

# Heliophysics Space Weather Vigil Focused Mission of Opportunity Solicitation

Pre-Proposal Conference  
*Overview of Vigil FMO AO and Solicitation Process*

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# Evaluation Organization

## Evaluation Panel

James Spann, Program Scientist  
Jamie Favors, Program Executive  
Science Mission Directorate (SMD), NASA Headquarters

## Science Evaluation Panel

James Spann, Program Scientist  
Jamie Favors, Program Executive  
Heliophysics Division, SMD

## TMC Evaluation Panel

Washito Sasamoto, Acquisition Manager (AM)  
Omar Torres, Backup AM  
NASA Science Office for Mission Assessments (SOMA)





# AO Objectives, Process



# Scope, Required

Science investigation

Focused, fully achievable science objectives

- A goal is understood to have a broad scope (*e.g.*, discover what causes the acceleration of the solar wind; discover the origin and what initiates a coronal mass ejection), while an objective is understood as a more narrowly focused part of a strategy to achieve a goal (*e.g.*, identify the specific drivers of space weather impacts in the near-earth environment that originate in the solar wind; identify key factors within the magnetosphere associated with pre-existing conditions that determine the geoeffectiveness of a space weather event).
- Proposed investigations must achieve their proposed objectives; however, the investigation might only make progress toward a goal without fully achieving it.

# Scope, Not Required

- Science Enhancement Option(s) are encouraged.
- Proposals may include Citizen Science as part of a Science Enhancement Option and may only be included in a proposal for the anticipated scientific results that it would produce and that will provide a necessary contribution to project-managed activities.



# Vigil FMO AO Objectives

The objectives of this solicitation are to

- Advance the research goals of the NASA Space Weather Program with a Focused Mission of Opportunity (FMO) investigation for a remote sensing and potentially other instrument(s) to be hosted as a NASA Instrument of Opportunity (NIO) on the European Space Agency (ESA) Vigil mission,
- Advance understanding of solar variability manifested as “the sudden release of magnetic energy that enables both flares and coronal mass ejections (CME) to accelerate particles to high energy efficiently”,
- Enable the development “of advanced methods for forecasting and nowcasting of solar eruptive events and space Weather”, and
- Make effective use of Vigil instrument data in the proposed investigation.

# Vigil-Complimentary Observational Objectives

## Context

- The selected investigation is expected to support objectives of the Vigil mission with the provision of low-latency observations for operational space weather applications, particularly observations of the solar atmosphere necessary to monitor and predict conditions determining space weather in the region of Earth.
- In the context of the Vigil baseline mission objectives, the solar atmosphere consists of the region between the photosphere and the near-radial corona. The FMO should fill in the observational gap between the Vigil mission's Photospheric Magnetic Field Imager (PMI) and the Compact Coronagraph (CCOR).
- Latency and cadence of FMO observations must be compatible with that of the baseline Vigil instruments.



# Vigil-Complimentary Observational Objectives

The priority Vigil-Complementary (VC) observational objectives are to:

- A. Identify the morphology of inner coronal structures including active regions, coronal holes, and quiet Sun. The observational cadence, resolution, field of view and temperature coverage should be sufficient to:
- Determine connection between PMI observations of the photospheric magnetic field and observations of extended coronal structures by the CCOR,
  - Evaluate the magnetic complexity and connection of coronal structures,
  - Define the structure of coronal holes sufficient to project the boundaries of high-speed solar wind streams, and
  - Establish the temperature of these structures sufficient to characterize their evolution.

# Vigil-Complimentary Observational Objectives

- B. Identify transient coronal activity including flares, prominence eruptions and markers of coronal mass ejections (CMEs) such as extreme ultraviolet (EUV) dimming. The observational cadence, resolution, field of view and temperature coverage should be sufficient to:
- Identify the active region associated with any X-ray flare of Class-C or greater,
  - Establish the magnetic connectivity of a prominence prior to eruption,
  - Determine the direction and speed of CME markers such as prominence, eruptions, coronal dimmings, and coronal streamer displacement,
  - Track the markers of Earth-directed CME to at least 1.8 solar radii.



