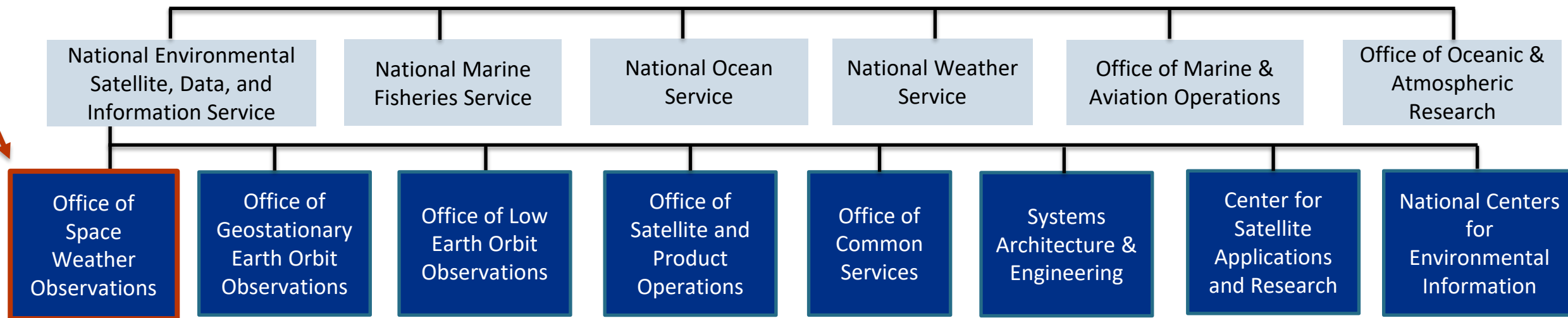


# Introduction to SWO

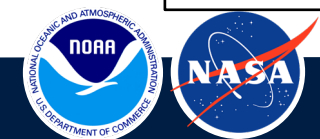
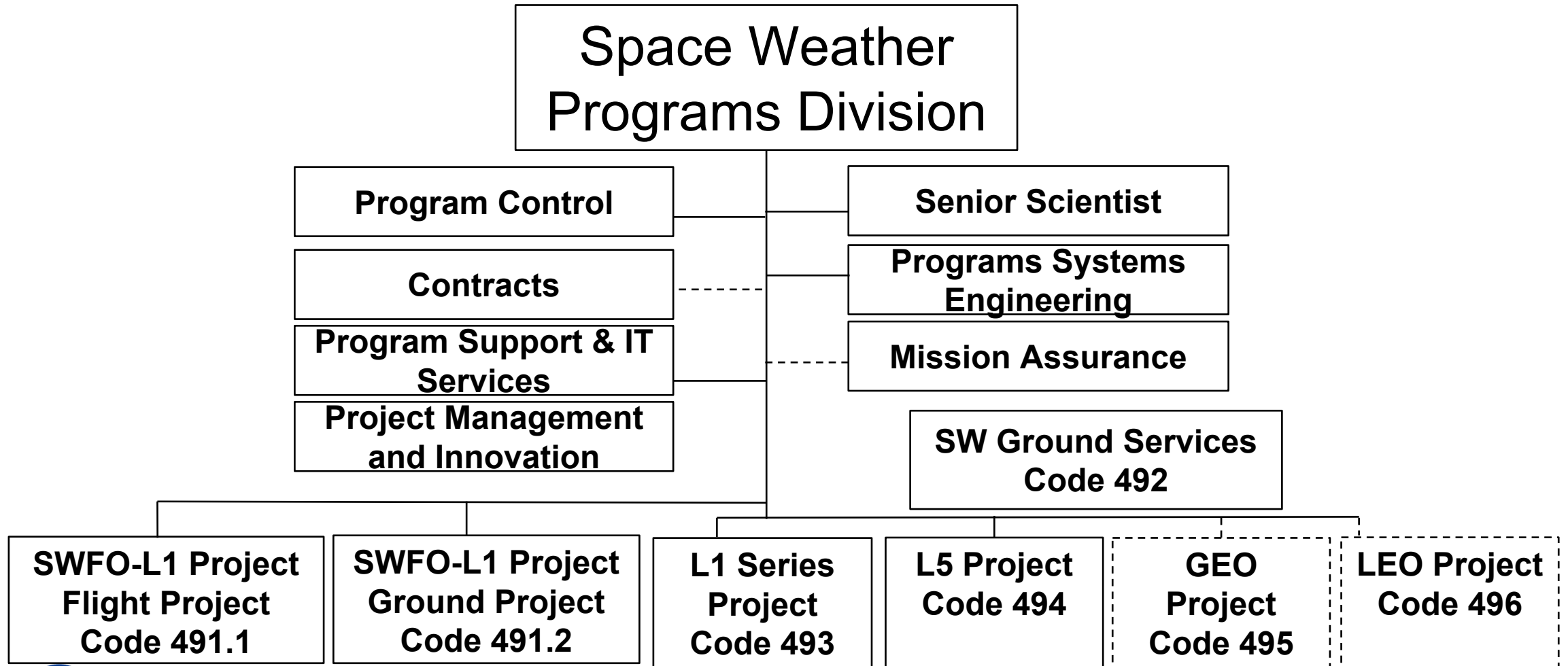
Elsayed Talaat  
Director, Space Weather Observations

