Budget targets are not yet approved in the President’s FY20 Budget, so numbers issued now should be considered as NASA/SMD/PSD’s intentions, and not as an actual promise of funding. NASA reserves the right to modify these targets as necessary. These budget guidelines shall be used by the project offices to define three options for the conduct of the extended missions:

1. **Within Guideline Option:** The proposal shall focus on describing an extended mission that can be accomplished within the FY20 through FY22 budget guideline. This is the most important option to be developed by the project, as it establishes the reference baseline and most likely mission.
2. **Science De-scope Option:** The proposal shall describe a series of reverse-priority de-scopes of science operations, with associated cost savings reflected by each de-scope increment. These de-scope scenarios should be incrementally repeated until a science floor is met where the mission is no longer scientifically viable for continuation.
3. **Overguide Option:** The proposal may include an overguide request, but it must be noted that PSD continues to work in a cost constrained environment during the period of performance of this PMSR. An Overguide Option is not required. The overguide request should only propose high-quality science data acquisition that is not attainable within the scope of the guideline budget.

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The proposed extended mission activities may reflect a reduction in the science operations scope as compared to the previous mission phase. Proposals should be as specific as possible about the reduction in scope and any increase in risk that results.

III. Proposal Content

The proposal is to focus on updates to the mission and the extended phase, emphasizing the science, within the current state of health of the spacecraft and instrument combination. As indicated in the budget section, three scenarios are possible. Each proposal must contain at least the “Within Guideline” and “Science De-scope” options, and include a traceability matrix for each, as well as a relevant budget in a PPBE format by WBS to the second level. If the guideline budget is considered the science floor by the Project, it should state that under the “Science De-scope” option.

Each proposal must contain within 32 pages (12 point font, 8.5x11-inch paper, 1 inch margins):

- Title Page: (not in page limit)
- Table of Contents (not in page limit)
- Executive Summary
- Current Mission Objectives and Historical Accomplishments (summary in Table 1). Missions should provide evidence of completion of their mission Level 1 requirements for the prior prime or extended phase, or an explanation of requirements still to be completed by the end of FY19
- Proposed Extended Mission Objectives
 - Science Objectives
 - Importance of mission instruments to achieving the objective(s)
 - Opportunities for acquiring scientifically unique data sets
 - Other
- Technical Plan to Meet Objectives
- Management Plan
 - Project Organization and roles of key personnel*
 - Deliverables (including archiving/past performance with the archive)
 - Schedule
 - Risk Analysis/Implications of the Risk Analysis
 - Cost Estimates (include separate science and operations budget)
- Traceability Matrix
 - Science goals/objectives, associated measurement, relevant instruments, mission constraints
- Guideline budget
- Summary

Not included in page limit:

- Acronym List
- References
- Relevance/benefit to other NASA missions/priorities (maximum of two pages)
- Publication list of ground-breaking science
- Publications that are from those outside the teams, i.e., the primary author is not on the team
- A list of Subject Matter Experts (SMEs) to support the newly selected SMD Science Education (SE) providers. *

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- Personnel Developmental Plan**

* The proposal should identify, by name and area of expertise, Subject Matter Experts (SMEs) to support the newly selected SMD Science Education (SE) providers and a single SME Point of Contact (POC) to work directly with the SMD SE providers. A full listing of SMD SE providers can be found at: <http://www.nasa.gov/press-release/nasa-selects-science-education-partners-for-stem-agreements>. Please note that this information will not be evaluated during this review, but rather it will seed subsequent evaluation by SMD Education if your mission is extended.

** The Planetary Science Division has a strong interest in developing the leadership and management skills of scientists who aspire to be candidates as Principal Investigators or Project Scientists on future missions. Given the long duration of most planetary missions and the infrequent opportunities, it is highly desirable that developmental and experiential activities for such persons be incorporated into the planning and decision processes for extended missions. To support that goal, the proposals for extended missions are encouraged to include plans for providing experience and developing skills for one or more aspiring mission Principal Investigators and/or Project Scientists to prepare them to potentially lead future missions. The proposing PI is expected to act as a mentor for those individuals and/or identify other appropriately experienced individuals to act in that role. Depending on the opportunity, consideration should similarly be given for aspiring instrument PIs. This portion of the proposal will be considered separately from the evaluation of scientific merit.

