



# Key Items from the Discovery 2019 AO

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# Outline



- Building an Inclusive Community
- Improving the Proposal Process
- Requirements & Order of Precedence
- Potential Targets
- Describing your mission and approach
- The Role of Principal Investigator
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- PI Responsibility and Contributions
- International Collaborations & Contributions
- Engineering Science Investigation
- AMMOS
- Data Plans and Archives
- Deferred to Step 2 (TDO, Education, Communications)



# Building an Inclusive Community



NASA recognizes and supports the benefits of having diverse and inclusive scientific, engineering, and technology communities and fully expects that such values will be reflected in the composition of all proposal teams.

Discrimination and harassment, including sexual harassment, are not tolerated at NASA. Proposers are reminded that contracts awarded under this AO will include conditions enforcing the civil rights acts that prohibit employment discrimination in all of its forms, including harassment.

Training the next generation of mission leaders is a priority for NASA, and proposers are encouraged to include career development opportunities.



# Improving the Proposal Process



## Reducing workload on proposers and evaluators

- Some content was limited:
  - Schedule content
  - Heritage Appendix (30 pages)
- Some content was deferred to Step 2, notably but not limited to:
  - Student Collaborations
  - Science Enhancement Options
  - Technology Demonstrations
  - Communications plans
  - Final Curation plan elements
  - Final Planetary Protection Plan
  - Detailed disposal plan
  - Independent Verification and Validation of Software
  - Costing of Conjunction Assessment Risk Analysis
  - Schedule-based end-to-end Data Management and Archiving Plan
  - Detailed breakdown of real year dollar costs

See specific details about each of these in the AO!

## Improvements

- Input files for parametric cost model are now accepted



# Requirements & Order of Precedence



Requirements are listed in both the Body of the AO and Appendix B. Appendix B provides further definition of proposal requirements and contains specific requirements for format and content.

Failure to follow AO requirements may result in reduced ratings or rejection of the proposal without review.

In the event of apparent conflicts between *Appendix B* and the *Body of the AO*, the *Body of the AO* takes precedence.

Documents in the *Program Library* on the acquisition website are intended to provide guidance for the development of proposals; they are specifically not intended to impose requirements.



# Potential Targets



Investigations may target any body in the Solar System except for the Earth and Sun, in order to advance the objectives outlined in Section 2.1.

(p. 4)

- Earth's moon and Mars or its satellites are allowed
- Missions to identify and characterize extra-solar planets are *not* allowed.
- Solar wind missions (e.g. Genesis) are possibly allowed, but generally only if specifically relevant to composition of bodies other than the Earth and Sun.

Section 2.1 describes the strategic goals and lists the relevant documents describing them: NASA 2018 Strategic Plan, 2014 Science Plan, and Planetary Missions Program Plan, all of which are in the program library.



# Describing Your Mission and Approach



These proposals are large and complex and it can be challenging to connect the observations to the science.

## Goals are not the same as objectives (5.1)

- A goal is understood to have a broad scope; an objective is understood as a more narrowly focused part of a strategy to achieve a goal.
- Investigations must achieve their proposed objectives; however, the investigation might only make progress toward a goal without fully achieving it.
- Some proposals fail to define specific objectives.

Proposals shall clearly state the relationship between the science objectives, the data to be returned, and the instrument complement to be used in obtaining the required data (see Requirement 14; Appendix B, Section D, for additional detail).

A new requirement has also been added to describe the traceability between the science objectives of the proposed investigations to the Decadal Survey (see Requirement 13).

**Section 5.1, Requirements 13 & 14; Appendix B, Section D**



# The Role of Principal Investigator



For PI-led missions, the PI fills a challenging, multidisciplinary role, which demands excellent communication, team building, and management skills. The PI is responsible for all aspects of the successful implementation of the mission. (Section 4.1.3.2)

A proposal shall identify and designate one, and only one, PI as the individual in charge of the proposed investigation. At least one deputy PI (DPI) must also be named. (Requirement 49)

Have you adequately considered these requirements and the demands they will place on you?



# Co-Investigators and Collaborators



The identity, role, and necessity of all Co-Is and Collaborators must be provided in the proposal.