# Office of Space Weather Observations

- The 2023 Consolidated Appropriations Act establishes the Office of Space Weather Observations (SWO) (Renaming the Office of Projects Planning and Analysis).
- SWO manages two major programs: Space Weather Follow-on (SWFO) and Space Weather Next (SW Next).



# NOAA/NASA Joint SWOPD GSFC Code 490





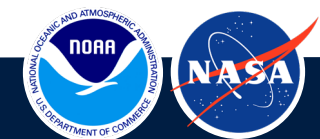
# 2 Major Programs



SPACE WEATHER NEXT

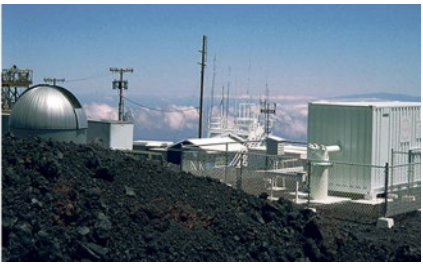
**SWX**

NOAA - NASA





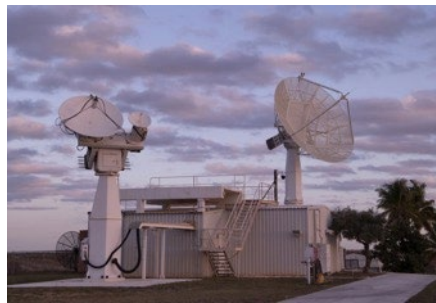
# Critical Ground- and Space-based Observation Capabilities



**GONG** – NSF/NSO-NWS  
NOAA now supporting operations

**Ground-based Magnetometers** – USGS  
Critical input to SWPC’s geomagnetic storm products

**Neutron Monitors** – NSF and Academia



**Solar Electro-Optical Network (SEON)** – USAF

**DSCOVR** – NOAA

**COSMIC-2; RO** – TASA & NOAA; Commercial

**GOES** – NOAA  
GOES U - NRL  
Coronagraph in 2024



**Solar Dynamics Observatory** – NASA

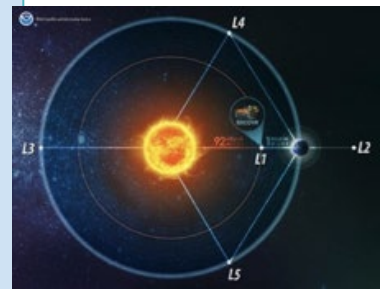
**Advanced Composition Explorer** – NASA

