



Earth Venture Mission-2

Access to Space

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From the EVM-2 AO

This EVM-2 AO is based on NASA SMD's Standard PI-led Mission AO. In addition to the listed major changes, this AO incorporates a large number of additional changes relative to previous Earth Venture AOs and the NASA SMD's Standard PI-led Mission AO including both policy changes and changes to proposal submission requirements. . . . Of relevance to the access to space discussion:

- Although NASA-provided launch services are offered and may be proposed, proposers may also propose alternative access to space including contributed launch services.
- NASA-provided launch services may be proposed at a charge of \$55M in FY18 dollars against the PI-Managed Mission Cost.
- Alternative access to space, which must be arranged by the proposer and funded within the PI-Managed Mission Cost, may also be proposed.



Options Allowed in the AO

- Four possible approaches the PI may propose for access to space:
 1. NASA-provided launch service
 - a. Small Class Launch Vehicle
 - b. CubeSat Class Launch Vehicle
 2. Non NASA-provided launch services (as primary, secondary, or co-manifested payload on US- or non US-provided launch vehicle)
 3. Hosted payload (on US- or non US-developed carrier)



1a. NASA-Provided Launch Services Small Class Launch Vehicle

- Typical approach used on other PI-led AO missions
- NASA-provided launch services may be proposed at a charge of \$55M in FY18 dollars against the PI-Managed Mission Cost.
 - Covers basic services as delineated in the ELV Launch Services Program Information Summary and expects the proposer to cover additional special requirements.
 - Launch delay costs as a result of spacecraft or payload delays are not covered in the basic services. Any such delay costs must be funded out of the PI-Managed Mission Cost and, therefore, represent a cost risk to the PI-Managed Mission Cost.
- Mr. Garrett Skrobot, NASA Launch Services Program, is the POC for any questions regarding NASA-provided Launch Vehicle capabilities.

If the proposed EVM-2 investigation . . . requires NASA provided launch services, then the investigation will be launched as the primary payload on a single expendable launch vehicle (ELV) that NASA will provide as Government Furnished Equipment (GFE). Standard launch services utilizing a domestic launch vehicle certified as a Risk Category allowable for Class D payloads per NPD 8610.7D, *NASA Launch Services Risk Mitigation Policy for NASA-Owned or NASA-Sponsored Payloads/Missions*, will be provided at a \$55M charge to the PI-Managed Mission Cost. There will be an additional charge against the PI-Managed Mission Cost for any launch services beyond the standard launch services offered. Detailed information on launch vehicle performance options for this AO, including a description of standard launch services and the nominal costs for nonstandard services for this AO, is provided in the *ELV Launch Services Information Summary* document in the EVM-2 Library.



1b. NASA-Provided Launch Services CubeSat Class Launch Vehicle

- Investigations may use the CubeSat Launch Initiative (CSLI) however a commitment from the NASA CSLI that the launch will occur within the 5 years required by this AO.
 - If funding is required to get this commitment this must be part of the PI-Managed Mission Cost
- If NASA provides a launch for a CubeSat investigation there will be a charge of \$17M in FY 16 dollars against the PI-Managed Mission Cost.
 - Multiple CubeSats which require Micro-Sat launch capability or multiple launches will be charged \$56M against the PI-Managed Mission Cost.
- Mr. Garrett Skrobot, NASA Launch Services Program, is the POC for any questions regarding NASA-provided Launch Vehicle capabilities.
- Ms Anne Sweet, Launch Services Program Executive is the POC for and questions regarding CSLI

NASA provides launch opportunities for CubeSats as secondary payloads on U.S. Government missions through the NASA CubeSat Launch Initiative (CSLI) (please refer to http://www.nasa.gov/directorates/heo/home/CubeSats_initiative.html) at no cost. If the PI proposes to launch through the NASA CSLI, a commitment from the NASA CSLI for launch within the schedule constraints of this AO will be required. NASA also plans to provide micro/small satellite class payload launch services for CubeSats as primary missions. If NASA provides launch services for a CubeSat investigation as a primary mission, there will be a \$17M charge to the PI-Managed Mission Cost. All NASA provided launch services for CubeSats are managed by the NASA Human Exploration and Operations Mission Directorate.



3. Non NASA Launch Services

Alternative access to space, rather than the use of NASA-provided launch services, may be proposed or considered under this AO. Alternative access to space may include non-NASA launch services as primary, secondary (e.g., on a secondary payload adapter), or co-manifested payloads on a U.S.- or foreign-manufactured launch vehicle.

The proposed investigation must be a complete Earth science investigation and the PI must remain in charge of the development, launch, and successful operation of the EV-2 mission.

