2023 Heliophysics Senior Review

Call for Proposals

1 Overview

NASA's Science Mission Directorate (SMD) periodically conducts reviews of its operating missions on a 3-year cycle per Title 51 U. S. Code §30504, as modified by the NASA Transition Authorization Act of 2017 (P.L. 115-10), to maximize the scientific return from these missions within finite resources which reads, in part:

> *(1) The Administrator shall carry out triennial reviews within each of the Science divisions to assess the cost and benefits of extending the date of the termination of data collection for those missions that exceed their planned missions' lifetime.*
>
> *(2) In conducting an assessment under paragraph (1), the Administrator shall consider whether and how extending missions impacts the start of future missions.*

The 2023 Heliophysics Division (HPD) Senior Review will assess the operating missions within the Heliophysics System Observatory (HSO), including the balance of the portfolio and the scientific merits and performance of the missions. The 2023 HPD Senior Review will assess the following 13 missions: AIM, GOLD, Hinode, IBEX, ICON, IRIS, MMS, New Horizons, SDO, STEREO, THEMIS, TIMED, and Voyager.

This 2023 HPD Senior Review assessment will cover extended mission operations in the period of FY2024-FY2028. NASA will use the results of this review to rebalance HPD mission allocations within the operating mission portfolio. These allocations drive mission budget allocations in the near-term (FY2024, FY2025, and FY2026) and planning for levels of support in later years (FY2027 through FY2028). Each mission invited to this Senior Review shall propose a mission extension either as a Science Investigation or Heliophysics System Observatory Infrastructure. Further description of these two types of extended missions is in Section 3, *General Instructions to Proposers*.

The Senior Review panel, formed by NASA Headquarters (HQ), will assess these proposals supplemented by presentations from the missions (see Section 4, *Senior Review Panel*, and Section 5, *Evaluation Criteria*). The assessment will be submitted to the Heliophysics Division at NASA HQ and used as input for decisions on the HSO portfolio. The potential outcomes for missions are fully described in Section 6, and are summarized as:

- Funded for an extended science mission (for Science Investigation proposals);
- Funded for an extended mission as HSO Infrastructure (for HSO Infrastructure proposals or Science Investigation proposals); or
- Termination.

Missions selected for an extended science mission should expect to be included in the next Senior Review. Missions selected for infrastructure operations will not be invited to the next Senior Review but will undergo programmatic review on a similar schedule.

HPD strives to maintain a scientifically well-balanced portfolio consisting of both new and continuing missions within the finite resources available. As in previous Senior Review cycles, the missions invited to this Senior Review should be cognizant of the constrained and dynamic budget space the Agency is working with as well as HPD missions in development. The 2023 Senior Review aims to reduce the total budget for the extended operating mission portfolio by up to 25% by 2026. See Section 3.2.1 for more information.

2 Schedule

This Senior Review, including panel discussions and mission presentations to the panel, will be held in early 2023. The Senior Review will be a virtual or hybrid meeting, with any in-person component located in Washington, D.C.

Draft Call for Proposals Issued	May 16, 2022
Comments due to NASA	May 31, 2022
Final Call for Proposals Issued	June 22, 2022
Senior Review Proposals Due	November 1, 2022
Senior Review Panel Evaluation	Early February 2023
Senior Review Panel Report Delivered to NASA	March 2023
NASA Response and Letter of Direction for each mission	March 2023 (NET)
Publication of Senior Review Panel Report	March 2023 (NET)

3 General Instructions to Proposers

3.1 Proposal Overview

For the 2023 Senior Review, each invited mission may submit a proposal for a Science Investigation or continued operations as part of the HSO Infrastructure. Each individual mission will select which proposal type to submit. The proposal types are:

- Science Investigation: Mission continues operations as part of the extended mission, and the science team receives funding to execute a scientific research plan. This science funding is in addition to the funding necessary to continue operations and associated activities (e.g., data validation, archiving).
- HSO Infrastructure: Mission continues operations as an extended mission and does not receive funding to execute a scientific research plan. It only receives funding necessary to continue operations and associated activities (e.g., data validation, archiving).

