

Discovery Program 2006 Announcement of Opportunity Q&A Updated March 13, 2006

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Other questions may be addressed to Michael New, Discovery Program Scientist,
michael.h.new@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, italicized font.

Categories of Questions

- Science (S)
- Technology (T)
- Management (M)
- Proposals (P)
- Launch Vehicles and Secondary Payloads (LV)
- International Participation (I)
- Missions of Opportunity (MO)
- Other (O)

Log of Questions

- January 6: LV-1, P-1, P-2, P-3, P-4
- January 17: MO-1
- January 19: P-5, P-6
- February 10: LV-2, LV-3, LV-4, LV-5, LV-6, LV-7, LV-8, LV-9, LV-10, LV-11, MO-2, MO-3, MO-4, MO-5, O-1, O-2, O-3, O-4, O-5, P-7, P-8, P-9, P-10, P-11, P-12, P-13, P-14, P-15, P-16, P-17, P-18, P-19, P-20, P-21, P-22, P-23, P-24, P-25, P-26, P-27, P-28, P-29, S-1, S-2, T-1, T-2
- February 23: LV-12, M-1, MO-6, O-6, ~~P-23~~, P-30, P-31, P-32, P-33, P-34, P-35, P-36, P-37, P-38, P-39, P-40, P-41, P-42, P-43, P-44, P-45, P-46, P-47, P-48, P-49, P-50
- February 27: LV-13, M-2, *P-50*, P-51, P-52, P-53, P-54
- March 5: *P-8*, P-55, *P-31*, *P-32*, *P-37*, *P-52*, P-56, *MO-3*, MO-7
- March 13: M-3

Science

- S-1 There does not appear to be a discipline node in the PDS for exoplanets. Where does that data go?**
Planetary data should be deposited in the PDS. Data on extrasolar planets should go to the astronomical data archive appropriate to that data type. Please see Section 5.2.4 of the AO.
- S-2 At the Pre-Proposal Conference it was implied that there is a six-month PI proprietary data period. Is that correct?**
NASA requests that PIs deposit data within 6 months of collection, allowing for a brief period of check-out time. Early delivery is encouraged. Note, though, that paragraph 2 of Section 5.2.4 of the amended AO states that: *By default, all NASA science data from Discovery missions is public immediately. However, a short period for exclusive rights to data may be proposed with justification. The proposed period of exclusivity should be the shortest period that is consistent with optimizing the science return from the mission and, except under exceptional circumstances, may not exceed six months...*

Technology

- T-1 There are many different definitions of TRL out there. How will it be judged by TMC?**
The definitions to be used by the TMC Panel are available from the DPL. See also question **O-5**.
- T-2 If the TRL-level of an instrument or component is not at level 6 at the time of proposal submittal (4/06), but the proposal provides a technical and management plan to achieve level 6 by Phase B, will the proposal be penalized?**
Any plan to develop technology to TRL 6 after selection, and any plan to mitigate any described risk to this approach, will be evaluated by the TMC Panel.

Management

- M-1 Do proposed projects have to adhere to the WBS structure called out in Appendix J: Flight Systems and Ground Support Work Breakdown Structure, of NPR 7120.5c or is it just an example?**
Yes, all projects are required to comply with the standard Level 1 and Level 2 WBS and the associated guidelines discussed in Appendix J of NPR 7120.5C. The details of the Level 3 and lower levels of the WBS are at the discretion of the project, but must roll up to the standard WBS definitions at Level 2.
- M-2 Is earned value reporting required for a MO, which by definition is less than \$50M?**
While for projects costing between \$20-50M a fully-validated EVM system is not required, "EVM principles" must be followed. Please see

NPR 7120.5C paragraph 3.4.3.2.a and the references therein.

- M-3 Can there be a phase-in of guest observers during phase E, i.e., a gradual transition between Phase E and Phase F? For example, if observing time were split 50-50 between the PI team and GO's in year 2, 30-70 in year 3, and 0-100 in Years 4 and 5. If so, how do we split up the Phase E-F costs between the PI team and NASA HQ?**
Essentially one can propose any start of a GO program. Note, though, that all of the science objectives of the mission must be accomplished within the proposed Phase E funding. In particular, the cost of mission operations for a mission duration necessary to accomplish the proposed science objectives must be a part of Phase E. The Phase E funding is part of the cost cap.

Proposals

- P-1 Is there a limit on the number of proposals that one organization can submit in response to the AO?**

There is no limit on the number of proposals that can be submitted by a single institution.