IV. Schedule

The following schedule will be followed for the current PMSR process:

- Draft Call for Proposals issued: October 11, 2018
- Comments due from Project Offices: October 25, 2018
- Distribution of Final Guidelines: November 21, 2018
- Final Proposal Submissions to NRESS: February 14, 2019
- Questions from Panel to Project Offices: March 7, 2019
- Face to Face visit / oral presentation: Week of April 1, 2019
- Senior Review Report submitted to SRS: April 22, 2019
- SRS reports to PAC: May 6, 2019
- PAC delivers formal recommendations to NASA: May 20, 2019
- NASA response/direction to Projects: June 3, 2019

Please note that the oral presentation is an update for operations (if necessary) and science, as well as an opportunity to answer questions from the panel at a face-to-face. It is not a presentation of the proposal.

V. Science Evaluation Criteria

Proposal science evaluations will be used with other inputs by PSD management to optimize the mission portfolio to balance science return and programmatic priorities. Evaluation criteria are limited to scientific merit for this review, as described more fully below. The science proposal must be consistent with the operational capability of the spacecraft and instruments. Any science degradation due to spacecraft/instrument degradation should be described in order for the Review Panel to accurately evaluate the science merit of the proposed tasks.

The criteria will be assessed against each budget option proposed. Extended mission proposals will not be compared to one another by the Review Panel.

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Factors of evaluation will include scientific relevance to PSD, benefit to the science community, and likelihood of “new” scientific discoveries.

Specific evaluation criteria to be used are as follows:

- Relevance and responsiveness to PSD and Agency strategic goals, including
 - Value to the Lunar Discovery and Exploration Program/NASA’s Exploration campaign for LRO
 - Value to the Mars Exploration Program for the Mars missions, including relay operations contributions
- Depth and breadth of the PSD objectives (as described in “Vision and Voyages for Planetary Science in the Decade 2013-2022” questions and objectives) addressed by the proposed extended mission (see http://solarsystem.nasa.gov/docs/PSD_response_to_DS_Final.pdf)
- Potential for groundbreaking science and its relationship to the Decadal Survey
- Scientific significance, productivity and uniqueness of investigation(s)
- Emphasis on past performance in archiving data in the Planetary Data System (PDS), as well as a request to identify existing data products that may be new candidates for archiving
- Opportunities for new investigators, where possible, including any potential transition to aspiring PI/PS
- Extent to which the science community beyond the mission science team utilizes data and conducts research
- Capability of spacecraft/instrument suite to achieve proposed science. This review does not evaluate operational capability of the spacecraft, or assess operational efficiencies, but assumes that the current capabilities will persist through the end of the review period of performance, except for known limitations (e.g., fuel, instrument degradation). If applicable, the effect on science by any significant degradation in instrument/spacecraft performance will be evaluated.

Quantitative “science per dollar” is not an evaluation criterion; however, the qualitative science “value” (e.g., “high”, “low”) will be assessed by the Review Panel based on the science merit criteria.

VI. Communications Plan

The “Memorandum For The Record: Plan For The 2019 Planetary Mission Senior Review”, the Senior Review Subcommittee TOR, and the entire call for proposals will be posted on the PAC website hosted by the Lunar and Planetary Institute .

All decisions will be briefed to the SMD Associate Administrator and others, as appropriate based on the decisions made, before direction is provided to missions.

The Planetary Science Division Director will issue direction to each mission. For those missions that are granted mission extensions, a plan and budget will be approved for FY20-22, with preliminary direction for FY23-24. The missions will be provided with a Letter of Direction containing decisions and directions. The Senior Review Subcommittee report and relevant Panel report will be attached.

The PAC report, Senior Review Subcommittee report, and two Panel reports will be posted on the PAC website hosted by the Lunar and Planetary Institute.

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The Planetary Science Division Director will approve a white paper on "NASA's Response to the 2019 Planetary Mission Senior Review." The NASA response will be posted on the PAC website hosted by the Lunar and Planetary Institute.

If any missions are proposed for termination, a communication plan will be established with Agency leadership, the Office of Communications, the Office of Legislative Affairs, and other stakeholders.

All projects will be provided with up to six months of funding for science evaluation/closeout at the end of any approved extended mission. The budget to support this closeout should be included in the proposal, assuming this extension is the final mission extension.

Should you have questions during the proposal process, please contact William Knopf at William.knopf-1@nasa.gov, (202) 358-0742.

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Appendix A: Example Table of Accomplishments

Table 1. Mission Science Objectives and Historical Accomplishments (format fixed)

Investigation / Requirement #	Investigation / Requirement	New to Extended Mission
1	Xxxxx	Y/N
2	Yyyyy	Y/N
3	Zzzzz	Y/N

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