

## Discovery 2019 Announcement of Opportunity Q&A Updated June 15, 2019

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Other questions may be addressed to Tom Wagner, Discovery Program Lead Scientist, [thomas.wagner@nasa.gov](mailto:thomas.wagner@nasa.gov). Questions (which may be abridged for brevity and paraphrased to ensure anonymity) and answers will be posted at the above URL twice a week, sorted by category and entered into the change log below.

Note: When an answer is revised, the number of the question will be listed in a blue, bold, italicized font in the log.

### Categories of Questions

Science (S)  
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### Log of Questions

#### 2019

April 16: P-1 and C-1  
May 7: M-1 and M-2; P-2 to P-14; I-1 to I-3; C-2; and O-1 to O-3.  
May 9: P-15 and ***O-3***  
May 14: P-16  
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June 4: P-18 to P-20  
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June 6: ***P-19***  
June 7: ***P-16*** and P-22  
June 10: P-23 and P-24  
June 11: P-25  
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June 15: P-27

## Science

No questions at this time.

## Technology

No questions at this time.

## Management

**M-1** *According to NPR 7120.5E, SRB convened reviews including the System Requirements Review (SRR) and the Mission Definition Review (MDR) are to take place prior to KDP-B. The AO states on page 72, “[f]or investigations down-selected to enter Phase B immediately, the down-select serves as the KDP-B.” Thus, can we assume that the SRR and MDR (and additional activities described by NPR 7120.5E to occur between KDP-A and KDP-B), will actually take place after KDP-B/down-selection?*

Yes, an SRR and/or MDR or equivalent would be held after down-selection. Discovery missions typically utilize Independent Review Boards rather than a formal SRB for these reviews. The SRB will be established prior to KDP-C.

**M-2** *Since the AO identifies (page 12) cost reserves in the PI-Managed Mission Cost, “[i]t includes any reserves applied to the development and operation of the mission as well.” The AO also states that, “[t]he term does not imply that a contractual relationship between the Proposing Organization and other proposal partners is required.” Following this logic, can we assume that the PI will control the release of reserves to direct-funded institutions (NASA centers or FFRDCs)? More specifically, are direct-funded institutions provided access to reserves via intra-Agency funding mechanisms without the direction and consent of the PI?*

The PI is responsible for all aspects of the mission, including the management of the reserves. No project-level reserves will be released without the knowledge and consent of the PI.

## Proposals

**P-1** *Requirement B-4 states “two extra pages are allotted for each additional separate, non-identical science instrument in the Science Section (Sections D and E)”. Radio science experiments (gravity science and precision ranging for astrometry) are quite involved, and require substantial text to describe, but typically do not have a dedicated instrument, relying instead on the spacecraft RF telecommunications system (possibly modified to optimize the science). Does this class of experiments qualify for two extra pages?*

Yes. The science instrument in this case is the spacecraft RF telecommunications system.

**P-2** *Has the POC for the Engineering Science Investigation (ESI) changed?*

Yes. Please contact Todd White, [Todd.R.White@nasa.gov](mailto:Todd.R.White@nasa.gov) or 650-604-4144 with any questions about ESI.

**P-3** *Page B-2 of the AO states that the page limit for sections D+E is “30 + 2 pages / additional non-identical instrument + 1 page for linkage to Decadal Survey (Requirement 13)\*\*”. Is the Decadal-Survey-linkage text limited to 1 page or can it be longer as long as the total page count is under the limit?*

Yes, it can be longer as long as the page count is under the limit.

**P-4** *Please clarify whether or not there is a cap on Phases E-F costs. This is a particular concern for missions with extended operations periods.*

There is no cap on Phases E-F costs, apart from the limitation of 20% cost growth during the Phase A Concept Study. One of the primary reasons for removing the costs from the AO Cost Cap was to allow missions with extended operations periods to compete on equal footing with missions of shorter duration. Note, however, that as the Phases E-F costs remain part of the PI-Managed Mission Cost, they will be evaluated as part of the baseline mission assessment.

**P-5** *Are there file size restrictions for the CD-ROM?*

There are no limitations on file size other those specified for proposals in Requirements B-5 and B-6, and within the CD-ROM limit of ~700 megabytes.

**P-6** *Are there software version requirements for the Microsoft Project files?*

Project schedules must be submitted in Microsoft Project using the 2010 file format, although 2007 format will also be accepted.