Each proposal shall include the scientific and technical elements listed in Appendix A, Proposal Content. Proposals for Science Investigations are required to address all proposal sections. Proposals for HSO Infrastructure are not permitted to propose science objectives for the mission to complete in the next extended mission.

Each proposal shall include a mission Inclusion, Diversity, Equity, and Accessibility (IDEA) Plan. The requirements for the Plan are described in Appendix A, Proposal Content. It is understood that missions are at various stages of maturity with regards to an IDEA Plan and the accompanying implementation. Missions should present an assessment of their situation and present a plan with metrics and milestones for progress. It is not expected that a mission could reach its ideal state (as called for in Appendix A) before the next Senior Review, but specific methods for progress shall be planned. NASA expects to regularly review missions' progress against their strategy and metrics/milestones.

As part of the mission proposal, a Principal Investigator (PI) or other key personnel may choose to resign and provide a succession plan with a candidate replacement/successor nomination. Additionally, SMD strongly encourages the appointment of new individuals as key personnel deputies for training future PIs and Project Scientists. A mission may discuss any succession planning in the IDEA Plan, but it must also be included in the page-limited proposal text.

The required proposal sections are listed in brief below. See Appendix A, Proposal Content, for more information.

Proposal Content:

- Completion of Previous Science Objectives
- Proposed Extended Mission Science Objectives (Science Investigation Only)
- Contributions to Heliophysics System Observatory
- Current Mission Status
- Anticipated Mission Operations
- Management Plan (including optional Succession Plan)
- Data and Code Management Plan
- Budget Narrative

Appendices and Additional Documents

- Acronym List
- Budget Template
- References
- Team Publications
- External Publications
- Required Document: Project Data Management Plan (PDMP)
- Required Document: Calibration and Measurement Algorithms Document (CMAD)
- Required Document: Mission Inclusion, Diversity, Equity, and Accessibility (IDEA) Plan

3.2 Budget

Each mission will use its in-guide budget, as delivered by the Program Executive for the Senior Review with this Call for Proposals. Missions should contact the Program Executive for the Senior Review (see Section 7) for assistance with any budget questions during this Senior Review.

Budgets for mission extensions beyond the prime mission lifetime (in NPR 7120.5 language, prime mission operations) will support, at a lower level, the activities required to maintain operations. Maintaining operations includes the sustained and safe operation of the mission spacecraft, any supporting facilities, and delivering high-quality science data products to the designated NASA archive. When a mission is in extended operations, NASA will accept higher operational risk, lower data collection efficiency, and instrument/mission degradation due to aging. Along with this greater risk, the cost of implementation will be at a decreased level of funding as the operational modes, the nature of the instruments, and the data they produce are better understood.

The in-guide budget shall prioritize operations over any non-operation tasks, with science research funding reduced to accommodate any operating requirements. (It is understood that a science investigation proposal may contain all science funding in over-guide requests, described below.)

Proposals may request over-guides for specific enhancements to the mission, whether operations (for both science investigation and HSO Infrastructure proposals), science tasks (for science investigation proposals), or other mission activities (e.g., communications, IDEA). An over-guide for operations shall not be requested before all non-operation activities have been removed from the in-guide budget. Any proposed over-guide shall be clearly separable from the in-guide and from other proposed over-guides.

Proposals may offer descopes (under-guides) to reduce the mission budget while preserving the highest-impact scientific activities.

3.2.1 *Budget Reductions*

The 2023 Senior Review aims to reduce the total budget for the extended operating mission portfolio by up to 25% by 2026. The reduction of the operating mission budget will likely be accomplished by a combination of science descopes, transitions to HSO Infrastructure, and terminations.

Mission budgets, including reductions and terminations, will be finalized as part of the Decision Process. (See Section 6 for more information.)

3.3 Proposal Format

The science, technical, management, and budget sections (Appendix A of this document) combined shall not exceed 30 pages for Science Investigation proposals and not exceed 20 pages for HSO Infrastructure proposals. Not included in the page limit are the Proposal Appendices and Additional Documents listed in Appendix 0 of this document. Letters of endorsement are not solicited and will not be considered if submitted.