**Solar & Heliospheric Observatory mission (SOHO)** – NASA-ESA



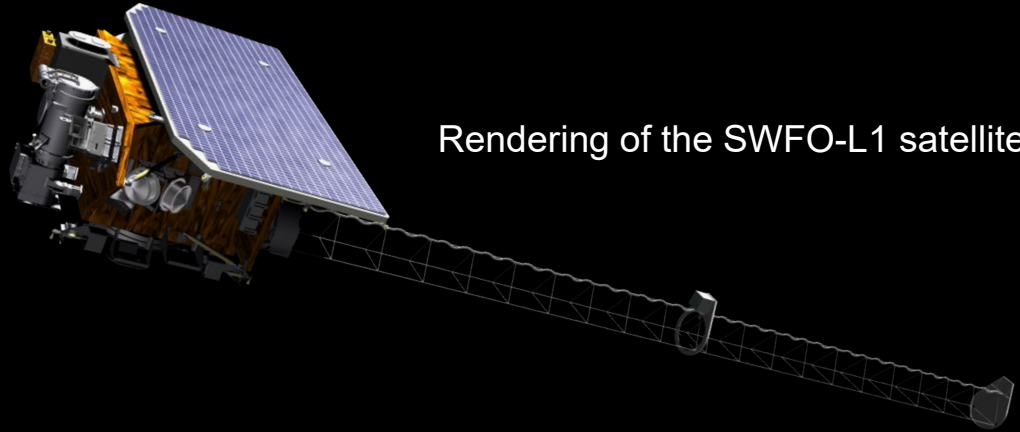
**Vigil L5 (Future)** – ESA (TBD)

**Space Weather Follow-On and Space Weather Next (Future)** – NOAA  
Rideshare to L1 with NASA’s IMAP in 2025

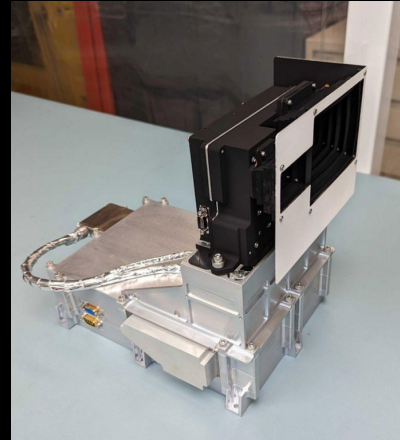




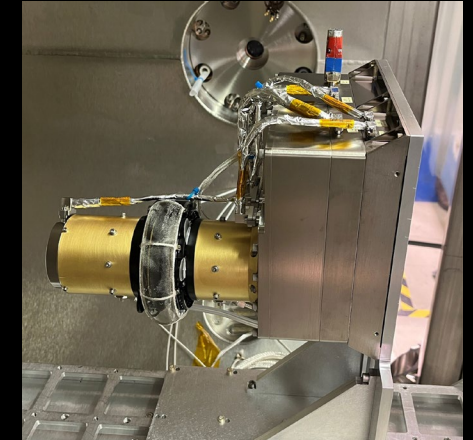
# SWFO-L1 spacecraft to launch in April 2025 will be the first of a satellite constellation needed to replace aging satellites at L1



Rendering of the SWFO-L1 satellite



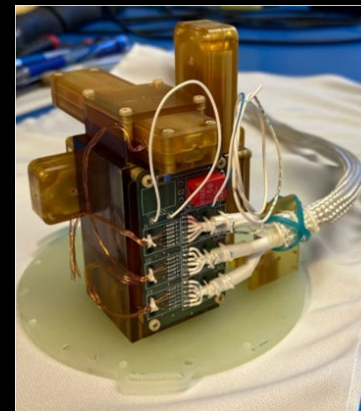
SupraThermal Ion Sensor (STIS)



Solar Wind Plasma Sensor (SWiPS)