***P-7 Are there any funding sources for collaborators from NASA? Can proposals to NASA's Research Opportunities in Earth and Space Science (ROSES) be used to support collaborators?***

See AO section 5.4.3 for discussion of the roles and funding of Collaborators and Co-Investigators. If you require funding to provide something necessary to a proposed mission, you should be a Co-Investigator on the proposal. As stated in the AO, a Collaborator must not be funded by the Discovery Program. As stated in section 5.6.7, contributions are welcome from both U.S. and non-U.S. sources, however contributions cannot be from the Discovery Program or other NASA Science Mission Directorate programs. Hence, proposals to NASA ROSES may not be used to support collaborators.

***P-8 Are retirees excluded from participating in proposals to this AO?***

Retirees are not excluded from this AO. Retired NASA civil servants that have post-employment restrictions should check with their NASA point-of-contact for legal matters.

***P-9 Is returned sample work Phase E or F or a combination? If "not F" is there a cutoff for E ending?***

Section 4.4.1 of the AO states "[d]ata analysis and preliminary analysis of returned samples may be continued during Phase F."

***P-10 Does the detail of a succession plan need to be in Step 1? Or is that a CSR requirement?***

Succession plans are not specifically required in proposals or CSRs. However, proposers should determine whether such a plan is appropriate to their investigation.

***P-11 Can you provide some guidance on how to cast baseline vs. threshold for a sample return mission where they might be the same? Or, to put it another way, for sample return missions without a successful return achieving the science objectives may not be possible; in that case is the threshold equivalent to the baseline?***

See section 5.1.4 Baseline and Threshold Science Missions. NASA recognizes that, in some circumstances, the Threshold Science Mission may be identical to the Baseline Science Mission and will provide no resiliency.

***P-12 Please provide additional guidance on activities occurring in Phase E that must be considered deferred Phase D activities. For example, would science data management and archiving costs be included?***

Generally, any activity—including the development of facilities—that could have reasonably occurred during development should be considered a deferred Phase D activity. Justifications should be provided for any activities that are not clearly Phases E-F activities, but are bookkept as ones.

***P-13 Can you confirm that the overall cost cap is higher when using the 4 m Low-performance launch vehicle?***

A mission that requires 4 m Low-performance launch vehicle would have a credit of \$15M and their Adjusted AO Cost Cap would rise from \$500M to \$515M. See details in section 5.9.2.1 of the AO.

***P-14 NASA centers have access to the CADRe database that facilitates provision of historical cost data as rationale for cost estimates. Since CADRe is not available to other proposers, doesn't this create an unfair advantage? Will use of CADRe cost data be restricted from use in proposal cost justifications and estimates?***

Use of CADRe by proposers will not be restricted. But rest assured that for the purposes of proposal evaluation, all of the models used to validate costs are available to all proposers.

***P-15 Our team is using Microsoft Project 2016 to create project files. Q&A P-6 states that Microsoft Project 2010 file format is required. Are submissions generated in Microsoft Project 2016 acceptable?***

Yes, because Microsoft Project 2019, 2016, 2013, and 2010 share the same file format. See <https://products.office.com/en-us/project/microsoft-project-faq> for details.

***P-16 Are Proposal Appendices (Section J) exempt from the formatting requirements defined in Requirement B-3? For example, are sections without page limits, like J.3 Resumes, required to maintain the minimum 1-inch page margins?***

All pages of the proposal must follow the formatting requirements described in Requirement B-3 ***with the exception of the Graphic Cover Page, Fact Sheet, and Foldout Pages as addressed in Question P-19.***

**P-17** *Can we change our mission name and proposal title from what was in the NOI? In addition, some of our Letters of Commitment may use the former mission name. The details of the mission, the PI and key personnel, and Co-Is remain the same as the NOI.*

You may change the mission name and proposal title. When you convert your NOI into a proposal, edit the title in the business data section of the cover page. Regarding Letters of Commitment that refer to the mission by its previous name, please provide an explanatory note at the beginning of Appendix J.2.

**P-18** *Requirement B-4--along with the Proposal Structure and Page Limits table--limits the total number of extra pages for Sections D through G to a maximum of 16. Is the page for "linkage to Decadal Survey" included in this 16?*

No, the page for "linkage to Decadal Survey" is not included in the 16 page limit.