Any proposed over-guide shall be clearly described and justified within the proposal page limit. All offered descopes, including a potential transition to HSO Infrastructure, shall be defined within a 2-page section outside the proposal page limit.

All pages, with the exception of the Budget Template, shall be formatted on 8.5- x 11-inch paper, with one-inch margins on all sides, single-spaced, with character (font) size not less than 11 points, and submitted in a single document in PDF format.

Should the proposing institution require a signature page, it shall be prepended as a cover letter to the proposal.

3.4 Proposal Submission

Each mission shall submit their proposal and other required documents no later than 11:59 PM US Eastern Time on November 1, 2022, and according to the following guidelines:

- The proposal, including all appendices, shall be submitted as a single file in PDF format through the NSPIRES website.
- The mission budget shall be formatted as a single Excel workbook according to the Budget Template provided and shall be delivered through the Box system.
- Instructions for submitting documents through the Box system will be transmitted to the missions individually by the Program Executive for this Senior Review.

3.5 Presentations to the Senior Review Panel

Each mission invited to the Senior Review Panel shall provide a mission presentation. This presentation should summarize the mission and its plans for the next three years, and should address any specific questions asked by the Senior Review Panel. Questions from the Senior Review Panel will be transmitted to the mission no later than one week prior to the presentation.

Each mission may supply no more than three mission representatives for the mission presentation. Mission presentations will be allotted 45 minutes total, divided as follows: 20 minutes for the oral presentation, 15 minutes for a discussion by the panel only, and 10 minutes for follow-up questions with the mission representatives. The role of the HPD Program Executive and Program Scientist for the Senior Review at the Senior Review Presentations is limited to answering programmatic questions posed by the Senior Review Panel.

Missions should consider the following guidelines to assist with the mission presentation:

- Oral presentations are to provide a forum for questions from panelists and answers from the mission representatives.
- Oral presentations should:
    - Assume the Senior Review Panel is familiar with the submitted Proposal Content.
    - Provide any significant updates, e.g., science results obtained since proposal submission.
    - Repeat the highlights of the proposals.
- Oral presentations should not:
    - Provide a full oral presentation of the Proposal Content.

4 Senior Review Panel

The Senior Review Panel will assess the scientific merits and performance of the mission described in each mission's proposal. The Senior Review Panel will review the following to assess the availability, usefulness, and usability of a mission's archival data sets and the current state of the spacecraft and ground systems:

- Mission presentations from the missions;
- Space Science Mission Operations (SSMO) report to describe the current state of the missions; and
- Heliophysics Digital Resource Library (HDRL) report to describe the flow of NASA mission data from the observatory into the NASA Archives for public use.

4.1 Post-Presentation Meeting of the Senior Review Panel

The Senior Review Panel will provide a brief and deliver an electronic presentation with preliminary findings to the Heliophysics Division Director on the last day of the meeting. The electronic presentation of the preliminary findings will be delivered to the Program Executive of the Senior Review.

The Senior Review Panel will deliver a Final Report to the Program Executive of the Senior Review when the final assessment has been completed.

It is anticipated that by March 2023, the Heliophysics Division Director will contact each of the proposing missions and provide a Letter of Direction. This Letter may include new budget guidelines and other specific instructions. Within 90 days from the notification of the results, each mission shall submit to the Heliophysics Division their plan for complying with the new guidance and instructions.

NASA will post the outcomes of the Senior Review to a public NASA website. The Heliophysics Division will ensure that key officials in international space agencies and other U.S. Government agencies are apprised of NASA's decisions resulting from the Senior Review.

The next Senior Review will be in three years, as required by Title 51 U. S. Code §30504, as modified by the NASA Transition Authorization Act of 2017 (P.L. 115-10), to reassess the operating mission portfolio. Missions selected for infrastructure operations will undergo programmatic review on a similar schedule.