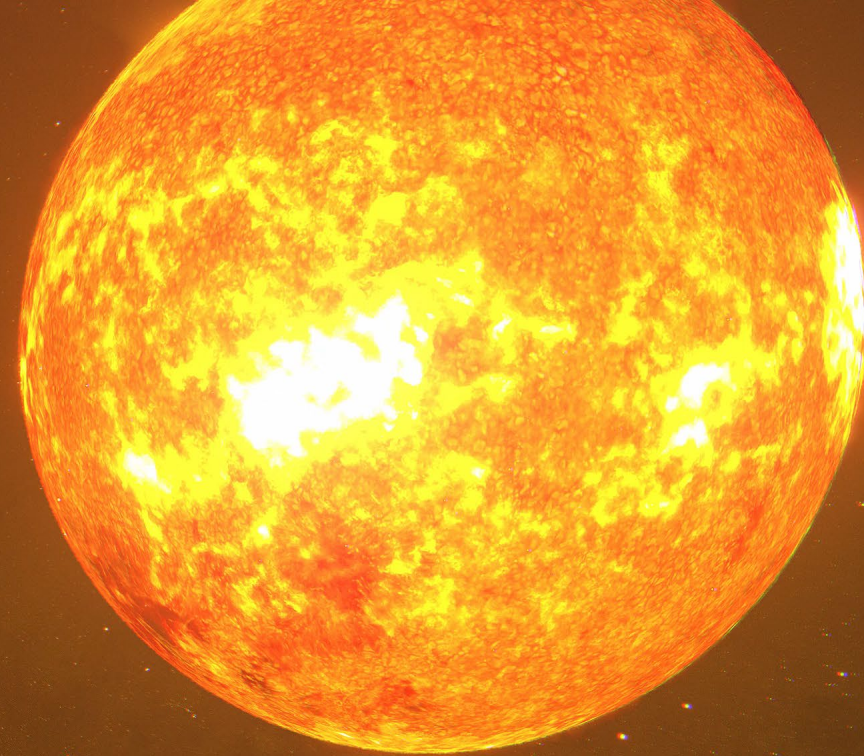
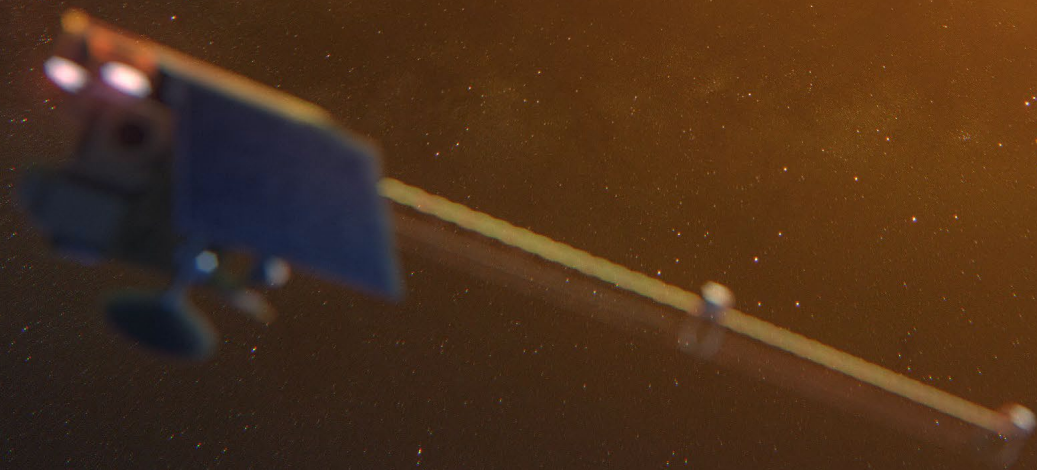
Compact Coronagraph (CCOR) installation on SWFO-L1



