

NOAA NESDIS in the Next Decade: Space Weather Observations

NOAA
National Satellite and
Information Service

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NOAA's Next-Gen Earth Observation Strategy

Integrated, Adaptable, and Affordable: Orbits, Instruments & Systems

LEO

Miniaturized instruments on small, lower cost, and proliferated satellites and partner data improving forecasts through better and additional data. Better precipitation forecasts, wave height predictions, ocean currents, and more.

GEO

Continuous real-time observations supporting warnings and watches of severe weather and hour-by-hour changes. High-inclination orbits to observe northern latitude & polar regions.

Space Weather Obs.

Reliably monitoring space weather from all applicable orbits (e.g., L1, GEO, LEO, HEO, L5) to protect the nation's valuable, critical infrastructure. New capabilities at L5 and high earth orbit provide additional insight and improve forecasts.

Common Ground Services

Secure ingest of data in different formats from different partners requires a flexible, scalable platform. Common Services approach integrates cloud, AI, and machine-learning capabilities to verify, calibrate, and fuse data into new and better products and services.

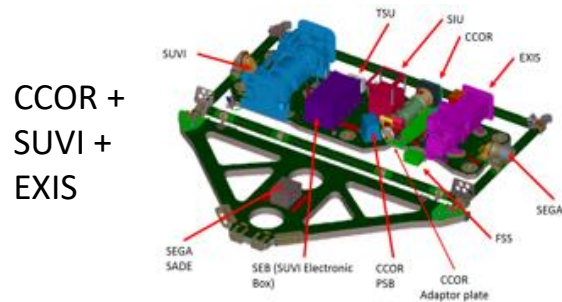


Space Weather Observations

- Pending Congressional approval, unifying NESDIS space weather activities into one effort
 - Will include Space Weather Follow-on program and continuity space weather observations on GOES-R series and on LEO programs such as COSMIC-2, POES.
 - NESDIS plans to manage all space weather observations under a single office, currently the Office of Projects, Planning, and Analysis
- Space weather observations continuity and product improvement are the mission goals of the office with two programs:
 - Space Weather Follow-on (SWFO) program executing
 - Coronagraph on GOES-U launch date 2024
 - SWFO – L1 observatory launch date 2025
 - *As proposed in the FY22 President’s Budget* -Space Weather Next (SW Next) program (Notional Schedule)
 - Program formulation: 2023
 - SWNext – L1 series first target launch date: 2028
- NOAA co-sponsoring next NASEM Solar and Space Physics Decadal Survey



Space Weather Follow On (SWFO) Program



CCOR on GOES-U Mission

Launch: 2024

Orbit: GEO

Instrument: CCOR on GOES-U solar-pointing platform

Command & Data Flow: GOES-R Ground System

Establish operational capability and continuity of Sun CME imaging observational requirements with multiple platforms; primary operational objectives:

- Observe CME parameters, shape, density and velocity
- Produce CME characteristics for input into operational heliospheric propagation code
- Enable space weather watches, warnings, forecasting and predictions



SWFO-L1 Mission

Launch: 2025 (ride share with NASA IMAP)

Orbit: Lagrange Point 1 (L1)

Instruments: CCOR, XFM, Solar Wind Instrument Suite (SWiPS, MAG, STIS)

Command & Data Flow: SWFO Ground System

Establish operational capability and continuity of space weather observational requirements with multiple platforms; primary operational objectives:

- Coronal White Light Images for detection of CMEs
- Observe CME parameters, shape, density, velocity
- Produce CME characteristics for input into operational heliospheric propagation code
- In situ solar wind measurements
- Measure solar wind magnetic field, thermal plasma, and energetic particles

Space Weather Next (SW Next) Program

- NESDIS is formulating the proposed SW Next program to implement NOAA's next generation of space-based space weather observations
 - ❑ NESDIS plans to manage all space weather observations under a single office, currently the Office of Projects, Planning, and Analysis
 - ❑ NESDIS plans to jointly implement SWFO and SW Next in FY22 through a joint NOAA-NASA effort at Goddard.
- SW Next will be responsible for the innovations in space weather observations to continue and enhance capability :
 - ❑ User Engagements to ensure meeting user needs
 - ❑ Investigate advanced operational concepts for deployment of new observing systems
 - ❑ Development of capabilities to continue observations and address unmet and emerging requirements
 - ❑ Modernize space-based architectures to utilize new cost-effective technologies