5 Evaluation Criteria

The Senior Review Panel will assess the Proposal Content against the following criteria:

Criterion A: Scientific Success in Previous Mission Investigation

- **Factor A-1:** Success of previous science investigation. (Achievement of Science Objectives in the previous extended mission period, for missions returning to their second or later Senior Review; or achievement of prime mission Science Objectives, for missions proposing for their first extended mission. Missions transitioning to

management under Heliophysics Division from another organization will be assessed only on their Division-relevant investigation objectives.)

- **Factor A-2:** Performance of addressing any findings in the previous Senior Review. (The 2023 Senior Review panel will have access to the previous Senior Review report for a mission, and other information from that review as needed.) This factor will only be assessed for missions returning to the Senior Review.

Criterion B: Overall Evaluation of the Proposed Investigation (Science Investigation only)

- **Factor B-1:** Scientific merit and impact of the proposed in-guide science investigation.
- **Factor B-2:** Implementation merit of the proposed in-guide science investigation.
- **Factor B-3:** Relevance of the proposed in-guide science investigation to the scientific goals of the Heliophysics Division as defined in the Division's Strategic Objectives and the 2013 Heliophysics Decadal Survey.
- **Factor B-4:** Cost reasonableness of the proposed in-guide science investigation.

Criterion C: Contribution to the Heliophysics System Observatory

- **Factor C-1:** Quality of the archival mission science data products and associated documentation.
- **Factor C-2:** Synergy with and benefit to the Heliophysics System Observatory. This factor applies only to the planned observations and not any previous scientific return or proposed mission-funded science investigation.

Criterion D: Technical Implementation

- **Factor D-1:** Health of the mission and suitability of the mission operating model to maximize its contribution to the Heliophysics System Observatory. For this factor, the mission includes the spacecraft, instruments, and project-managed ground systems.
- **Factor D-2:** Cost reasonableness of the mission's operations model. This factor includes the ability to continue healthy operations within the in-guide budget.
- **Factor D-3:** Sufficiency of the management plan and, if applicable, necessity for the succession plan.

Criterion E: Inclusion, Diversity, Equity, and Accessibility

- **Factor E-1:** Mission Inclusion, Diversity, Equity, and Accessibility (IDEA) Plan. This factor applies to the mission's ideal state of IDEA, including in terms of mission activities, mission team structure, movement of individuals in/out of and within the mission team and succession planning. This factor includes any tailoring of institutional IDEA strategies to the mission's Plan.
- **Factor E-2:** Recent progress against the mission IDEA Plan. This factor assesses the mission's recent actions that have addressed and made progress against the mission IDEA strategy. This factor applies only to those missions that had developed an IDEA strategy before this Senior Review.

- **Factor E-3:** Planned progress against the mission IDEA Plan. This factor assesses the mission's plan to advance towards its ideal state of IDEA by the next Senior Review. This includes planned metrics and milestones, and the ability for upcoming actions to meet those metrics/milestones and to enable further progress after the next Senior Review.
- **Factor E-4:** Cost reasonableness of the mission IDEA activities.

Criterion F: Under-guide and Over-guide Requests (Informational Only)

- **Factor F-1:** Scientific merit and impact of any proposed over-guide science investigation.
- **Factor F-2:** Implementation merit of any proposed over-guide science investigation.
- **Factor F-3:** Scientific merit and impact of any proposed under-guide science investigation.
- **Factor F-4:** Implementation merit of any proposed under-guide science investigation.
- **Factor F-5:** Merit and impact of any proposed over-guide for mission operations.
- **Factor F-6:** Merit and impact of any proposed over-guide for the mission IDEA plan.

The evaluation of each mission will consider the following points:

- Criteria A-D are rated and weighted to provide an overall proposal rating.
    - For Science Investigations, the criteria are weighted as follows: Criterion A, 25%; Criterion B, 30%; Criterion C, 20%; Criterion D, 25%.
    - For Heliophysics System Observatory (HSO) Infrastructure, the criteria are weighted as follows: Criterion A, 25%; Criterion C, 50%; Criterion D, 25%. As HSO Infrastructure proposals do not have a science investigation, they are not evaluated against Criterion B.
- Criterion E is rated and tracked separately from the overall proposal rating. (Note: This may be incorporated into the overall proposal rating in the next Senior Review.)
- Criterion F is informational and unrated. It does not contribute to the overall proposal rating.
- Each evaluation criterion above will be assigned an adjectival rating based on the number and significance of the strengths and weaknesses, according to the following table:

Adjectival rating	Basis
Excellent	A thorough and compelling proposal of exceptional merit that fully responds to the objectives of this Call as documented by numerous or significant strengths and with no major weaknesses.
Very Good	A competent proposal of high merit that fully responds to the objectives of this Call, whose strengths fully out-balance any weaknesses and none of those weaknesses constitute fatal flaws.
Good	A competent proposal that represents a credible response to this Call, whose strengths and weaknesses essentially balance each other.
Fair	A proposal that provides a nominal response to this Call and whose weaknesses outweigh any strengths.
Poor	A seriously flawed proposal having one or more major weaknesses that constitute fatal flaws.

NASA will use the individual mission evaluations when considering the continuation decisions in this Senior Review. This will include:

- The assessment of the missions under consideration.
- The overall strength and ability of the Heliophysics System Observatory—including both missions in operation and development—to fulfill the Heliophysics Division priorities from FY2024 through FY2026, as represented in the 2020 SMD Science Plan and the context of the 2013 Heliophysics Decadal Survey.

6 Decision Process

The Senior Review Panel will write a Final Report of all reviewed missions for the NASA HPD Director. The NASA HPD Director will develop a response to the findings, including decisions on continuation or termination, and notify the following parties in sequence:

1. SMD Associate Administrator
2. Individual missions
3. The public, via the Final Report and NASA Response published on website linked below.

A Letter of Direction will provide each mission with their individual continuation/termination decision and further directions before the Final Report is posted. All public documents, such as the Final Report and the NASA Response, will be posted on the Heliophysics Senior Review page: https://science.nasa.gov/heliophysics/resources/senior-review.

6.1 Continuation

Missions selected for continuation will receive an approved plan identifying whether the mission will continue as a Science Investigation or HSO Infrastructure and a budget for the extended mission period, with preliminary direction for future years.

Missions proposing a Science Investigation may be selected for science funding, or for continuation as HSO Infrastructure. A Science Investigation may be funded at the in-guide budget, a descoped (under-guide) budget, or the in-guide budget plus NASA-approved over-guide requests.

Missions selected for continuation as HSO Infrastructure will not receive approval for a budget with funding for science research continuing more than 9 months after the Senior Review decision is delivered.

6.2 Termination

Missions selected for termination will begin executing their End of Mission Plan (EOMP) upon delivery of the termination decision, with end of operations expected about 9 months and no more than 12 months afterward. After the end of operations, missions will enter Phase F for up to 12 months. In Phase F, a significantly reduced budget will be available to complete mission activities to ensure the successful ingestion of all mission data into the designated NASA archive(s) and finalize other mission documents for public release (e.g., PDMP, CMAD).

A notification process will be followed for each terminated mission.

7 Further Information

For further information, please contact:

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7.1 Useful Links

Data archiving material:

Heliophysics Data Portal:
http://heliophysicsdata.gsfc.nasa.gov

Digital Object Identifier info:
https://datacite.org

7.2 Policy Documents

NASA Strategic Plan (2022):
https://www.nasa.gov/sites/default/files/atoms/files/fy_22_strategic_plan.pdf

SMD Science Plans (2020):
https://science.nasa.gov/science-red/s3fs-public/atoms/files/2020-2024%20Science.pdf

NASA Heliophysics Decadal Survey:
https://www.nap.edu/catalog/13060/solar-and-space-physics-a-science-for-a-technological-society

Scientific Information Policy for the Science Mission Directorate (SPD-41)
https://science.nasa.gov/science-red/s3fs-public/atoms/files/Scientific%20Information%20policy%20SPD-41.pdf

Heliophysics Science Data Management Policy
https://science.nasa.gov/science-red/s3fs-public/atoms/files/HPD_Data_Policy_Final_20220209_TAGGED.pdf

7.3 Templates

PDMP Template

CMAD Template

Budget Template (will be provided)

Appendix A

Proposal Content

This Appendix identifies the sections expected in each proposal and describes the requirements to be met and the content to be contained within them.