- This terminology is intentionally designed to allow the proposer to devise their own approach to launch, including working directly with Launch Vehicle providers outside of the LSP NLS II contract mechanism
 - Allows the Proposer to purchase a U.S. launch vehicle outside of NASA LSP and NLS II contract
 - Allows the Proposer the use of a non-U.S. launch vehicle with certain restrictions
 - Contributed launch services must be provided on a no-exchange-of-funds basis and be part of a legitimate scientific collaboration.
- This will allow for possibly innovative Science Instruments + Spacecraft + Launch Vehicle proposals



3. Non NASA Launch Services (cont.)

- Proposal must be consistent with national law and NASA policy
- Insight/Oversight role of NASA Launch Services Program (LSP) is defined by NASA policy and delineated during Phase A activities
- A charge to the PI-Managed Mission Cost of \$2.0M will be charged for the expected NASA LSP monitoring activities.

The proposed launch service will be assessed in conjunction with NASA stakeholders as part of the selection process.

Proposals that include non-NASA launch services obtained from/provided by a U.S. or non-U.S. partner shall meet the following requirements:

- The proposer must demonstrate a commitment from the organization(s) that will provide the launch services.
- The proposer must demonstrate a commitment from the Launch Services Provider when flying as a primary.
- The proposer must demonstrate a commitment for the proposed co-manifested mission organization(s) or, when flying as a secondary, of the primary mission organization(s) utilizing the launch services; these commitments must be documented in a Letter from the appropriate organization(s).
- The proposal must describe the launch services, demonstrate compatibility with the proposed launch vehicle, and show how the provider will fulfill the mission requirements.

Purchased launch services must be obtained on a U.S.-manufactured launch vehicle only. U.S. Space Transportation Policy prescribes the use of U.S.-manufactured launch vehicles for the launch of U.S. Government-sponsored payloads.

Contributed launch services may be obtained on a U.S.- or foreign-manufactured launch vehicle; contributed launch services must be provided on a no-exchange-of-funds basis and be part of a legitimate scientific collaboration.



3. Non NASA Launch Services (cont.)

- New Language to clarify the minimum information for evaluation of the maturity of a PI chose alternative access to space
- The proposal must identify the launch opportunity and must provide evidence in the proposal that the launch service provider agrees to manifest the mission should the proposal be selected and confirmed for flight by NASA. This evidence must include a Letter from the launch service provider containing, at a minimum, the following information:
 - Evidence that the launch service provider will provide the services described in the proposal under the conditions (cost, schedule) described in the proposal;
 - A description of the opportunity (or opportunities, if more than one under consideration) that the launch service provider can offer for consideration by the PI; and
 - A description of the process that the launch service provider will use in order to commit to the PI to provide specific launch services for the proposed investigation, should NASA select the proposed investigation; this process description must include a notional schedule for identifying the specific launch opportunity and definitizing the cost.



4. Hosted Payloads

- Alternative access to space may include payload accommodations as a hosted payload (e.g., instrument package) on a U.S.- or foreign-provided spacecraft.
- The proposed investigation must be a complete Earth science investigation and the PI must remain in charge of the development, launch, and successful operation of the EVM-2 mission.
- Proposer must do all the negotiating to secure the ride.
- The partnership must be established in the proposal.
- Stability of the ride and mission is an evaluation criterion.
- Insight/Oversight still set by NASA policy

Proposals that include payload accommodation as a hosted payload on a U.S. or foreign provided spacecraft shall meet the following requirements:

- The proposer must secure the organization(s) that will provide the payload accommodations.
- The proposal must identify the mission opportunity or opportunities and must provide evidence in the proposal that the mission provider agrees to manifest the EVM-2 investigation should the proposal be selected and confirmed for flight by NASA.
- The proposed EVM-2 investigation must be self-sufficient and the success of the EVM-2 investigation must not depend on the other science payloads accommodated on the host platform. The NASA PI is responsible for the entire EVM-2 investigation including mission assurance. The proposal shall describe how mission assurance will be met for those areas that are not under the PI's control.



4. Hosted Payloads (cont.)

- Purchased payload accommodations may be obtained on a U.S.- or a foreign-provided spacecraft.
 - Launch may subsequently occur on a U.S.- or foreign-manufactured launch vehicle.
- Contributed payload accommodations may be obtained on a U.S.- or a foreign-provided spacecraft on a no-exchange-of-funds basis.
- Contributed payload accommodations may be obtained on a foreign-provided spacecraft only if the accommodations are provided as part of a legitimate scientific collaboration on a no-exchange-of-funds basis.
- A charge to the PI-Managed Mission Cost of up to \$2.0M will be charged for the expected NASA LSP monitoring activities for payload accommodations launched on a foreign launch vehicle.