- P-2 If the PI chooses to change organizations after the selection of a proposal, can the award be transferred with him/her?**

Awards made under an AO are contracts between NASA and the sponsoring organization. When a PI leaves the sponsoring organization under which they were awarded a contract, the sponsoring organization has the responsibility of providing a qualified replacement PI or recommending termination of the award. NASA has the right of approval for the recommended replacement PI. If the replacement is approved, the award will continue at the original organization. However, if NASA judges that participation of the original PI is critical to the project owing to their unique knowledge and capabilities, then NASA will seek the agreement of both the PI's original and new organizations to transfer the award (novation). If such an agreement is not possible, NASA may elect to terminate the original award at the PI's original organization and then implement a new award at the PI's new organization to complete the project.

- P-3 What mission scenarios or science goals are included under the AO?**

The science goals of the AO are described in section 2.1 of the AO. Please refer to it and the strategy documents referenced by it.

- P-4 For some time I have been doing research in planetary science. I would like to participate in a proposal to this AO but I do not have a proposal team. Can I attend the preproposal conference?**

The preproposal conference is open to all interested parties. Additionally, individuals and organizations interested in participating in proposal teams may post their contact information on the Discovery Teaming Interest webpage. This webpage is described in section 6.1.4 of the AO.

- P-5 The October 1, 2013 cutoff imposed by the AO seems somewhat arbitrary and restrictive; only a fraction of Phase D costs would end up in FY 2014 were the October 1, 2013 cutoff to be extended, and significant expenditures will occur in both fiscal years regardless. Can the AO be amended to allow launch through December of 2013 to allow for the use of gravity assists from Earth and Venus?**
No, the AO will not be amended to change the “launch by” date. If a later date is needed, please consider applying to the next Discovery AO.
- P-6 The originally promised cost cap for this Discovery AO (per 2005 FBO notice) was \$450 M. The cap of \$425 M results in a reduction of available resources and science capability for new missions. Is there something that can be done to increase the cost cap?**
The conference report (109-272) that accompanies the FY 2006 Appropriations Bill (H.R 2862) states: *The conferees have modified Senate language regarding the Discovery program. The conferees set a cap of \$425,000,000 on all future Discovery missions beginning with the next announcement of opportunity.* The Discovery cost cap cannot, therefore, be raised.
- P-7 Does the AO exclude the submission of balloon-based missions?**
There is nothing in the AO that explicitly forbids suborbital proposals that address the scientific goals of the AO. Such proposals, though, must be submitted as full mission proposals, not as a “Mission of Opportunity” unless the proposal is for an instrument that will fly as part of another agency's or country's balloon program.
- P-8 Section 5.3.3 (page 12) of the AO describes the use of DSN and DSMS. Do we need to include in the proposal a DSN or DSMS commitment letter and/or preliminary service agreement?**
~~No but a Link Budget Estimate is required (see page B-19 of the amended AO).~~ *Yes a letter as well as a Link Budget Estimate is needed. Please see question P-32.*
- P-9 Item 1 on the proposal checklist requires a page number of the date of proposal submission – This is not an item that a page number can be included for. Shall we insert a date instead or black the box out?**
Just insert the date of submission.
- P-10 Item 2 on the proposal checklist requires a page number for the electronic cover page. However, proposers are advised to not change the cover page in any way. In order to comply with the checklist’s request for page numbers, are we allowed to add page numbers to the electronic cover page or shall we black this box out?**
Simply check this box if the cover page has been printed and attached.
- P-11 Item 3 of the checklist asks for page number for the original authorizing signature. Are we supposed to add a page number to the endorsement letter?**

Yes, add a page number.

- P-12 Item 11 and 12 on the proposal checklist requires a page number for the letters of endorsements. Are you requesting page numbers be added to the original signature letters?**

Yes, add page numbers to the letters.

- P-13 Section 5.9.1 (page 17) of the AO states: *A cost reserve for Phase E should also be included as appropriate.* What is appropriate for a Phase E reserve?**

The AO does not set an appropriate reserve for Phase E. The proposer should propose a reserve that is consistent with mitigating risks to successfully completing the mission. It is up to the proposer to identify risks and explain proposed mitigation. The details of that mitigation plan, including the allocation of reserves, will depend on the proposed mission and identified risks. The TMC review will evaluate the adequacy of the proposed reserve.

- P-14 Are the 50 copies of the proposal required to be numbered sequentially (1-50)?**

That is not a requirement of the AO.