# Science and VC Traceability Matrix

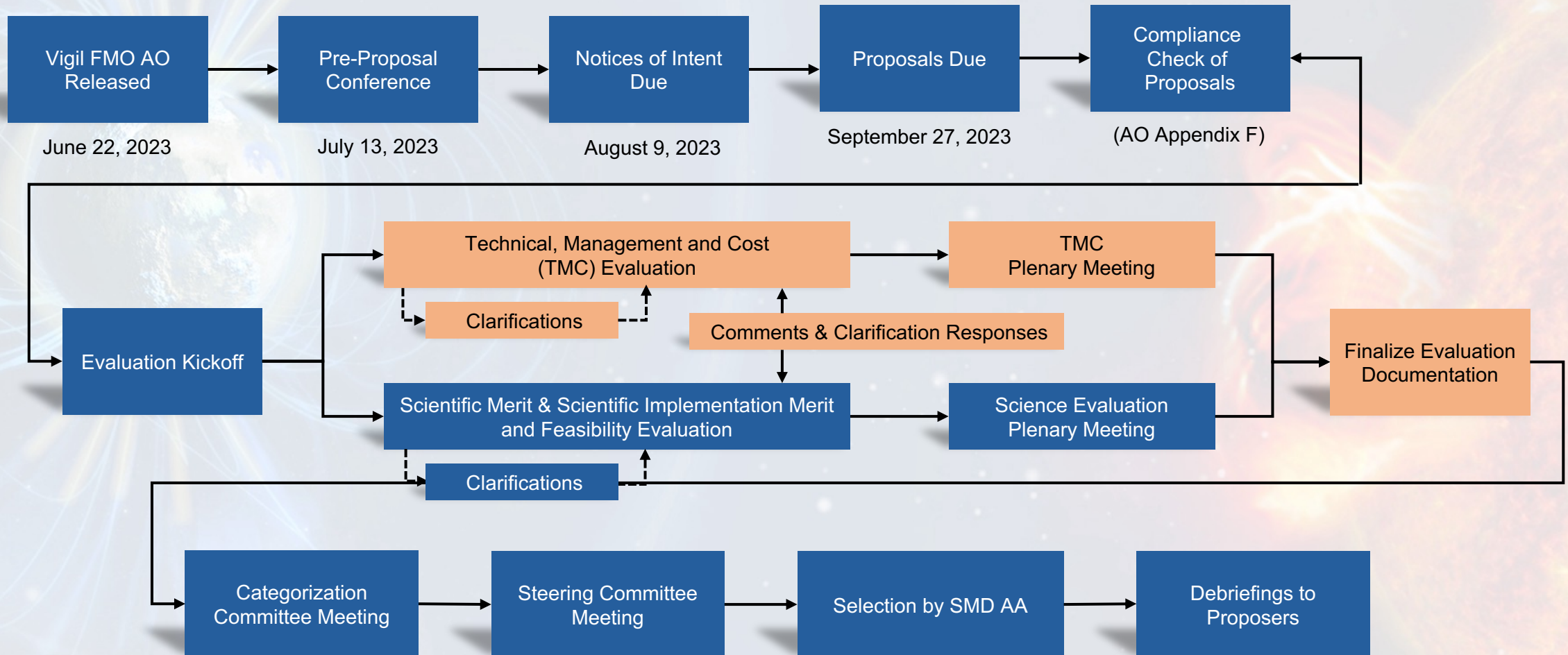
- Traceability from science and VC operations goals to measurement requirements to instrument requirements (functional and performance), and to top-level mission requirements shall be provided in tabular form and supported by narrative discussion. Projected instrument performance shall be compared to instrument performance requirements. Requirement B-17.

# Process

- Solicitation structure
  - One-step process - NASA intends to select one investigation
- Proposal submission
  - Mandatory NOI (9 August 2023)
  - Proposals submitted via NSPIRES (27 September 2023)
  - Augmented proposals, accompanying material via Box (29 September 2023)
- Clarification process
  - Material distributed, received via Box
  - Additional instructions will be distributed after proposal submission
- Selection process



# Process, Solicitation Flow





The background is a composite of three astronomical images. On the left, Earth's magnetic field is shown as glowing blue and yellow lines. In the center, a dense field of blue stars is visible. On the right, a close-up of a star's surface shows bright orange and yellow flames.

# **Additional AO Aspects**



# AO Overview

- In addition to meeting the unique investigation science goals and objectives, investigations will be required to address Vigil-Complementary (VC) observational objectives (Section 2.3.1).
- Level 1 science and VC operations requirements and Level 2 project requirements will be required as part of proposals and will be evaluated for their maturity (commensurate with the pre-Phase A nature of the concepts) (Section 5.1.5).
- An engineering model (EM) must be provided to ESA by the Engineering Model Delivery Readiness Date (Section 5.2.9 and Section 3).
- A structural-thermal model (S-TM) must be provided to ESA by the Structural-Thermal Model Delivery Readiness Date (Section 5.2.10 and Section 3).

# AO Overview

- Proposals led by non-U.S. institutions are not being solicited (Section 4.2.1).
- For contributions that are essential to the success of the proposed investigation or on the critical path, the proposal must include mitigation plans for the failure of the funding or contribution to materialize, to include holding fully encumbered reserves to develop the contribution directly (Section 5.6.6).
- The process for clarification of Potential Major Weaknesses has been expanded (Section 7.1.1).
- A Diversity and Inclusion Plan is required and will be evaluated according to Factor B-6 (Section 5.3.8).
- Minimum unencumbered cost reserves are 15% for Phase E (Section 5.6.2).