Magnetometer (MAG) Sensor



SWFO Antenna







# NOAA Space Weather Satellite Programs

## Continuity of Space Weather Observations

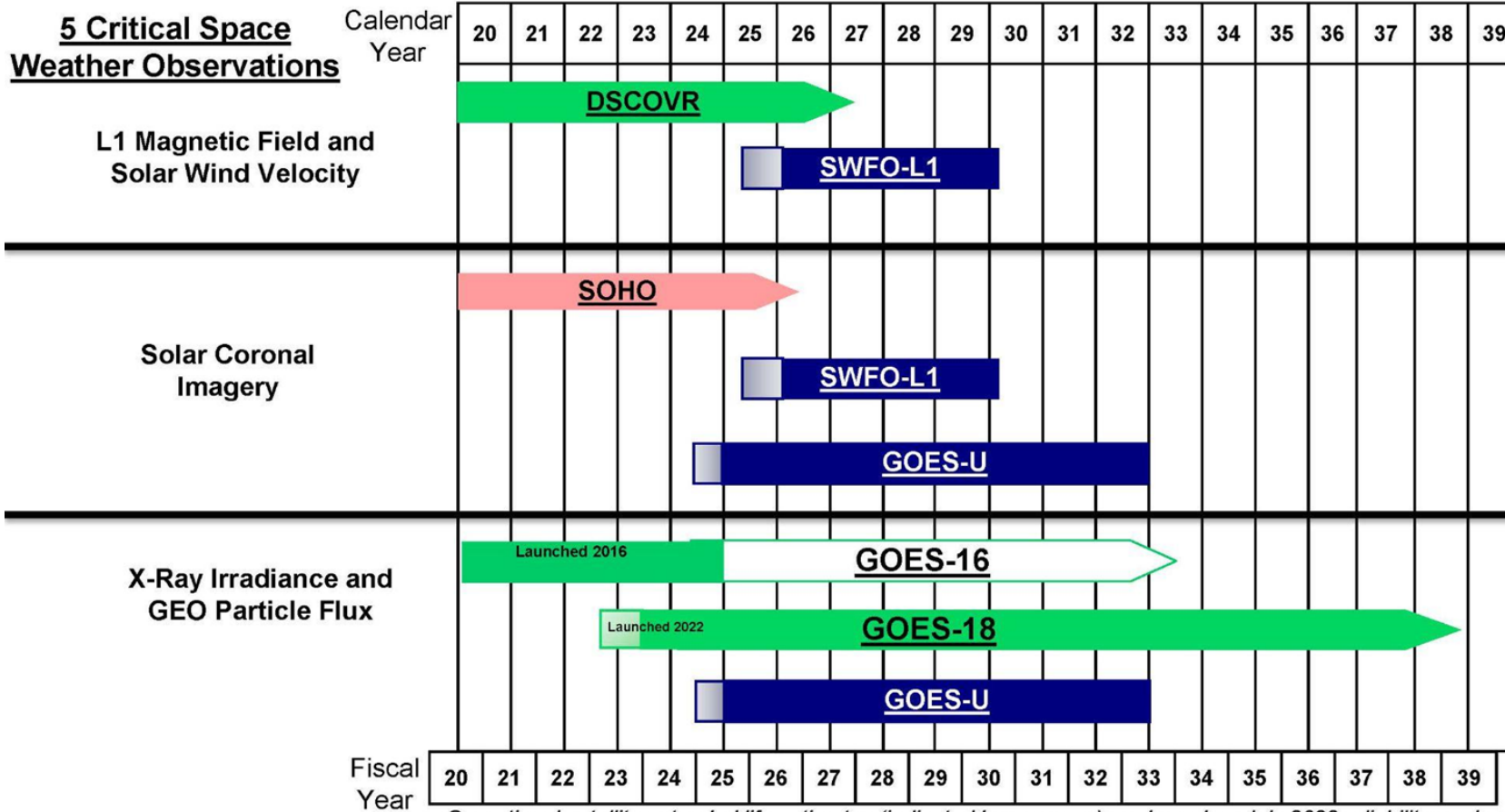


Click a satellite's name for the current status.

