



COMMUNITY ANNOUNCEMENT: SPACE WEATHER COMMERCIAL OBSERVATIONS DEMONSTRATION

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1. Purpose and Overview

The Space Weather Commercial Observations Demonstration Community Announcement is being released to share planning information and inform the community of NASA's goals to release a Request for Proposal (RFP) in the future. This community announcement is not an RFP.

The primary goal of the Space Weather Commercial Observations Demonstration (SWxCOD) is to transition from traditional, single-mission deployments to a proliferated architecture of space weather observations that enable and drive improvements in space weather modeling and prediction. This program incentivizes partnerships between space weather instrument makers and commercial satellite operators to integrate space weather sensors onto existing or future commercial constellations. By doing so, we increase the global availability of critical data for researchers and forecasters by employing NASA's "Science-as-a-Service" model. Within the Space Weather Program, "Science as a Service" means identifying and developing commercially sourced observations that will improve space weather capabilities.

While NASA's Commercial Satellite Data Acquisition (CSDA) program successfully identifies, evaluates, and acquires existing commercial Earth observation datasets, SWxCOD operates strategically upstream. SWxCOD is specifically designed to share the risk of expanding on-orbit infrastructure by incentivizing the development, integration, and flight of new space weather instruments that do not currently exist in the commercial data marketplace. By co-funding the initial deployment phase and fostering new partnerships between payload developers and satellite constellation operators, SWxCOD actively incubates novel capabilities. Ultimately, SWxCOD serves as an engine for the commercial space weather ecosystem, generating unprecedented data streams that may eventually transition into sustained procurement models similar to CSDA.

Specifically, SWxCOD is a flight demonstration service designed to integrate and validate distributed, multi-point, high spatial and temporal resolution space weather observations and demonstrate their potential to improve space weather modeling and prediction, while aligning with commercial business models. An initial list of targeted observations is included in this announcement in section 1.1. NASA intends to award directly to commercial industry through



firm-fixed price contracts for delivery of targeted observations. Any specific observation requirements will be identified in the development of the RFP and shared in the future release of the SWxCOD RFP. The RFP will request that the prime contractor (industry) integrate payload(s) capable of providing needed space weather observations.

1.1 Targeted Observations

The demonstration focuses on filling critical observation gaps through a multi-vendor strategy, leveraging the unique scalability and rapid cadence of commercial space. The targeted observations identified for this effort are detailed below. These targeted observations are intentionally not over prescriptive at this time but during development of the RFP, some observational requirements may be levied to better define targets. The goal is not for a proposer to address all targeted observations, but rather to focus on a subset that best aligns with their capabilities and business priorities and addresses one or more of the identified observation gaps. Some targeted observations may be prioritized and refined during RFP development.

Thermospheric Mass Density (TMD): This data enables accurate satellite drag forecasts and collision avoidance warnings for Low Earth Orbit (LEO). NASA allows vendors broad flexibility in the observational methods used to derive this product. Solutions may include in-situ direct sampling (e.g., miniaturized mass spectrometers), inferred measurements using various classes of accelerometers (e.g., micro-g, nano-g, or novel atomic accelerometers), remote sensing techniques, Precision Orbit Determination (POD), or novel combinations of multiple measurement modalities. Regardless of the chosen measurement architecture, vendors are responsible for delivering the final TMD data product and must include robust estimates of their measurement uncertainties, accuracy, and precision.

Ionospheric Plasma Drift Velocity, Density, or Scintillation: High-resolution global state plasma density and ion drift data at low altitudes are required to nowcast and forecast GNSS loss-of-lock, positioning errors, and high-frequency (HF) radio disruptions. Commercial in situ probes, remote sensing techniques, or a combination of both can establish a continuous global web of ionospheric data.

Space Current Systems: Space current systems (e.g., field aligned currents, electrojets, etc.) are a key mechanism in magnetosphere-ionosphere coupling and are a root cause of geomagnetically induced currents (GICs) that threaten terrestrial power grids. Global monitoring requires high-density networks of satellites, making proliferated commercial constellations ideal hosts for these necessary magnetic field measurements.



Radiation Environment Monitors: In situ monitoring of Energetic Particle Precipitation (EPP) and Solar Energetic Particles (SEPs) is required to forecast Event Total Dose (ETD) and spacecraft charging hazards. Distributing dosimeters, solid-state detectors, and other radiation monitors across LEO constellations and throughout cis-lunar space provide the continuous, global coverage necessary to map radiation threats to satellite infrastructure and human spaceflight.

Auroral Imaging and Spectroscopy: Capturing the full conductivity pattern and Energetic Particle Precipitation (EPP) in the auroral zone is essential for calculating and predicting the magnitude of atmospheric heating events. This category includes spectroscopic measurements, both nadir-viewing and limb-viewing.

Airglow Measurement: Far Ultraviolet (FUV) and Extreme Ultraviolet (EUV) emissions, in addition to visible light techniques, infrared, microwave, or terahertz, provide vital remote sensing of ionospheric and thermospheric neutral composition, density, and temperature.

