



# Heliophysics Explorers Program (HEP) 2019 Medium-Class Explorer (MIDEX)

## Concept Study Guidelines and Criteria: Technical, Management, and Cost (TMC)

Mr. James Florance – Acquisition Manager and TMC Co-Chair  
Dr. K. Chauncey Wu – Acquisition Manager and TMC Co-Chair  
NASA Science Office for Mission Assessments (SOMA)

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## Guidelines and Criteria for the Phase A Concept Study

- The *Guidelines and Criteria for the Phase A Concept Study* document (a.k.a., G&C) is posted in the 2019 Heliophysics MIDEX Program Library.
  - <https://explorers.larc.nasa.gov/HPMIDEX/programlibrary.html>
  - “Program Specific Documents” section, item 5.
- This document contains instructions for preparation of the Concept Study Report (CSR).
- Requirements are designated as CS-1 to CS-115.
- Note the following language from the document:
  - All program constraints, guidelines, definitions, and requirements specified in the AO are also applicable to the CSR, except as noted herein.
  - In case of conflict between the HPMIDEX19 AO and the G&C, the G&C take precedence.
  - Because members of this evaluation team may not have reviewed, nor be provided access to Step 1 proposals, ***each CSR must be a self-contained document.***

## Guidelines and Criteria for the Phase A Concept Study (cont'd)

- Evaluation Criteria and Weighting.
  - Criterion A, *Scientific Merit of the Proposed Investigation*, is not re-evaluated, unless the CSR has significant changes to the science objectives. (Weighting approximately 20 percent)
  - Criterion B, *Scientific Implementation Merit and Feasibility of the Proposed Investigation*. (Weighting approximately 30 percent)
  - Criterion C, *Technical, Management, and Cost (TMC) Feasibility of the Proposed Investigation*. (Weighting approximately 45 percent)
  - Criterion D, *Quality and Merit of the Student Collaborations*, and Criterion E, *Quality and Merit of Small Business Subcontracting Plans*. (Weighting approximately 5 percent)

## **Guidelines and Criteria for the Phase A Concept Study (cont'd)**

- The format of the CSR is specified in Sections A through L.
- The CSR Structure and Page Limits are specified on page 14.
  - 5 pages for Executive Summary.
  - 30 pages for Science Investigation (highlight changes from Step 1).
  - Sections E through I: 98 pages + 2 pages for each additional, separate, nonidentical instrument or flight element + 5 pages for Student Collaboration.
  - No page limit for Cost Proposal, Section J (formats are specified).
  - No page limit for Justification and Cost Proposal for optional Science Enhancement Option Activities, Section K.
  - No page limit for Section L, Appendices, on specific topics.
    - Appendices should not be renumbered.

## Guidelines and Criteria for the Phase A Concept Study (cont'd)

- Electronic versions of CSRs and all required files, along with images of the original signatures of the Principal Investigator and an official of the PI's institution who is authorized to commit its resources are due to the Heliophysics MIDEX Program Scientist via the NASA NOMAD Large File Transfer (LFT) service by **4 p.m. Eastern Time, July 7, 2021**.
- Electronic submission via LFT containing unlocked, bookmarked, searchable PDF file(s) of the CSR—limited to the main body of the CSR, all tables, all appendices, and the MEL—as well as a separate PDF of the Fact Sheet, Microsoft Excel files of cost tables and the MEL, Microsoft Project schedule files, references not publicly available, any optional cost files, and other documents specified in Requirements CS-7, CS-8, and CS-9.

see Requirements CS-5 through CS-9

- Materials identified as subject to U.S. export laws and regulations, in accordance with AO Section 5.8.3, must be marked and also redacted to create separate versions of the files that are collected in a Redacted folder.