As of February 2024

### 5 Critical Space Weather Observations

Calendar Year



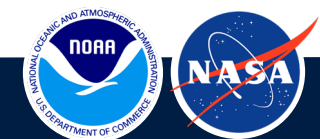
Fiscal Year

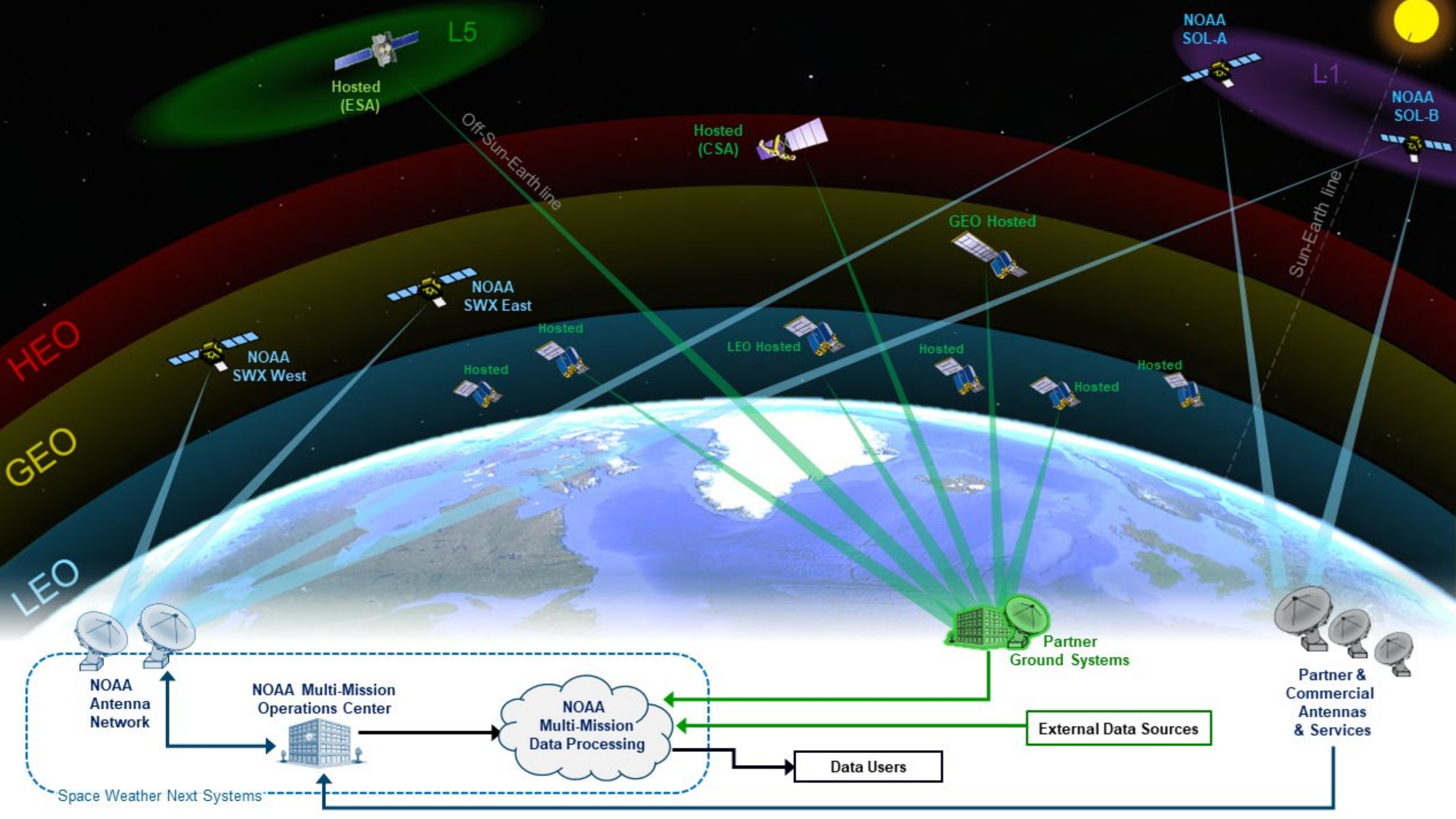
- Key**
- In-orbit and operational
  - Partner Mission
  - In-orbit Storage
  - Planned mission life
  - Planned in-orbit checkout

Operational satellite extended life estimates (indicated by an arrow) are based on July 2023 reliability analyses (60% confidence) for satellites in orbit for at least one year.

GOES: Geostationary Operational Environmental Satellites  
 DSCOVR: Deep Space Climate Observer  
 SOHO: Solar Heliospheric Observatory (ESA)

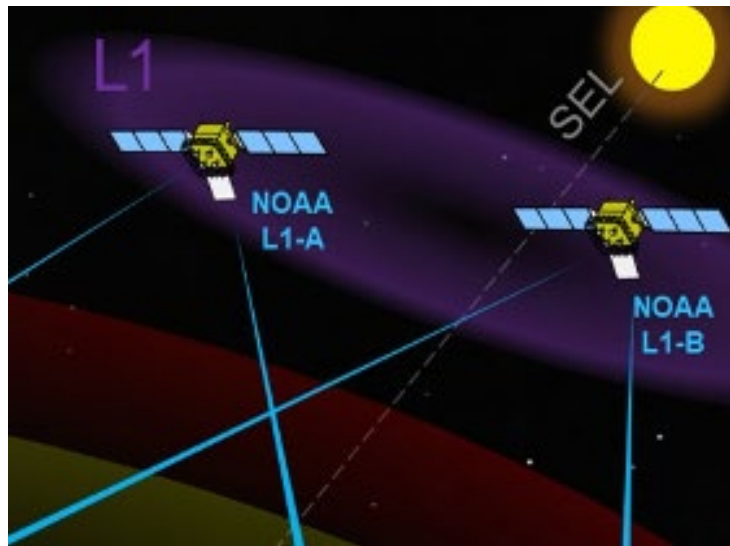
Approved:   
 Assistant Administrator for  
 Satellite and Information Services