- “A Co-Investigator is defined as an investigator who plays a necessary role in the proposed investigation...the necessity of that role must be justified.”
  - Experience shows that for each Co-I this requires more than a single sentence fragment plus a CV.
- “The identification of any unjustified Co-Is may result in the downgrading of an investigation and/or the offer of only a partial selection by NASA.”
  - The review panel will be thoroughly and firmly instructed on this matter.

The annual time commitments and funding source of all Co-Is and Collaborators must be specified.

- Proposers are strongly encouraged to include a table containing this information.



# PI Responsibility and Contributions



Contributions are welcome within the restrictions defined in the AO:

- No non-US nuclear power sources,
- Sum of all contributions is not to exceed 1/3 of PI-Managed Mission Cost, and
- “Foreign contributions to science instruments should not exceed approximately one-third of the science payload. Proposals shall include a discussion of the scale of the internationally-contributed instruments, how the proposed contribution is consistent with NASA’s policy...and how the programmatic risks associated with the contribution will be handled. “

“A contribution does not alleviate the responsibility of the PI and management team to exert penetrating and timely oversight on the development, delivery, and performance of the contribution. The PI remains accountable to NASA for the success of the entire investigation, including contributions, with full responsibility for its scientific integrity and for its execution within committed cost and schedule.”



# International Collaborations & Contributions



## 5.7.1 NASA welcomes international participation; however:

- By *statute*, NASA cannot enter into bilateral collaborations with the People's Republic of China.
- By *policy*, NASA funds cannot be used to support research at non-US institutions.
- Foreign contributions cannot exceed 1/3 of the PIMMC/science payload (Requirement 84)
  
- More details later in the session



# Engineering Science Investigation



Requirement 22. If aerobraking or an entry, descent, and/or landing into any atmosphere is proposed, a campaign to obtain diagnostic and technical data about vehicle performance and entry environments shall be described in proposal appendix J.13 (see Appendix B, Section J.13).

- This [Engineering Science Investigation \(ESI\)](#) will be funded outside AO cost cap.
- Details on the proposed approach are required, an estimated cost is not required.
- The ESI's Goals and objectives are outlined in a document in the Program Library.



# AMMOS



Requirement 45. If a ground/operations system solution other than the Advanced Multi-Mission Operations System (AMMOS) or mission-unique adaptations to the AMMOS is proposed, it shall be described and budgeted for in the proposal.

- Goal of Rqmt. 45 is *not* to mandate use of the AMMOS.
- NASA invests heavily in the development and maintenance of AMMOS and its use is expected to offer savings to missions since only mission-unique adaptations need to be funded by the mission.
- Investigations which choose to use an operations system other than the AMMOS must provide a justification for this choice.
  - Extensive heritage is an acceptable justification.



# Data Plans and Archives



The *Data Management and Archiving Plan* (Section 4.4 and Requirements 15 and B-24)

- Includes data processing from calibration to archiving.
- Shall be in compliance with the requirements and guidelines in the *NASA Plan for Increasing Access to the Results of Scientific Research* in the program library.
- The *Data Management Plan* specified in 4.4.2 is part of the *Data Management and Archiving Plan*.

The *Data Analysis Plan* (Requirement B-23) is about how the science products and data obtained will be used to meet the objectives.

- Requirement B-23 includes *a list of the specific data products and the individual team members responsible for the data products*.
- Plan implies the presentation of well-organized set of activities, people, and products linked to science objectives.
- Poor presentation of the Data Analysis Plan is a common shortcoming.

Use of a NASA-approved data archive is required (4.4.3), and use of NASA's Planetary Data System is encouraged; see later talk in this session.



# Technology Demonstration Opportunities



Definition and evaluation of Technology Demonstration Opportunities (TDO) are deferred to Step 2. (Section 5.1.7)

No information on activities associated with TDO(s) is needed for the Step-1 proposal as all requirements associated with this section have been deferred until Step 2.

Plans and costs for such activities must be defined in the Step-2 Concept Study.



# Education, Communications, Student Collaboration



Education and Communication (E&C) is still in flux NASA-wide.

E&C plans are *not* required in Step 1. (5.5.2)

- If new E&C requirements are levied, funding should come with them.
- Communication plans will be developed in Phase B.