- P-15 Appendix B, Section A (Cover Page and Proposal Summary) discusses the proposal summary from the cover page being public-domain, to be placed in an open database. As we consider *every* detail about our proposals to be competition sensitive and proprietary, may the proposal summaries be blank?**

The AO requirement is that: *the Proposal Summary should not contain any proprietary or confidential information that the submitter wishes to protect from public disclosure.* The Proposal Summary is an abstract suitable for publication and must not be left blank. The Summary, though, is not evaluated.

- P-16 The NASA New Start Inflation Index (Table B-3) are low compared to inflation values recently provided officially by NASA HQ for other purposes. Why is there a difference?**

Amendment 1 to the AO has corrected this issue. The guidelines for the use of inflation indexes and the values of the NASA New Start Inflation Index have been modified.

- P-17 On page B-2 (Appendix B) you show 11 Appendices to the proposal, not including an appendix on Link Margin (downlink and uplink data is contained in sections G2 and G3; page B-8). On page B-19 you show an additional appendix (9. Communications Link budget Design Data). Which is correct; the table or the subsequent text?**

The table on page B-2 is incorrect. Amendment 1 to the AO has corrected the table so that it now includes the Communications Link Budget Design.

- P-18 Page B-19. Item 9. Detailed Communications Budget Design Data. Must every suggested table in the reference document be included**

in the proposal, or are there a select few they are really looking for?
The AO clearly specifies on page B-15 that the appendices listed on pages B-14 to B-22 are required.

P-19 Page B-10--provide definition of "Body Coordinates". Is this Observatory, spacecraft, or instrument coordinates?

The AO clearly states: *spacecraft body coordinate frame*.

P-20 Page B-10: "statement of whether instrument is active or passive." Does this refer to thermal control, or just to instrument operation (in the sense of an active radar vs. a passive radiometer)?

This refers to instrument operation. Thermal control stability requirements are the next item.

P-21 The table on page B-2 does not include Appendix 9 mentioned on Page B-19 (Communications Link Budget Design).

This has been corrected by Amendment 1. The Communications Link Budget Design has been added to the table.

P-22 Is the E/PO expenditure of ¼ to ½% a hard cap?

No. We expect proposals to come in within that range, but proposers can certainly choose to do more.

~~**P-23 Are "students" grad students, undergraduates, both? Are post-docs? "Students" are both undergraduate and graduate students. Post-docs are not considered to be students. Please see P-44.**~~

P-24 In the past, E/PO has been budgeted at a higher percentage of the total mission cost. Is there a message here?

There is no message. The cap has been increased, so the total percentage can decrease. Plus the student collaboration has been added as an additional component. Proposers are welcome to exceed the guideline budget if they so choose.

P-25 Do you expect the student collaboration to be written by students?
That is not a requirement of the AO, nor is it prohibited by the AO.

P-26 Are contributions considered to be part of the total cost, or in addition (i.e., are they counted against the cost cap)?

The cost cap is the SMD cost of the mission. The total cost is the SMD cost plus any contributions. Section 5.9.3 of the AO states that: *the sum of contributions of any kind to the entirety of the flight hardware for a Discovery Mission investigation from non-U.S. sources may not exceed one third (1/3) of the estimated total cost in U.S. dollars.*

P-27 Can a Science Enhancement Opportunity (SEO), Technology Demonstration Opportunity (TDO), or Student Collaboration (SC) be contributed?

Yes. There is nothing in the AO that would prohibit this except for the restriction described in Section 5.9.3 of the AO (see P-23).

P-28 Is there time phasing associated with contributions? Must they be Phase B and beyond or could they be in Phase A or pre-Phase A?

The AO does not place any time-phasing requirement on contributions.

- P-29 Section 5.9.4 of the AO states that: “The CADRe itself will not be considered as part of the evaluation, but proposers will be required to identify the estimated costs of CADRe data collection in the proposal.” Has this changed and if so, in what way?**

Yes, this situation has changed. NASA is now funding support contractors to do CADRe development. Projects will need to collect existing documents and transmit them to the support contractor. Amendment 1 to the AO has clarified this issue.

- P-30 Exactly what NEPA paperwork is actually required to be included in the proposal submission?**

According to pp. B12-B13 of the AO, proposal Appendix H *“...should also include a description of the National Environmental Protection Act (NEPA) and Nuclear Safety Launch Approval requirements for the proposed mission, and a brief description of the implementation plan, including schedule, for satisfying these requirements.”* NEPA paperwork is not required at the time of proposal although proposers are expected to provide a plan to achieve NEPA compliance and to budget funds and schedule to that end.