## Updated Criterion C Factors

- Factor C-2, Adequacy and robustness of the mission design and plan for mission operations.
  - Removed evaluation of communication, ground systems, and facilities which will be evaluated in new Factor C-7, Ground systems.
- Factor C-4, Adequacy and robustness of the management approach and schedule, including the capability of the management team.
  - Addition of subfactor for small business subcontracting plan including small disadvantaged businesses.
  - Risk management aspects moved to new Factor C-6, Adequacy of the risk management plan.

## **Additional Criterion C Factors**

- **Factor C-6, Adequacy of the risk management plan.**
  - Includes risk management aspects of Factor C-4, Adequacy and robustness of the management approach and schedule, including the capability of the management team.
  - Adds acknowledgement of no mitigation for a contribution and programmatic risk assessment for contributions.
- **Factor C-7, Ground systems.**
  - Assessment of the proposed mission operations plans, facilities, hardware and software, etc.
- **Factor C-8, Approach and feasibility for completing Phase B.**
  - Assessment of the completeness of plans.
  - Assessment of the adequacy of the approach.

## Guidelines: Items Deferred from Step-1

- Independent Verification and Validation of Software (see AO Section 4.6.1)
- Conjunction Analysis Risk Assessment (see AO Section 4.6.4)
- Updated Planetary protection plans (see G&C Appendix L.9 and AO Section 5.1.5). Note that the baseline Planetary Protection Plan is due at PDR.
- Detailed End-Of-Mission Plan (see G&C Appendix L.11)
- Science Enhancement Options (see G&C Requirements CS-25 and CS-42, Sections E and K, and AO Section 5.1.6)
- Enhancing Technology Demonstration Options (see G&C Requirement CS-42, Sections E and K, and AO Section 5.2.3.1)
- Student Collaboration, if proposed (see G&C Requirements CS-4, CS-42, and CS-55, Section H, and AO Section 5.5.3)
- Schedule-based end-to-end data management plan (see G&C Requirement CS-23, Section E.5, Appendix L.5, and AO Requirements B-23 and B-24)
- Requirements for real year dollars (see G&C Requirements CS-13, CS-64, and CS-66)

## Guidelines: Part II

- Requirement CS-8. Provide a list of the individuals who have participated in the concept study (*e.g.*, individuals who worked on the CSR, any CSR contributor, Red Team member, reviewer, etc.) and/or whom you are proposing to provide work should the mission be down-selected. Additionally, provide a list of all organizations named in the CSR, or providing developmental or research services, including the lead organization, subcontractors, vendors and contributing organizations who have an interest in the mission. Provide a draft list of the participants as a Microsoft Excel spreadsheet document to the AO point-of-contact (AO Section 6.1.5) three months prior to the due date of the CSR. Use the Microsoft Excel spreadsheet template that has been posted to the Program Library. This list is to be updated and a final revision shall be included in a separate file at the time of CSR submission.
- Requirement CS-9. Create a separate document that contains a table with all of the requirements (Requirement CS-1 through Requirement CS-115 and the page, section, or table number that is the main place in the CSR where the requirement is addressed. Provide this table as a PDF document to the AO point-of-contact by email no later than seven days after the CSRs are due.

## Guidelines: Section G, Management

- Tailoring to NASA requirements described in NPR 7120.5E may be proposed by missions at any risk classification. Proposers must identify any tailorable requirements that are proposed to be adjusted, provide a rationale for each adjustment, and describe the cost, schedule, and/or other benefits that would be realized should one or more of the adjustments be accepted by NASA. Note that these adjustments reflect potential modifications to the baseline investigation, to be addressed after down-selection.
- The panel evaluating the third evaluation criterion, TMC Feasibility of the Proposed Investigation Implementation, will provide comments to the Selection Official on the proposed tailoring of the requirements and their justifications. These comments will not be considered for the TMC Feasibility of the Proposed Investigation Implementation risk rating but may be considered in the selection decision.