A1. Completion of Previous Science Objectives

All missions shall describe completion of their previous science investigation. This investigation includes either the Science Objectives proposed in the 2020 Senior Review, for those missions included in that Senior Review, or the prime mission Science Objectives, for missions proposing for their first extended mission.

A2. Proposed Extended Mission Science Objectives (Science Investigation Only)

Science Objectives

Science Investigation proposals shall present achievable Science Objectives (SOs) and describe the research plan that will lead to their completion. These SOs are narrowly focused scientific targets that are part of a larger strategy to achieve a Science Goal (SG). The mission team will achieve these SOs within the requested in-guide budget.

Proposals shall discuss how completion of these SOs would make significant progress on clearly defined SGs. They shall further discuss how those SGs address specific Heliophysics Division goals, as defined in the Division's Strategic Objectives and the 2013 Heliophysics Decadal Survey.

Each proposed Science Objective shall require using the proposing mission's data, is encouraged to leverage other HSO data, and may use non-HSO data. Proposals that require data, a facility, or other resources not under the direct control of the mission Principal Investigator (PI) or Co-Investigators shall include a discussion about the risk of resource availability for the mission's use during the period under consideration in this Senior Review.

Over-guide Requests (Optional)

Proposals may include additional achievable SOs, and the associated research plan that requires resources beyond the in-guide budget. The budget shall describe and justify an over-guide request for this increase in scope.

Under-guide/Descope Offers (Optional, up to 2 additional pages)

Proposals may offer descopes (under-guides) to reduce the mission budget while preserving the highest-impact SOs. Descopes for a transition to HSO Infrastructure can also be offered.

A3. Contribution to Heliophysics System Observatory

Both Science Investigation and HSO Infrastructure proposals shall discuss other science investigations enabled or enhanced by the mission's continued operations, either alone or with

other HSO components. These investigations are not expected to be completed by the mission team within the requested budget. All proposals shall also describe how continued operations would benefit the Heliophysics research objectives described in NASA's 2020 Science Mission Directorate Science Plan (Section 7 of this document). The mission *must* continue to produce meaningful and significant science data.

This discussion needs to include a plan for adjusting the mission orbit(s) and configuration if applicable; such adjustments may either facilitate synergy with other HSO components or address potential gaps in the HSO's coverage. The discussion should focus on investigations that require or benefit from a long observation period (e.g., related to the solar cycle, improving signal/to-noise on specific observations, etc.) or that benefit from the mission's particular data. These investigations could include improvements or extensions on those previously conducted with the mission data or address studies started with other mission data. The discussion should also address the risk of potential unavailability of other HSO resources. This discussion will be used to assess the mission's contribution to the HSO.

A4. Technical Implementation

Current Mission Status

Proposals shall contain the status of the various mission components, including the spacecraft bus, instruments, and ground system(s) (e.g., spacecraft control center, science center). The discussion should summarize the capabilities and health of the components and systems (including *but not limited to* propellant, power, consumables), instrument performance, and point out limitations to future science investigations as a result of degradation, aging, use of consumables, obsolescence, etc. If applicable, all missions proposing for a second or later extended mission shall describe how the mission addressed 2020 Senior Review feedback.

Anticipated Mission Operations

Any mission contemplating any change in orbital configuration (i.e., change of period, apogee, perigee, inter-spacecraft spacing, etc.), which even potentially would affect their current End of Mission Plans (EOMP), must work with their respective Center Safety and Mission Assurance (SMA) organization to ensure the contemplated changes do not do violate requirements levied under NPR 8715.6B, NASA Procedural Requirements for Limiting Orbital Debris and Evaluating the Meteoroid and Orbital Debris Environments or do not affect the existing EOMP.

Mission proposals shall describe any operational changes that require modifications of the EOMP *and will not* include the EOMP itself. HPD will work with the Center SMA organizations to document that the mission plans are up to date and compliant with the relevant requirements and processes.