- P-31 What does certification of the costs, described in Section 7.3.2 of the AO, entail? Does this certification go in with the proposal?**

Certification of costs is described in FAR 15.406-2. This certification is not submitted with the proposal and is only needed if the proposal is selected for a Phase A Concept Study. *US Government suppliers are not required to provide a certificate of current cost and pricing data.*

- P-32 Could you please clarify Section J-2 (Page B-14) of the AO — specifically, the use of the word “offering” and the statement “Letters of Endorsement from all parties involved in the proposal...” Do proposers need to submit letters of endorsement for organizations “offering” items (1) whose costs are included in our proposal budget; (2) funded by SMD, but outside the proposal budget, e.g. the IV&V facility or DSMS; or, (3) contributed on a no-exchange-of-funds basis?**

Letters of Endorsement from all critical participating institutions are required whether they are providing their services/goods on a no-exchange-of-funds basis or for a cost. “Critical” here is defined as “essential for mission success.” The exception is goods or services *that are* paid for by SMD, are not part of the proposal budget, and are not a limited resource. Thus, a letter of endorsement is not needed from the NASA IV&V facility but *one* is needed from the DSN/DSMS since the bandwidth of the latter is a strongly constrained resource.

- P-33 The terms Letter of Endorsement and Commitment Letter seem to be used interchangeably. Are they the same thing?**

The terms are, indeed, used as synonyms.

P-34 Are individual SOWs required for each team member, as stated in Appendix J-1 (p. B-14) of the AO?

SOWs are required for all team member organizations that will be funded via a contract.

P-35 On page 19 of the Discovery AO, it states: “The cost of contributions does not need to include funding spent before the start of the investigation (i.e., before initiation of Phase B if confirmed for flight).” Are letters of endorsement required from institution only making contributions during Phase A?

Yes. Letters of Endorsement are required from critical institutions participating in any phase of the proposed mission.

P-36 If an industrial partner is willing to commit to a firm, fixed-priced contract, does a 25% reserve for their portion to the cost of the mission still need to be held at the project level? Can the proposal team deviate from the 25% requirement to reflect the lower cost risk based on the type of contract to be employed?

No. The seventh paragraph of Section 5.9.1 of the AO state: *Discovery mission investigations must show (through the end of Phase B) a credible reserve of at least 25 percent of cost to go through the end of Phase D.*

There are no caveats on this statement.

P-37 Appendix A, Section XIII.B of the AO requires a subcontracting plan for Phase A as part of the proposal. What is the expected scope and content of such a plan? What level of detail and specificity are required for the subcontracting plan in the proposal?

The AO in Appendix B, Section H (p. B-13) states that *When major subcontracts are required, the acquisition strategy, including contract incentive policies, should be described. If applicable, this section should also include a description of the National Environmental Protection Act (NEPA) and Nuclear Safety Launch Approval requirements for the proposed mission, and a brief description of the implementation plan, including a schedule, for satisfying these requirements.* If a proposal is selected for a Phase A Concept Study, then the AO also states that, *Offerors other than small business concerns are advised that contracts resulting from this AO will be required to contain a subcontracting plan that includes goals for subcontracting with small, small disadvantaged (including HBCUs and MEIs), women-owned, veteran-owned, service-disabled veteran-owned, and Historically Underutilized Business (HUB) Zone small business concerns.*

Since the Phase A awards are expected to exceed \$500,000, the Small Business Act requires that contract awards, except to small business concerns, contain subcontracting plans unless subcontracting opportunities

are not available. The requirements of a subcontracting plan are delineated in FAR 19.704.