Space Working Environment: The LEO operational environment is increasingly threatened by lethal small orbital debris (SOD) (cm and below) that is not observable from the ground, of both anthropogenic and natural origin (meteoroids, dust). This category includes in situ detectors (e.g., impact plates), optical methods (e.g., glint, laser/lidar techniques) and inferred methods (e.g., signatures in attitude control systems or star trackers).

Note: NASA seeks to avoid the duplicate procurement of existing data. Therefore, datasets and telemetry already licensed and delivered under the NASA CSDA Program or equivalent non-NASA government data procurement mechanisms are excluded from this demonstration. However, offerings for new architectures, higher spatial/temporal resolutions, or novel capabilities targeting these same physical phenomena (e.g., advanced GNSS-RO or enhanced POD) are highly encouraged. Proposals, in response to the future RFP, will need to demonstrate how these architecture goes beyond current commercial data offerings to establish a new observational capability on orbit.

2. Programmatic Tenets

SWxCOD is built upon the following foundations:

- **Public-Private Partnerships:** The program incentivizes collaborations between instrument makers and industry by co-funding pilot projects that unite sensor developers and constellation operators. This approach accelerates commercialization and supports the growth of the on-orbit space weather ecosystem.



- **Industry-Led Architectures:** NASA empowers payload developers and spacecraft operators to design constellation and spacecraft architectures that suit their needs. Standardization is encouraged but not mandated, allowing for flexible interface solutions.
- **Commercial Ownership:** Ownership and operation of the observational infrastructure shift to the private sector, ensuring that industry can innovate and scale independently to provide streamlined solutions for future government data buys and commercial business cases. NASA focuses on enabling and supporting adaptive approaches that address evolving observational needs.
- **Data Availability:** All contracted operators must offer open-access data for research, ensuring seamless integration into modeling and forecasting tools. Depending on the specific observation, vendors may be required to provide relevant ancillary telemetry or metadata, which must also be completely open and non-proprietary.
- **Shared Deployment Risk (Incubation vs. Acquisition):** Unlike established data-buy programs that purchase data from mature constellations, SWxCOD shares the financial and technical risk of physically integrating and launching new sensor payloads onto commercial buses. NASA acts as a strategic partner to help cross the 'valley of death' between instrument prototype and commercial flight.
- **Decoupled Science:** SWxCOD focuses on deployment and data acquisition infrastructure, while data analysis is funded separately through Space Weather Program research elements.

3. Formulation Strategy

NASA's formulation strategy for targeted space weather observations centers on issuing a Request for Proposal (RFP) following comprehensive external community engagement, as detailed in *Engagement Approach*. This process ensures that stakeholder input shapes the requirements and expectations for observational capabilities, fostering alignment with industry expertise and operational realities.

3.1. Eligibility and Teaming

Future SWxCOD proposals will be limited to U.S. commercial entities. By restricting eligibility to domestic commercial providers, NASA aims to reinforce commercial practices and business tenets throughout the contracting process. This focus is intended to drive scalable architecture and innovative solutions that can be readily adopted for future government data acquisition programs. Limiting participation to U.S. companies increases the likelihood that operational



models, data rights, and technical standards will be compatible with federal procurement needs and support the growth of the national space weather ecosystem.

3.2. Contracting Approach

The RFP will intentionally avoid prescriptive technical specifications, instead emphasizing the desired outcomes for observation quality, coverage, and data utility. By focusing on observation results rather than detailed design mandates, NASA aims to encourage innovative solutions and adaptability within the industry. This commercial-oriented contracting approach is designed to promote flexibility, scalability, and market-driven solutions, ensuring that the selected architectures can evolve and be leveraged for expanded government data buy procurement structures in the future.

NASA anticipates a total program element budget of \$10M for this demonstration, with the intent of selecting up to two commercial teams for Firm-Fixed-Price (FFP) contracts valued at up to \$5M each. Additionally, SWxCOD is envisioned to solicit on a regular, near annual cadence so that rapid assessment of observations can be completed. This funding is structured to incentivize partnerships between instrument manufacturers and satellite constellation operators to achieve distributed, multi-point space weather measurements on orbit. By structuring contracts around clear, outcome-based milestones, NASA encourages commercial best practices and a results-oriented environment that can scale to future operational needs. This procurement model utilizes a milestone-based payment structure divided into two distinct phases.

- **Phase 1: Initial Deployment (2 Years):** Milestone payments tied to the deployment and demonstration of a minimum of 3-5 concurrent, multi-point observations on orbit.
- **Phase 2: Service Acquisition (1-Year Options):** Following the successful on-orbit demonstration in Phase 1, Phase 2 includes options for sustained observation periods and data delivery, supporting both pilot activities and ongoing data acquisition. This enables continued data utilization until assessment activity are completed and data procurement pathways are determined. Throughout this period, data will be ingested into space weather models to quantify its utility and demonstrate that the measurements improve space weather prediction in a meaningful way.