**Instructional and not a requirement**

## Guidelines: Section I, Preliminary Design and Technology Completion (Phase B) Plan

- Once entering Phase B, Heliophysics Explorer projects will be subject to the same requirements as all other NASA missions. Note that the CSR only satisfies some of the KDP-B deliverable requirements, and that the balance will have to be developed early in Phase B (consistent with Section 2.2.7.1 in NPR 7120.5E: “In a two-step AO process, projects are down-selected following evaluation of concept study reports and the down-selection serves as KDP B. Following this selection, the process becomes conventional with the exception that products normally required at KDP B that require Mission Directorate input or approval will be finished as early in Phase B as feasible.”).

**CSR does not satisfy all deliverables for PDR**

## **Guidelines: Appendix L.4, Phase B Contract Implementation Data**

- This appendix provides data necessary for the Explorers Program Office to modify the contract during the First Bridge Phase in order to add the balance of Phase B activities to the contract. Provision of Phase B contract implementation data may be deferred to the date of each concept study team's Site Visit.
- From the G&C INTRODUCTION:
  - Upon a continuation decision, NASA will execute the two-month priced option for a First Bridge Phase and begin to provide Phase B funding for the project(s) that are continued beyond the Phase A concept study. The focus of the First Bridge Phase is: 1) participation in the Explorers Program Office project kick-off meeting; 2) work with the Explorers Program Office to negotiate and award the balance of the Bridge Phase; and 3) other interactions with the Explorers Program Office as necessary. A Second Bridge Phase will be negotiated during implementation of the First Bridge Phase in the first two months of Phase B to cover the remainder of the phase. The Second Bridge Phase is intended to cover the remainder of Phase B and to provided continuity while negotiations are underway to modify the contract to include Phases C/D and E/F. Institutions awarded a Phase A contract are required to provide the First Bridge Phase proposal at the time of the CSR submission (*e.g.*, Sections I, J, and L.4).

## **Guidelines: Appendix L.17, Additional Cost Data to Assist Validation (Optional)**

- In addition to the specific cost table data requested in the Cost Proposal (Section J), investigation teams may also provide any additional costing information/data that they feel will assist NASA to validate the project's proposed costs. Vendor quotes, cost estimates, rationale for design heritage cost savings, are all examples of data that can be included here. Input and output files for any publicly available cost model may be included with each electronic submission, if accompanied by discussion in this appendix.

**Make it easy for evaluators to validate your proposed cost**

## Guidelines: Appendix L.20, Space Systems Protection

- 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. For more information regarding Space Systems Protection requirements that will be imposed after down-selection, see the NASA-STD-1006.pdf and associated FAQs for Protecting Spaceborne Assets 13-May-2020.pdf in the Program Library.
- Additionally, the letter from the Associate Administrator required that the command uplink, position, navigation, and timing subsystems recognize and survive interference. Finally, information pertaining to the command uplink, including command dictionaries, must be protected—at least to the level of Sensitive But Unclassified (SBU)
  - Requirement CS-106. Provide the detailed plans, as applicable, addressing the protection of uplink commands using approaches compliant with FIPS 140-2 Level 1.
  - Requirement CS-107. Provide the detailed plans addressing the ability of command uplink, position, navigation, and timing subsystems to recognize and survive interference.
  - Requirement CS-108. Provide the detailed plans addressing the protection of command uplink information at no less than the Sensitive But Unclassified level.
- Exemptions
  - Hosted instrument payloads
  - Class C or D spacecraft lacking propulsion subsystems
  - Spacecraft that will operate more than two million kilometers (“deep space”) from the Earth
- Additional costs associated with these new requirements are outside the AO Cost Cap.

## **Guidelines: Appendices L.24 & L.25, Impact of Delayed LRD**

### L.24 Launch Readiness Date Slip

- Requirement CS-112. This section shall include a detailed discussion of the science, engineering, risk, and cost impacts of delaying the Launch Readiness Date by two years. Include budget profiles assuming an extended Phase B.