- P-38 Will the Notice of Intent appear in some way on the Discovery Program site?**
No.
- P-39 According to Appendix J of the AO (p. B-14) a number of SOWs appear to be required: one for the Phase A Concept Study; one for Mission Phases B/C/D/E; one SOW for each separate organization on the Team (plus contractual funding information). All SOWs must include not just scope of work, but deliverables (including science data products). Are these many SOWs really required?**
Yes, all of these SOWs are required. Please see question P-34.
- P-40 Does having a student collaboration component improve one's chances of winning a Discovery award?**
Student Collaborations are encouraged and are considered a strength. Student Collaborations may have offsetting weaknesses, however, if they fail to address requirements identified in the AO.
- P-41 Can student collaborators be involved in planning, organizing competitions, web page development, or data analysis as opposed to New Horizons Student Dust Experiment (SDE)-type hardware development?**
Proposers may define an SC that involves development of an instrument, investigation of scientific questions, analysis and display of data, development of supporting hardware or software, and/or other aspects of the mission. The activities may involve flight or ground systems.
- P-42 Is there a particular level of education at which the student collaboration is targeted?**
Students of any age may be involved in Student Collaborations.
- P-43 Is E/PO at the ¼ - ½% level defined in the same way as it has been before: K-14, informal education, and Public Outreach (not “Public Relations”)?**
In general, yes. However, efforts that involve K-14 students may now qualify as Student Collaborations (SC) and may be counted as such under the SC program element.
- P-44 How are “students” defined in connection with Student Collaborations?**
Students are individuals enrolled in college undergraduate and/or graduate studies as well as individuals pursuing studies (K-12) leading to a high school diploma (or equivalent). Post docs are not considered students.
- P-45 Where in the proposal should a Student Collaboration be included?**
Information relevant to the evaluation of Student Collaborations is to be included in proposal sections D, E, G, H, I, J as appropriate.
- P-46 Is there a change in emphasis intended in the E/PO programs from**

K-12 to graduate and undergraduate education?

No real change in emphasis is intended. Instead, an expansion is implied. The “traditional” space science E/PO program has had opportunities for involvement of underserved college students, as well as pre-service teachers. The Student Collaboration is an enhancement to the portfolio of E/PO opportunities for college students.

P-47 Where should Student Collaborations be budgeted?

Funding for Student Collaborations (SC) is to be included in the overall budget. Sufficient detail must be provided as to allow the reviewers to determine if all SC requirements have been met.

P-48 Do you expect E/PO programs to cover the previously described components of the E/PO program *and* add Student Collaborations for ¼ the cost that E/PO programs had budgeted in the past? Do you intend the cost of E/PO programs to be tied to the mass of the spacecraft?

The AO requires an E/PO effort with a budget of ¼-½% of the mission cost as defined in the AO. The proposer may choose to propose a program above this level. The proposer is encouraged to submit Student collaboration(s) but is not required to do so. SCs are proposed in addition to the ¼-½% E/PO effort and may be as large as the proposer desires subject only to the mission cost cap and the estimated costs of the rest of the mission. There is no expectation regarding the relationship of a Student Collaboration to any spacecraft property.

P-49 Student Collaborations are a new element to the SMD mission E/PO program. Can NASA provide additional examples of the types of activities that could be proposed?

Principal Investigators are encouraged to propose innovative Student Collaborations (SC) that inspire students, engage them directly in prospective missions, and contribute to the development of their education and work skills relevant to NASA missions. Proposers may define an SC that involves development of an instrument, investigation of scientific questions, analysis and display of data, development of supporting hardware or software, and/or other aspects of the mission. The activities may involve flight or ground systems.

The proposer must clearly identify the proposed SC as an E/PO element. If proposed, the proposer must provide details of the development schedule of the SC, including decision points for determining SC readiness. An SC may have the potential to add value to the science or engineering of the mission, but the proposer must describe how the SC will be planned so that the baseline science investigation is not compromised in the event that the SC component is not funded, encounters technical, schedule, or cost problems, or fails in flight. The proposer is encouraged to provide an

adequate plan for mentoring and oversight of students to maximize the opportunity for teaching, learning, and success in contributing to the mission.

P-50 If the launch window for a proposed mission opens up prior to the October 1, 2013 deadline, but extends for several weeks after, may a proposal be submitted to this AO or must it be submitted to the next one?

~~Such a proposal may be submitted to this AO.~~ *This situation is acceptable and the proposal may be submitted to this AO, although the proposed mission must plan on launching before October 1, 2013. The TMC review will evaluate the schedule risk associated with the proposed launch date.*

P-51 Is a sole-source procurement justification required to be submitted in the proposal for each major sole-source procurement (i.e., instruments, ground systems, etc.)?

This issue will be clarified by Amendment 2 to the AO.

P-52 In Appendix B, J-4(e), Resumes (page 17), the AO ask for a signature of an authorizing official of the individual's organization. Is this needed since we are required to submit a letter of endorsement for any contributions?