A5. Management Plan

Proposals shall include the project organization and roles and capabilities of key personnel, including but not limited to PI/Project Scientist, Deputy PI/Deputy Project Scientist, and Project Manager. Changes in key personnel will be documented. The appointment of new individuals as key personnel deputies for training future PIs and Project Scientists is encouraged. NASA recognizes and supports the benefits of having diverse and inclusive scientific, engineering, and

technology communities and fully expects the reflection of such values in the composition of all teams.

Succession Plan (Optional)

A Succession Plan can be included in the proposal which provides a nomination for a replacement or successor of key personnel.

A6. Data and Code Management Plan

All missions shall adhere to the Science Information Policy for SMD (SPD-41) and the Heliophysics Science Data Management Policy (see links in Section 7 of this document).

Data Management

Proposals shall describe the state of the mission data and archiving process and the anticipated long-term (< 50 years) legacy of the mission data. This section shall document and discuss known data issues that impact the data's current and future usefulness or usability (e.g., instrument failures, incomplete calibrations, documentation). It shall describe the current and planned activities that support the data processing and archiving, including *but not limited to* calibration updates, data validation, interfacing with the end-user, the update of relevant documentation, and the potential publication of related papers.

All missions *must* fully and completely archive their data products in the NASA Heliophysics Data Archives. These data shall be of the highest quality produced by the mission and in a format that meets Heliophysics Science Data Management Policy requirements. At a bare minimum, deliveries shall include datasets in appropriate formats, SPASE descriptions for the data to allow them to be accessible and usable by both specialist and non-specialist users, and proper documentation.

The archival data products shall be described in the Project Data Management Plan (PDMP). The algorithms for the processing and calibration of the data shall be described in the Calibration and Measurement Algorithms Document (CMAD). This section of the proposal shall not unnecessarily repeat information in the PDMP or CMAD and will reference those documents as needed. Links to templates for the PDMP and CMAD can be found in Section 7.

Missions that have not archived all data products in a NASA Heliophysics Data Archive will each propose a plan to immediately initiate the transition of those holdings to said Archives. The plan shall describe the tasks, identify individuals responsible for the tasks, and provide a reasonable timeline.

Code Management

All missions shall provide a plan to release project-originated code under an open-source license and associated documentation. This requirement does not apply to:

- Calibration and processing codes that implement the algorithms described in the CMAD, unless there is significant utility in doing so.
- Code that originated outside of the mission and has contributed to the mission.
- Personal research code that is not useful to an end user or that is near-trivial to redevelop.

A7. Budget Narrative

The Budget Narrative shall discuss the proposed budgets, labor, major equipment, and other expenses for the in-guide budget, and explain in detail sufficient to allow insight into the incremental cost of each proposed task. The budget must include all project-specific costs, include costs supported by the project budget, NASA-furnished mission services, and direct or 'in-kind' services from non-NASA sources.

Budgets shall be submitted in using the NASA Planning, Programming, Budget, and Execution (PPBE) format provided in the attached Budget Template and shall cover a five-year planning window. The Budget Template contains instructions and the mandatory format for the budget portion of each proposal.

Each mission shall submit the required Budget Template for, at a minimum, an in-guide submission. If the current budget program guidance provided for any of the years under consideration is zero and the project is proposing to continue operations during that year, the proposal shall include an over-guide request to support that year's activities.

Any requests that exceed the in-guide allocation shall be detailed in over-guide requests, with each over-guide on a separate budget spreadsheet in the Template. Multiple over-guide requests may be listed within this section, and the proposal shall clarify any interdependencies between them. The proposal shall detail and provide a description of the additional tasks (as described in Appendix A2 of this document).

Missions are encouraged to identify possible descopes (under-guides) to their proposed plan. These descopes should be set to allow meaningful cost savings to NASA by substantively reducing the scope of the science investigation, if proposed, and of mission operations. These descopes may increase the risk of the mission. Depending on the nature of the descopes, the proposal may present these descopes as independent options, or cumulatively.