# AO Overview

- Class D payloads with cost or fixed-price incentive contracts and subcontracts with a value of at least \$20M and with an estimated life-cycle cost below \$150M, are granted a deviation from the Federal Acquisition Regulation (FAR) and NASA FAR Supplement (NFS) 1834.201 Earned Value Management Systems requirement (Section 4.6.2).
- Compliance with NASA-STD-1006A, Space System Protection Standard is now mandatory for all NASA missions (Section 5.2.6).
- Evaluation Factor C-3 “Adequacy and robustness of the flight systems” is not a consideration for this opportunity (Section 7.2.4).
- Student Collaboration is not being solicited (Section 5.5.2).
- Citizen Science is being solicited separate from the Baseline and Threshold Investigations, as a potential Science Enhancement Option (Section 5.1.7).

# Data, Software Management Plans

- Projects are subject to NASA guidelines regarding data and software publication
  - NASA Plan for Increasing Access to the Results of Scientific Research [PL NASA Plan for Increasing Access]
  - SMD Policy Document (SPD) 41a: Scientific Information Policy for the Science Mission Directorate [PL SPD-41a]
  - Heliophysics Division Science Data Management Policy [PL HPD SDMP]
- Data Management Plan documents data analysis, management, and archiving
  - Calibration, publication, archiving of data
  - Data latency period
  - Documents
    - Project Data Management Plan [PL PDMP template]
    - Calibration and Measurement Algorithm Document [PL CMAD template, SDO/EVE CMAD]
- Software Management Plan documents scientific software and tools [AO Req. 10]
  - Products (software, tools, documentation)
  - Open source release from inception (license, repository)
  - Management (testing process, responsible team members)



# Diversity and Inclusion Plan

- NASA has core value of Inclusion
  - Supports the benefits of inclusive and diverse communities
  - Expects that inclusion, diversity, equity, and accessibility values will be reflected in composition/culture of proposal teams
  - Published Strategic Plan for Diversity, Equity, Inclusion, and Accessibility
- Proposals must include a Diversity and Inclusion Plan
  - Presents broad goals, objectives, project activities (incl. specific actions), methods to assess and document progress
  - Tailored to issues the investigation team expects to encounter during the proposed work
  - Encouraged to leverage institutional resources, but shall tailor to project-specific details
- Plan will be evaluated in Factor B-6



The image is a composite of three distinct astronomical scenes. On the left, a view of Earth from space shows its blue and white surface, with a complex network of glowing blue and yellow magnetic field lines extending into the dark void of space. The background is a vast field of stars, ranging from small, distant points of light to larger, more prominent stars with visible diffraction patterns. On the right side, a large, vibrant nebula or star-forming region is depicted, characterized by intense orange, red, and yellow colors, suggesting high temperatures and active stellar processes. The overall composition is set against a deep, dark blue space background.

# Selection Process



# Categorization and Steering Committees

- NASA will convene a Categorization and Steering Committee
  - Categorization Committee, post-evaluation
  - Steering Committee, post-categorization
- Committees provide independent assessments within the solicitation process
  - Categorization Committee: Considers the evaluation results, categorizes the proposals for the Selection Official [AO §7.1.2]
  - Steering Committee: Assesses evaluation process, reviews results of proposal evaluation and categorizations
- Committees consist of only NASA Civil Servants and unconflicted Intergovernmental Personnel Act (IPA) appointees

# Selection Decision

- Selection Official is SMD Associate Administrator
  - May consult with senior members of SMD and the Agency concerning the selections
- Sponsoring Division prepares for the selection decision [AO §7.1.3]
  - Final evaluation results
  - One or more options for the selection decision
  - Selection recommendation
- Selection Official may consider a wide range of programmatic factors [AO §7.3]
  - Based on proposal categorization and evaluations, influenced by Division programmatic considerations
  - Overriding consideration will be to maximize scientific value while advancing NASA's science goals and objectives



The image is a composite of three distinct astronomical scenes. On the left, a view of Earth from space shows its blue and white surface, with a complex network of glowing blue and yellow magnetic field lines extending into the dark void of space. The background is a vast field of stars, with a prominent bright yellow star in the center. On the right side, a close-up of the Sun is shown, displaying its fiery orange and red surface with visible solar flares and a glowing corona. The overall color palette is dominated by deep blues, oranges, and yellows, creating a dramatic and scientific atmosphere.

**Questions?**



All further questions pertaining to the Vigil FMO AO  
MUST be addressed by email to:

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(subject line to read "Vigil FMO AO  
Questions")