~~If a signed letter of endorsement is included in the proposal, then the resume need not be signed.~~ *If a letter of endorsement signed by the authorizing official and the participating individual is included in the proposal, then the resume need not be signed.*

P-53 "Headroom" is certainly desirable between the proposed mission cost and SMD cost cap. Will a proposal be penalized for not having adequate headroom if the baseline mission cost is 1) deemed to have good margin, but 2) the addition of a TDO results in a total that is close to the cap?

"Headroom" is not an evaluation criterion; cost risk, though, is evaluated. Provision should be made for allowable cost growth in Phase A (see Section 5.9.1 of the amended AO). The evaluation criteria for TDOs are described in Section 7.2.4 of the AO.

P-54 Regarding Appendix B, Proposal Guidelines, Section E: Please define and explain the differences between: Participating Scientist Program, Data Analysis Program, and Guest Observer Program.

A "Participating Scientist Program" solicits proposals for investigators wishing to join the mission team at a point in time after the mission has been selected. Its intent is to broaden and strengthen the mission science team's expertise. A "Data Analysis Program" funds the analysis of science or engineering data acquired during the mission other than that proposed as part of the mission itself. A "Guest Observer Program" funds the use of an observatory-type mission by researchers not on the mission team. Note that proposers are free to expand or alter these definitions in their

proposals as they see fit.

P-55 How is “overall merit” defined in Section 7.2.4 of the AO with regard to the evaluation of SEOs, TDOs. And SCs?

“Overall merit” is defined as the science merit and science implementation merit and feasibility. SEOs, TDOs, and SCs will be evaluated under the same science criteria as any other component of a mission. Additionally, SCs will be evaluated as part of the proposed E/PO plan (see Section 5.6.2 of the AO).

P-56 Is it acceptable to name the same person as the project manager on multiple proposals from the same organization? What about deputy project manager and mission system engineer?

Yes, this practice is acceptable.

Launch Vehicles and Secondary Payloads

LV-1 It is difficult to use the launch services cost data (found in the “ELV Launch Services Program Information Summary”) because it is put into terms of Earth circular orbit lift capability. Most Discovery missions are interplanetary with a C3 ranging from 1 to 50. KSC needs to be clearer about what vehicles these really are. As most Earth orbit launches don't make use of a solid upper stage and most interplanetary launches do require one, it makes translating the mass table extremely difficult.

Section 5.11.2 in the Discovery AO says: *The launch market is highly dynamic and NASA cannot assure which of the candidate launch capabilities will be available for launch in the next decade (launch date under this AO is NLT October 1, 2013). Accordingly, proposers should plan to be compatible with either vehicle family [Atlas or Delta] through spacecraft PDR as a specific launch vehicle will usually be assigned after that milestone.* Information to aid you in determining what lift ranges and mass margins can be expected for the available families of launch vehicles can be obtained from the planning tool described on page 2 of the “ELV Launch Services Program Information Summary” located in the Discovery Program Library. An updated version was posted on January 6, 2006.

LV-2 In the ELV Launch Services Program Information Summary document, costs are given for four mass ranges. Using the Launch Vehicle Performance website (<http://elvperf.ksc.nasa.gov/elmMap/index.html>) one can sometimes find two very different launch vehicles that meet a proposal's needs. Since these different launch vehicles could have very different costs, how should a proposer choose?

Essentially, what is at issue is cost versus launch performance (mass) margin. The proposer is free to balance cost against launch performance margin and justify the resulting trade. The TMC panel will evaluate the

adequacy of the proposed trade.

LV-3 You've stated that the use of a foreign ELV involved interagency coordination. What does this mean?

The actual process for receiving US government approval to use a foreign launch vehicle is described in "U.S. Space Transportation Policy," Section V1.a which can be found in the DPL.

LV-4 Can proposers assume that the LV costs in Table 1, from "ELV Launch Services Program Information Summary" in the Discovery Program Library, include costs for a third stage if needed, or should proposers include any upper stage costs as a separate item in the overall mission cost?

Yes, the table includes the costs for a third stage, should one be required.

LV-5 It appears that the ELV costs in the table are in real year dollars and should be de-escalated for current years cost estimates. Please confirm.

Yes, the ELV costs are in real year dollars and should be de-escalated for the current-year cost estimates. The proposer should de-escalate the ELV costs following the instructions in Section 1 of Appendix B of the amended AO.

LV-6 What assumptions can be made about using volume below the separation plane on the Atlas V both inside and outside the payload separation ring? If you assume the standard C22 launch vehicle adapter and a standard payload separation ring, can flight hardware hang below the separation plane at all? If so, down to the LVA/PSR interface? Down to the base of the LVA?