Any mission requiring the use of NASA High End Computing resources is requested to fill in the best estimates for those needs by fiscal year in the Budget Template, Sections VII and VIII. The units of accounting are Standard Billing Units (SBUs), the definition of which can be found at https://www.hec.nasa.gov/user/policies/sbus.html. Missions that require High End Computing assets but do not fill out these Sections of the Budget Template will receive a lower priority in access when allocations are made annually or will not receive an allocation.

A8. Proposal Appendices and Additional Documents

Each proposal shall contain a set of appendices that can be used to provide additional information for the review panel.

i. Acronym List
ii. Budget Template
    - Appended to the proposal shall be at least one spreadsheet. The Budget Template (provided as a separate document to this call) describes the mandatory format for the budget submission. The instructions for submitting the budget spreadsheet as a

separate document and a proposal appendix are found in Section 3.4, Proposal Submission.

iii. References

iv. Team Publications
   - List of relevant journal publications where the primary author is on the mission team or during the execution of the research.
     - When possible, a Digital Object Identifier (DOI) should be included.
   - It is recommended that the publication list should be listed in sequence with the most recent refereed publications first. The list should contain, as a minimum, the most recent papers over the past 2 or 3 years. It is appropriate to list papers presented at American Geophysical Union (AGU) and American Astronomical Society (AAS) meetings, other conferences, Ph.D. theses, etc., though these should be listed separately from the listing of the refereed publications.

v. External Publications
   - List of relevant journal publications from the past 3 years where the primary author is not, or was not during the execution of the research, on the mission team.
     - When possible, a DOI should be included.
     - Missions may identify, via bold font, publication co-authors that were mission team members whose work on the publication was supported by the mission.

A9. Required Document: Project Data Management Plan (PDMP)

The PDMP documents the evolving state of the mission data, metadata, and ancillary information to be archived for long-term use by specialists and non-specialists. It shall capture the data products produced by the mission's prime and extended mission operations, with specifications of applicable dates. The PDMP shall follow the template provided in Section 7 of this document.

This document is updated as necessary, recording any mission instrument and data set changes.

A10. Required Document: Calibration and Measurement Algorithms Document (CMAD)

The CMAD documents the evolving state of data calibration and processing for all final data products included in the PDMP. It describes the algorithms used (referencing publicly accessible papers or other documents, as appropriate) and directions for incorporating cited calibration files. The CMAD shall follow the template provided in Section 7 of this document.

A11. Required Document: Mission Inclusion, Diversity, Equity, and Accessibility (IDEA) Plan (up to 5 additional pages)

One of the strategic goals from the NASA 2022 Strategic Plan is fulfilling Presidential Executive Orders 13985 and 14041 through supporting participation by underserved communities in its technology programs and executive orders. NASA will continuously promote the incorporation and transformation of Inclusion, Diversity, Equity, and Accessibility (IDEA) into HPD culture and business practices.

The mission IDEA Plan is a strategy describing planned efforts to increase inclusion, diversity, equity, and accessibility. The Plan must include the following elements:

- Description of the mission's ideal IDEA state, including but not limited to
    - Mission team structure and activities;
    - Mission team participation, including movement of individuals into, out of, and within the team.
- Actions taken since the last Senior Review to make progress on the mission IDEA strategy, if a mission IDEA strategy was developed before this Senior Review.
- Metrics and milestones for mission activities to make progress on the mission IDEA strategy. These shall include expected dates and outcomes for steps taken to make progress on the IDEA strategy.
- Narrative on the implementation of the mission's IDEA strategy within the in-guide budget and justification of any requested over-guide budget.

Where a mission draws upon a participating organization's IDEA strategy, the Plan shall tailor that overarching strategy to the mission and provide mission-specific details for the other required elements.

It is understood that missions are at various stages of maturity with regards to an IDEA Plan and the accompanying implementation. Missions should present an assessment of their situation and present a plan with metrics and milestones for progress. It is not expected that a mission could reach its ideal state before the next Senior Review, but specific methods for progress shall be planned.

NASA expects to periodically review mission IDEA Plans (including but not limited to at future Seniors Reviews) to assess achievement of the milestones described.