**P-19** *Does the 1-inch margin requirement apply to all proposal pages; including the cover sheet, fact sheet, and foldouts?*

***The Graphic Cover Page described in Requirement B-12 does not require a margin. The Fact Sheet described in Requirement B-13 requires a minimum of a 1/8 inch margin. Foldout Pages described in Requirements B-41, 42 and 51 require a minimum of a 1/8 inch margin.***

**P-20** *AO Requirement B-5 states: "Images (e.g., figures and scans) shall be converted into machine-encoded text using optical character recognition." However, optical character recognition (OCR) of all figures and scans is not realistically achievable by us. Is your expectation to convert as much of the proposal PDF as possible while recognizing that not all figures and scans can be converted? Can you please provide guidance on this aspect of Requirement B-5?*

This requirement is intended to facilitate review by making proposal text easily searchable. All text in figures that is germane to review must be searchable in either the figure itself or the figure caption. For example, axis labels and explanatory notes for graphs must be searchable text. Generic part numbers in an image of a circuit board might not have to be searchable, but critical part labels should at least be included in the figure caption. In cases where the proposer is unsure or the image does not allow OCR, it is recommended that proposers include explanatory notes in the figure caption that facilitate keyword searches.

**P-21** *Requirement B-3 states that “Margins at the top, both sides, and bottom of each page shall be no less than 1 inch if formatted for 8.5 x 11 inch paper; no less than 2.5 cm at the top and both sides, and 4 cm at the bottom if formatted for A4 paper.” Does the 1-inch margin need to be blank, white space? Or can the 1 inch margin contain a background color, background graphic, banner graphic (e.g., for a page header)?*

There should be no reviewable content in margins. Page numbers, headers denoting proposal sections, and notices of proprietary and export-controlled material are acceptable, though proposers must also address Requirement 95 regarding export-controlled material. Margins are expected to consist of whitespace. No graphics should run into the margins to demonstrate that no material has been lost from the proposal due to formatting errors. Any attempt to use the margins to increase proposal content may result in a proposal being deemed non-compliant and returned without review.

**P-22** *Can the margins on the Fact Sheet be colored as long as there is no reviewable content in these margins?*

Yes.

**P-23** *Building on Question P-22: in addition to color, can the margins on the Fact Sheet contain background imagery with no reviewable content that extends to the edge of the page?*

Yes.

**P-24** *Page 45 on contributions says "Mitigation may include, but is not limited to, descoping the contributed items and/or holding reserves to develop the contribution directly. Note that reserves held for this purpose should be weighted by likelihood and will be considered by NASA to be encumbered."*

*Since no guidance is provided in the AO on how to weight such reserves by likelihood, would it be considered a weakness to hold encumbered reserves for the entire cost of a contributed item even though we consider the likelihood of needing the full reserves to be very low? Or, can NASA provide or point to such guidance?*

No, it would not be considered a weakness to hold encumbered reserves for the entire cost of a contributed item.

***P-25 My question at this point is whether NASA would reconsider the guidance previously provided in P-20. At this late stage in Discovery 2019, adding explanatory notes to figure captions for images with text that are not recognized by OCR but are germane to review would be significantly burdensome. I am hopeful that NASA would consider altering the P-20 guidance to provide for making the proposal searchable to the maximum extent possible, acknowledging the technology and time limitations. In doing so, NASA would recognize that not all text in figures germane to review would necessarily be searchable.***

No, NASA will not reconsider the guidance. NASA recognizes the burden on proposers, but machine-encoded text in the proposal PDF is required for review activities. Beyond proposal evaluation, searchable text also facilitates activities such as conflict-of-interest checks from letters of commitment, which are often scanned. Also note that P-20 is only a refinement on Requirement B-5, which states that “Electronic proposals shall be a single unlocked (e.g., without digital signatures) searchable Adobe Portable Document Format (PDF) file... Images (e.g., figures and scans) shall be converted into machine-encoded text using optical character recognition.”

***P-26 Some documents in the Program Library have been superseded by newer and more comprehensive versions. Can the revised versions be included as updates to the library?***

No, unfortunately the documents in the program library cannot be updated. Page 1 of the AO states, “In order to provide a consistent basis for proposals and evaluations, documents in the Program Library will be the versions used for evaluations even when superseded elsewhere.”

***P-27 Can you please clarify the intent of the AO in regards to the following: We understand that any usual Phase CD costs that are deferred into Phase E will still count against the cost cap. We want to understand if mission ops training costs during Phase E also count against the cap?***

If the mission ops training can reasonably occur during development but occurs during Phase E, it will be considered a deferred Phase D activity that is under the AO Cost Cap. Proposers must provide justification for cases where the training could not take place during development.