The stayout zone for the C22 adapter is depicted in the Atlas V Commercial Users Guide, Figure E 8-6, p. E-42. View the lower left hand corner for "Stayout Zone" and follow the phantom line (dash and dots). Area above and inside is usable payload space below the separation plane. A limited amount of allowable infringement into the "Stayout Zone" can be negotiated if need arise, *but* very little. Ultimately, the answer to the question will depend on detailed drawings, models, and clearance analysis for verification of non-contact.

LV-7 Paragraph 2 of Section 5.11.2 of the AO states "NASA will provide ELV and EELV configurations as described in the Discovery Launch Services Information summary..." but no such specific configurations are in that document. The LVs are only described in general terms of lift capability ranges. Later in the AO, requirements are levied on the proposers to provide data on the specific LV chosen by the team: Section 6.1.3 (NOI), 7.2.4 (TMC Evaluation Criteria), Appendix B Section C (Fact Sheet), etc. all require specificity with regards to the LV (accommodation within the fairing, etc.). Thus it is not currently possible to be compliant with

the AO unless specific LV configurations are provided by KSC, or all the LV requirements in the AO are removed. How will NASA resolve this discrepancy?

Available LV configurations are described in the reference PPG web site listed in the Launch Services Document in the AO library.

LV-8 In the ELV Launch Services Program Information Summary document, the first two options in Table 1 appear to correspond to a Taurus and a Delta II 2920-10. In past AOs, an intermediate launch option (such as a Delta II 2420-10) has been made available at an approximate discount of \$10 million from the Delta II 2920-10. Is such an option going to be made available for this AO? If so, will the discount be \$10 million as it has been in past AOs?

Pricing is for planning purposes for the AO and not meant to be program management costs. The performance ranges and cost are inclusive of the vehicles in question. Cost risk should be explained if different cost numbers are used in the proposal.

LV-9 Section 5.11.2 discusses two “families” of LVs. Is this a reference to Delta II and EELV, or to Delta IV and Atlas V?

Available LVs for this AO are all LVs currently on the NASA Launch Services (NLS) Contract: Pegasus XL, Taurus XL, Delta II, Delta IV, and Atlas V.

LV-10 What is NASA HQ going to do about the possible and unknown additional costs for a Delta II post CY2010? Should proposers budget \$30M/yr as mentioned at the Pre-Proposal Conference?

The Delta II “fly-out” cost is a cost risk about which PIs can do nothing. It is an SMD cost risk. The selecting official may choose not to select a mission using a Delta II if this risk is deemed too great to take on. Proposers should be compliant with the AO, and this issue will be resolved programmatically at selection.

LV-11 The ELV tables shown have an additional cost for “nuclear materials.” When does this cost come into play?

The flight of any nuclear material at all incurs additional costs, as shown on the table. This includes RHUs and radioactive sources contained within instruments. It is possible that the costs will be somewhat reduced if directly relevant past experience with your proposed nuclear use exists.

LV-12 Will the ELV annex be updated to reflect planetary curves with respect to C3 curves of performance versus cost? A C3 = 0 column is not adequate.

Using the information available from the Vehicle Performance Website (<http://elvperf.ksc.nasa.gov/elvMap/index.html>), it is possible to reduce a combination of launch mass and C3 to the C3=0-equivalent launch mass. There are no plans to update the ELV annex at this time.

LV-13 Do the launch vehicle costs listed in the ELV Annex include upper

stages?

The “upper stage” (whether it is a second stage or a third stage) is always included for the performance and cost ranges designated.

International Participation

Missions of Opportunity

MO-1 The Announcement of Opportunity for the Discovery Program 2006 talks about Discovery Mission investigations to be launched before 1 Oct 2013. Can one also propose investigations using existing missions, for example the DI flyby spacecraft, to perform science during cruise phase?

Yes. Section 5.12.1 of the Discovery AO states: *Mission extensions and proposals for new science missions that utilize existing in-flight SMD spacecraft that have completed their prime flight missions (Deep Impact and Stardust) are also allowed in this opportunity.*

MO-2 Could a Mission of Opportunity Project focused entirely on construction of web sites or children's books about topics like "Lessons from NASA Missions and Programs on the Solar System and Other Planetary Systems" using information from the Hubble Program, Spitzer Telescope, Stardust, Chandra Program, Gamma Ray Telescope, Deep Impact and the many other programs that study planetary information be considered?