Student Collaboration (5.5.3) is expected for every mission, but no information on a SC is needed in the Step-1 proposal as all requirements associated with this section have been deferred until Step 2.



# Previously Submitted Questions



**Answers to questions that were previously submitted are published:**

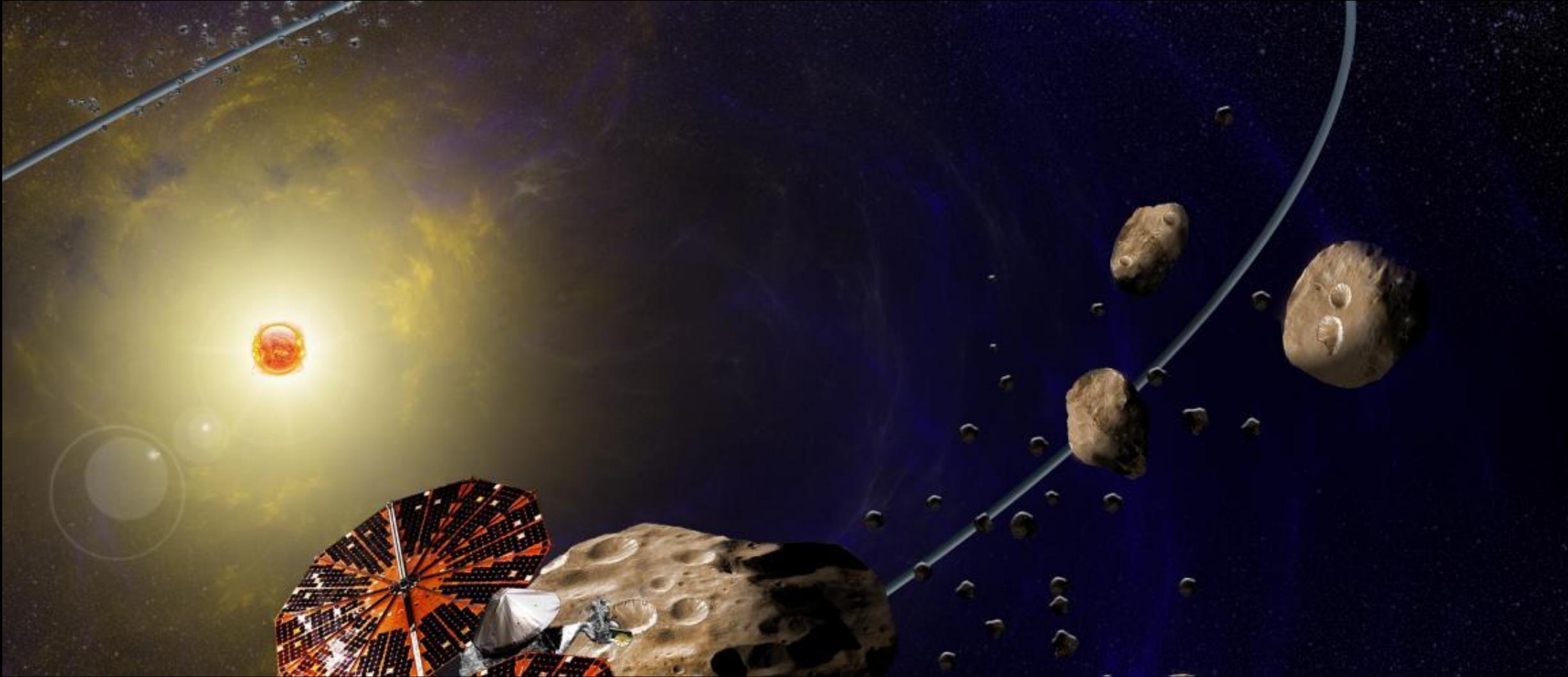
<https://discovery.larc.nasa.gov/prepropconf.html>

(See the *AO Q&A* tab on the left side)

**We are currently addressing:**

- Requirement 46: Encryption requirements for command uplink for missions with Earth flybys within 2 million km during Phase E, but expect to post an answer soon.
- Page limits: A possible discrepancy between the Draft AO Q&A and Final AO on additional pages for non-identical instruments, but expect to post an answer soon.
- Some questions submitted too recently include here, but answers to which will be published ASAP!

# Questions?



LUCY Mission, artist conception