### L.25 LRD Preference

- Requirement CS-113. This section shall describe the impact of both LRDs. The discussion is requested to inform programmatic considerations and will not be evaluated. Topics covered should include cost, schedule, launch vehicle, and any other significant benefits or detriments. Proposers are encouraged to make the assumptions needed to minimize the impact to the mission should the non-preferred launch date be chosen by NASA; such assumptions should be noted in the discussion.

## **Guidelines: Appendix L.27, Reference Materials List**

- Requirement CS-115. This section shall provide a list of any internal program and project management standards to be used in the proposed development (e.g., GEVS, “GOLD Rules”). To the extent practicable, the referenced documents shall be included with the electronic submission.

CSRs may additionally provide, in this appendix, a list of other reference documents and materials used in the concept study. Investigation teams are encouraged to include an active URL for those documents available through the Internet. If the URL is password protected, provide the password in the CSR.

## Site Visits

- Site visits, either virtual or in person, with oral briefings will be used to clarify implementation details and commitments.
- Site visits are anticipated during the September – October 2021 timeframe at locations to be coordinated between the PI/Concept Study Team and NASA HQ/SOMA.
- Briefings for each site visit will be limited to approximately eight hours.
- All site visit presentations/briefings should be in a plenary session with all Evaluation Team members attending - no splinter sessions.
- Written significant weaknesses, questions, and/or requests for information will be provided to the PI/Proposal Team 6 days before the site visit. All teams will have the same lead time.
- Some questions will require an early response, 2 days before the site visit.
- Any additional information provided to NASA by the investigation team at the site visit, in response to the NASA-identified weaknesses and questions, or in response to NASA requests for additional information, will be treated as updates and clarifications to the CSR.

## Updated and Additional Program Library Documents

### Updated:

- Heliophysics Explorers Program 2019 Medium-class Explorer (MIDEX) Guidelines and Criteria for the Phase A Concept Study

### Added for Step 2:

- NASA Plan for Increasing Access to the Results of Scientific Research
- Program Level Requirements Appendix (PLRA) examples from TESS and ICON
- Mission Definition Requirements Agreement (MDRA) example from ICON
- Sample International Agreements from Juno and MSL
- Agency Risk Management Procedural Requirements, NPR 8000.4B
- CSR Conflicted Party List template
- Security Requirements for Cryptographic Modules, FIPS PUB 140-2
- Space System Protection Standard, NASA-STD-1006
- FAQs for Protecting Spaceborne Assets 13-May-2020

## Updated/New Criterion B Factors

AO Factor A-3, renumbered as Factor B-6 below, will be re-evaluated as a factor for Scientific Implementation Merit and Feasibility.

- Factor B-6. Likelihood of scientific success.

In addition, three new evaluation factors that are not described in the AO, and therefore were not evaluated for Step-1 proposals, will also be considered. Factors B-7 to B-9 will be evaluated for the CSRs in addition to the factors specified in AO Sections 7.2.2 and 7.2.3 (repeated or updated as Factors B-1 through B-6).

- Factor B-7. Scientific Implementation Merit and Feasibility of any Science Enhancement Options (SEOs), if proposed.
- Factor B-8. Scientific Implementation Merit and Feasibility of any PI-Team-Developed Enhancing Technology Demonstration Opportunities (TDOs), if proposed.
- Factor B-9. Maturity of proposed Level 1 science requirements and Level 2 project requirements.

## G&C Feedback to NASA

- Please review the *Guidelines and Criteria for the Phase A Concept Study* document carefully!
- Please send any questions, discrepancies, errors, *etc.*, by email to Dr. Moses, Mr. Florance, and Dr. Wu before November 6, 2020.
- As required, the G&C document will be amended, and the amended document will be posted on the acquisition website, <https://explorers.larc.nasa.gov/HPMIDEX/>.
- Please check the acquisition website regularly for updates!