Unlike CSDA, which evaluates data from established on-orbit assets, SWxCOD's Phase 1 actively funds the physical integration and on-orbit commissioning of new sensors. Phase 2 then serves as a critical evaluation bridge: by ingesting this newly created data into space

weather models to quantify its utility, Phase 2 mimics the rigorous scientific evaluation processes used by established data-buy programs. Successful completion of Phase 2 prepares the vendor to enter long-term operational procurements.

SWxCOD is designed to incubate novel space weather observation capabilities. Upon successful demonstration and validation, new space weather data products may be considered for integration into NASA's CSDA program, leveraging CSDA's established acquisition, and stewardship processes for long-term operational adoption. This would shift responsibility for manufacturing, deploying, operating, and scaling these observational capabilities to industry, enabling commercial providers to establish the necessary business case, develop competitive offerings, and participate in the broader government data marketplace. In this way, SWxCOD will serve not only as a demonstration of individual capabilities, but also as a deliberate pathway for creating a sustainable commercial ecosystem capable of delivering proven space weather observations at the scale and continuity required for operational use.

3.3. Data Rights and Licensing

Procurement options for additional data through SWxCOD should follow SMD Policy Document SPD-41a. However, it will be critical to establish clear IP frameworks to protect commercial innovation while enabling scientific utility.

3.4. Utility Assessment and Science Validation Approach

The assessment and validation approach is to quantify the improvements these data products bring to space weather modeling and forecasting, ensuring that their utility is rigorously evaluated. To maintain objectivity and foster innovation, the scientific evaluation of these data products—including their usefulness and contribution to enhanced capabilities—will be funded through separate, dedicated research opportunities. This decoupled approach allows for targeted investigations that focus exclusively on the scientific merit and operational benefits of the new data streams, independent of the initial deployment and acquisition contracts. Ultimately, this structure bridges the gap between demonstration and operational adoption, enabling NASA to onboard new data products efficiently while maintaining high standards for scientific rigor and operational relevance.

4. Engagement Approach

NASA's Space Weather Commercial Observations Demonstration program element is dedicated to a transparent, collaborative, and market-responsive engagement process to support the



advancement of targeted observations in Section 1.1. NASA's engagement process is intended to foster a collaborative dialogue with industry and the research community, allowing stakeholder feedback to inform the development of a mature and clearly articulated RFP. Through this process, NASA seeks to identify and address potential concerns, risks, and implementation challenges early, ensuring that the solicitation is structured to maximize participation, encourage innovative solutions, and minimize unnecessary barriers to execution.

4.1. Targeted Industry Outreach

Following this announcement, NASA will conduct direct outreach to interested industry teams. Outreach efforts will focus on understanding interface maturity, data rights and licensing considerations, mission cadence, and expectations for future Firm-Fixed-Price (FFP) milestone-based service contracts—addressing key industry drivers that impact program success. Feedback gathered during community engagement activities will be used to refine the acquisition strategy and mature the RFP. NASA's objective is to produce a solicitation that clearly defines desired outcomes while proactively identifying and mitigating contractual, technical, operational, and business concerns that could otherwise hinder participation or program success.

4.2. Payload and Instrument Teaming

NASA will host group conversations with payload and instrument developers to facilitate connections with potential industry partners. These meetings are intended to identify collaborative opportunities, match technical capabilities with operational needs, and stimulate innovation across the payload and industry communities. The group format will help foster networking, exchange of best practices, and the development of joint solutions for space weather observations.

A layered approach will be employed to build coalitions on both the industry and payload sides. NASA will actively facilitate the creation and strengthening of alliances, supporting both instrument developers and constellation operators in forming mutually beneficial partnerships. This process will include structured opportunities for partnership evaluation, enabling stakeholders to assess compatibility and collaborative potential.

Throughout the engagement cycle, NASA will offer multiple opportunities for collaboration and partnership evaluation. By providing forums for open dialogue, technical exchange, and feedback, NASA aims to lower barriers to entry and support a dynamic, market-ready environment for instrument developers and satellite owner-operators.



4.3. Engagement Methods

NASA will use group discussion and one-on-one meetings as key methods of engagement. Group engagement sessions will provide a forum for discussion of programmatic tenets and technical gaps, while individual meetings will allow for tailored conversations addressing specific stakeholder needs and questions. These sessions are designed to ensure direct and meaningful interaction between NASA and its partners.

The Space Weather Program maintains a list of potential partners that we intend to engage with while we develop the RFP, if you would like to ensure your participation, complete the web form linked below.

<https://forms.gle/cvTGh82g4JW6JyUR8>

5. Anticipated Timeline

The Space Weather Program remains committed to a timely transition from announcement and initial engagement through to formal partnership establishment. The timeline for these activities is as follows.

- Information Gathering Sessions – Q1 CY27
- Release of the Draft RFP – Q2 CY27
- Release of the Final RFP – Q2 CY27