### **Launch Vehicles and Secondary Payloads**

No questions at this time.

## **International Participation**

### ***I-1 Are foreign instrument contributions allowed to fulfill a critical role?***

Mission critical contributions are not forbidden, however proposers should carefully consider the various sections of the AO that apply to both contribution limits and risk assessment, including, but not limited to: 5.3.6 Risk Management; 5.6.7 Contributions; 5.7 Non-U.S. Participation Requirements; and 7.3 Selection Factors. If the foreign instrument contribution is critical, carefully review Section 5.6.7 and be sure that it is consistent with all of the limitations specified; including but not limited to 1) the sum of contributions of any kind to the entirety of the investigation is not to exceed one-third of the proposed PI-Managed Mission Cost; 2) the proposed contribution is consistent with NASA's policy that the contribution does not exceed approximately one-third of the science payload; and 3) explain how the programmatic risks associated with the contribution will be handled.

### ***I-2 If an instrument is procured from a non-U.S. and non-government source—such as a foreign university—is that considered a partnership that requires an international agreement?***

See section 5.7 Non-U.S. Participation Requirements of the AO for details. The direct purchase of supplies and/or services, which do not constitute research, from non-U.S. sources by U.S. award recipients is permitted. If it is a contribution, then all of the details about international agreements in 5.7 and other parts of the AO apply.

### ***I-3 Does NASA expect to retain possession of a returned sample return capsule that was contributed by an international partner?***

It is the policy of the Discovery Program that any space-exposed hardware returned to Earth will be made available to the science and engineering community for study. Such hardware must be delivered to and processed by the NASA Astromaterials Acquisition and Curation Office located at the NASA Johnson Space Center (JSC). See section 4.4.6 of the AO for details. NASA could consider developing a partnership where an international partner contributed and retained the sample return capsule in accordance with the requirements and goals of 4.4.6, however proposers are advised to carefully consider the various sections of the AO that apply to risk assessment and contribution limits, including, but not limited to: 5.3.6 Risk Management; 5.6.7 Contributions; 5.7 Non-U.S. Participation Requirements; and 7.3 Selection Factors.

## **Radioactive Materials**

No questions at this time.

## Telecommunications

**C-1** *Preceding Requirement 46, Section 5.2.10, Space Systems Protection, states:*

*Previously identified threats and vulnerabilities to space systems have indicated that the command uplink to robotic spacecraft needs to be better protected. On February 1, 2019, the NASA Associate Administrator issued a letter directing that all newly started or newly solicited robotic spacecraft protect their command uplink through the use of encryption that is compliant with Level 1 of the Federal Information Processing Standard (FIPS) 140-2. This requirement does not apply, however for (1) hosted instrument payloads; (2) Class C or D spacecraft lacking propulsion subsystems; and (3) spacecraft that will operate more than two million kilometers (“deep space”) from the Earth.*

*Does the last sentence statement also apply to Requirements 47 and 48? That is, are missions that qualify for one or more of the exemptions required to address all three requirements?*

*In addition, how should the term “operate” in the third exemption be interpreted, given that all missions take actions as soon as they are separated from the launch vehicle, including establishing communications, deploying solar arrays, and even sometimes performing maneuvers—all of which qualify as operations.*

The exemptions only apply to Requirement 46. Requirements 47 and 48 apply to all proposed missions.

The term “operate” in the third exemption should be read as “operate during Phase E”.

**C-2** *Does Requirement 46 apply to missions that execute Earth flybys within 2 million km of Earth as part of the outbound portion of their interplanetary trajectory?*

Missions that fly by the Earth as part of the outbound portion of their interplanetary trajectory and are only inside the 2,000,000 km limit for very brief periods are exempted from this requirement.

## Other

***O-1 Since education and communication plans are deferred until Step 2, do their costs need to be estimated in the Step 1 proposal? Are the costs potentially rolled into the 20% cost growth limit allowed between Step 1 and Step 2?***

Education plans are not needed at this time. See Section 5.5.2 of the AO for details. Communication and Outreach Plans are not needed for Step 1 proposals or Step 2 Concept Study Reports, but will be developed during Phase B of the mission. See Section 5.5.2 of the AO for details.

***O-2 Who submits the NOI?***

The PI submits an NOI.

***O-3 Where are the presentations from the Pre-Proposal Conference posted?***

Hyperlinks to the presentations are included in the meeting agenda *in the* presentation titles (<https://discovery.larc.nasa.gov/prepropconf.html>).