No, a Mission of Opportunity proposal must contain a scientific investigation. In addition, a MO must be part of a non-SMD space mission (Section 5.12.1).

MO-3 Could a Mission of Opportunity proposal make use of a non-SMD spacecraft (such as GP-B) or assets on the International Space Station?

There is nothing in the AO that specifically precludes the use of such assets *assuming that they have completed their prime mission*. A letter of endorsement from the organization controlling the resource may be needed, however. Section 5.12.4 of the AO, as amended, states: *It is incumbent on the proposing investigator to provide evidence in his/her proposal that the sponsoring organization intends to fund the parent mission and that the endorsement of NASA for U.S. MO participation is required by the sponsoring organization prior to April 1, 2009.* Since GP-B, for example, is an SMD-mission, no letter is required for that example.

MO-4 How do you address planetary protection issues if you are proposing a Mission of Opportunity?

Flight of an instrument on a non-NASA mission is subject to, at least, the COSPAR planetary protection regulations and any additional regulations

of the mission in particular, if they exist. The proposers are responsible for addressing in their proposal what these requirements impose on their investigation (e.g., cost of sterilization, schedule issues, etc.). Please contact John Rummel, NASA's Planetary Protection Officer, about any particular situation.

MO-5 What is the justification for not increasing the MO cost cap from \$35M? It has been fixed since MO's were introduced in 1998.

This is not correct. The MO cost cap was \$21M in the 1998 MIDEX AO and \$22M in the 1998 Discovery AO.

MO-6 Is there any latitude in the AO for the proposal of a Mission of Opportunity on a non-SMD mission whose sponsoring organization will not be able to produce a firm funding commitment by the AO submission date?

Section 5.12.4 of the amended AO states: *It is incumbent on the proposing investigator to provide evidence in his/her proposal that the sponsoring organization [of the parent mission] intends to fund the parent mission.*

The risk associated with participation in that mission will be evaluated by the TMC review.

MO-7 Section 5.12.5 of the AO lists those costs to be included for extended mission Missions of Opportunity proposals. It does not list EPO as an allowed cost. Are EPO costs not expected or required for these types of MOs?

The list of costs in the fifth paragraph of Section 5.12.5 is not intended to be a complete list of all cost categories. The proposal budget should include all costs necessary to carry out the MO investigation. An EPO component is expected at the same percentage level of the total budget as for all other Discovery projects.

Other

O-1 Is the Discovery and New Frontiers Program office at MSFC?

The Program Office is up and running but it has no role in the selection process.

O-2 Could you please clarify the purpose of the "Discovery Teaming Interest" web page?

The Teaming webpage is simply provided as a convenient forum for organizations interested in participating in Discovery project proposals and missions to provide contact information and short descriptions of the expertise they might bring to a proposal team. Proposal teams may find on this list a needed element to complete and/or complement their team but are not required to contact or use any organization on the list. NASA has not performed any investigation to verify the listed information, provides no endorsement of any organization on the list, and takes no responsibility for the information or subsequent actions by any organization on the list or their personnel.

O-3 Will past performance with the delivery of data to the PDS be considered during the downselect?

Yes. Section 7.3.3 entitled “Confirmation of Investigations for Phase B” states that: *The product of the Phase A studies will be Concept Study reports as specified in the document entitled Guidelines and Criteria for the Phase A Concept Study in the DPL. The scientific, technical, management, cost, and other aspects of the Concept Study will be assessed according to the criteria contained in this document by a panel composed of individuals who are experts in each of the areas to be evaluated. Past performance of the partners in the implementation of previous or current space missions, particularly cost capped missions such as NASA’s Explorer or Discovery missions, will be one of the factors used in assessing cost risk, schedule risk, and the risk of failure in technical performance.*

O-4 The required cost table, Table B-1 seems to be garbled (missing letters, missing words, misalignments, etc.) in the PDF document on the web. Can a new electronic version be published that corrects this?

A new version of the table has been released as a part of the recent amendment to the AO.

O-5 TRL Definitions link in the Discovery Program Library points to a dead URL.

The link has been fixed.

O-6 The AO says a site visit may be requested, but the schedule in Section 8.0 does not show a timeframe for site visits to occur. Will there be site visits, and if so, when are they likely to occur?

Site visits may be requested as a part of the TMC evaluation during the Phase A Concept Study. They are a part of the down-select process and will be coordinated with the PI.