NASA Launch Services Program's Monitoring Role for non NASA-provided Launch Vehicles

Earth Venture Mission-2
Pre-Proposal
Teleconference/WebEx

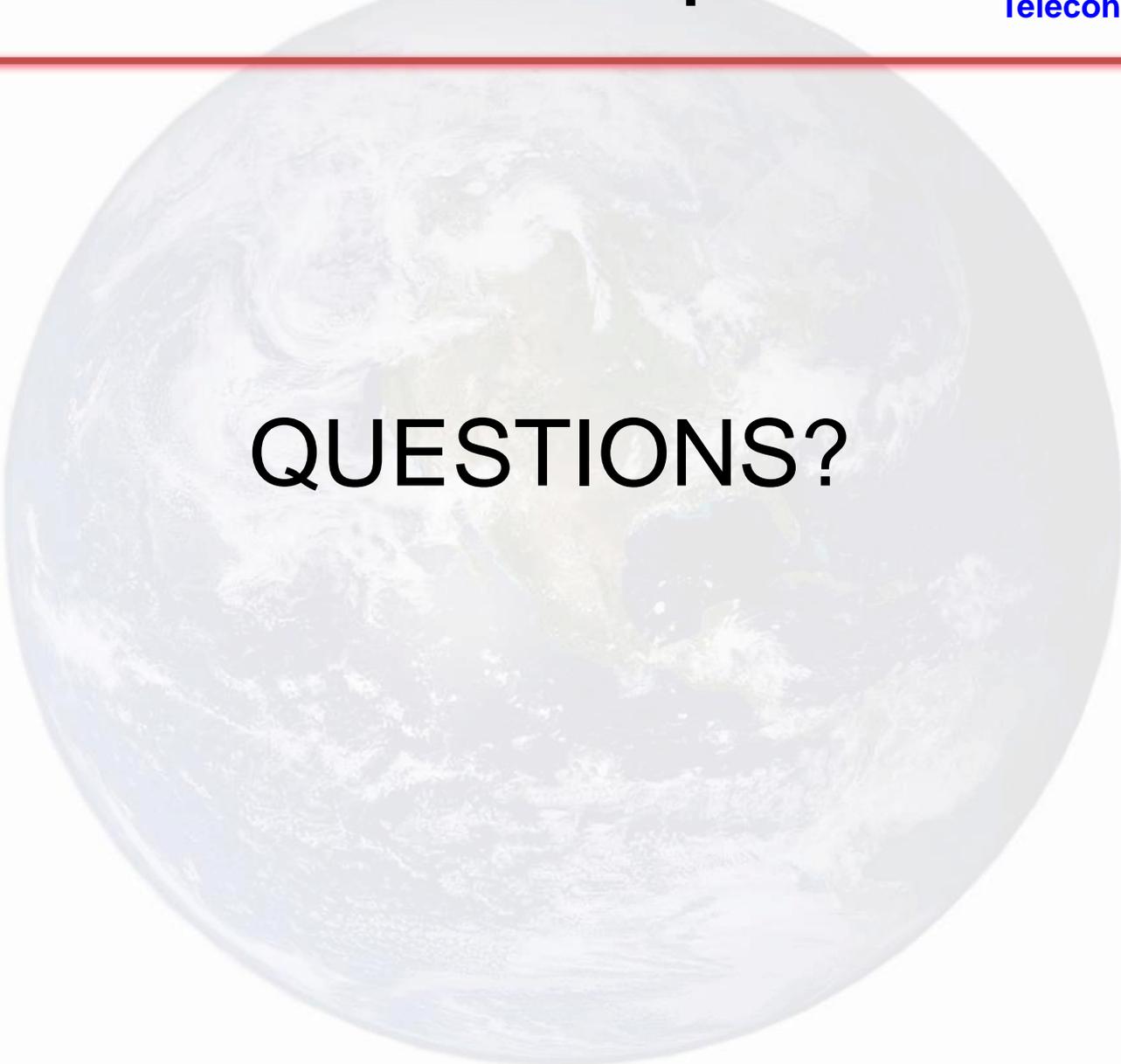
- The LSP monitoring role will be done through an established process that has been employed on previous NASA missions
 - GRACE-FO with the Kosmotras DNEPR and GFZ - German Research Centre for Geosciences
 - LADEE with the Minotaur and the Air Force
- Mr. Garrett Skrobot, NASA Launch Services Program, is the POC for any questions regarding LSP Advisory Services.

Non-NASA launch services will be handled by NASA consistent with existing policy and regulations. The demonstrated reliability and the resultant probability of mission success for contributed launch services will be evaluated by NASA consistent with U.S. Space Transportation Policy (see Section 5A) and NASA's Launch Services Risk Mitigation Policy (NPD 8610.7D, *NASA Launch Services Risk Mitigation Policy for NASA-Owned or NASA-Sponsored Payloads/Missions*). The proposed launch service will be assessed in conjunction with NASA stakeholders as part of the selection process. The NASA Flight Planning Board will approve final mission assignment assuring consistency with Agency risk strategy. Information on the reliability of ELVs may be obtained from the point of contact listed in the *Launch Services Information Summary* document.



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QUESTIONS?