# Space Weather Next L1 Series Project Overview

- **Two spacecraft, L1-A and L1-B on the Sun-Earth line at Lagrange 1**
  - Independently launched payloads on dedicated LVs
  - 3-axis stabilized / sun pointing
  - S/C wet mass < 500 kg
  - Operating Power: 700 W
  - X-band downlink at 450 kbit/sec: X-band uplink w/ ranging
  - Extend and adapt SWFO ground segment for antenna network command and control
  - Product Operations will be in NESDIS Common Cloud Framework

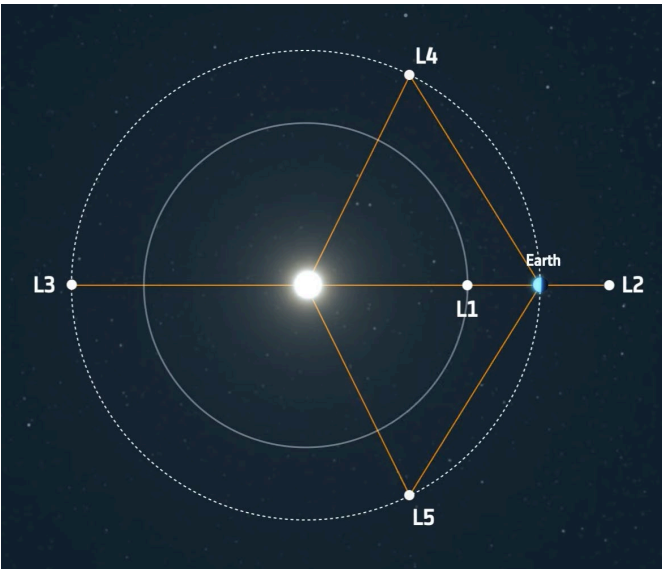


Instrument	Status
<b>Coronagraph</b>	Five vendor studies of a Commercial Coronagraph are underway
<b>Solar Wind Plasma Sensor</b>	Adapt from SWFO-L1 requirements
Suprathermal Ion Sensor	
<b>Magnetometer</b>	
<b>X-ray Flux Monitor</b>	ESA-contributed, flown on L1-A only
<b>X-ray Irradiance</b>	Solicitation to be developed for L1-B mission
Instrument of Opportunity (IoO)	Both missions scarred for IoO



esa

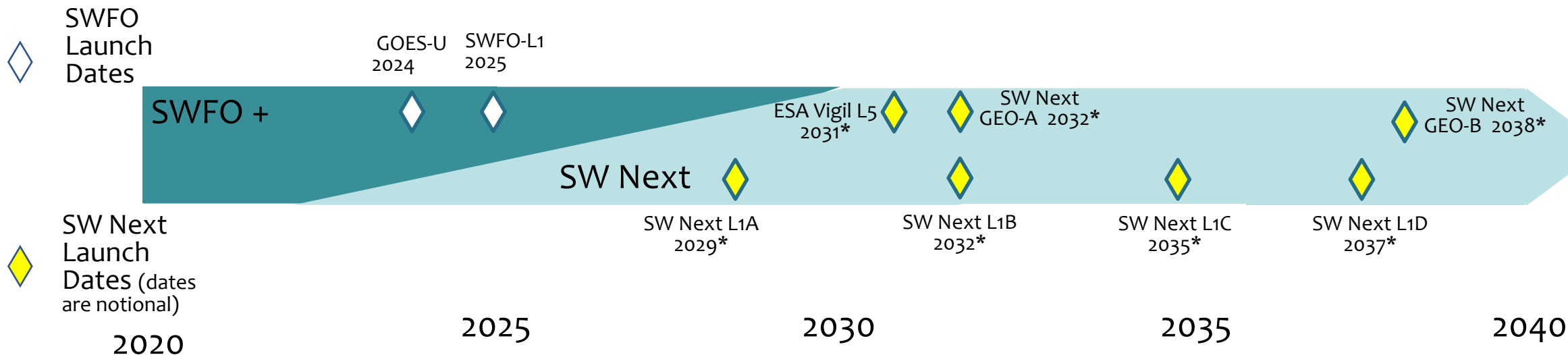




## NESDIS provision of a Compact Coronagraph (CCOR-3) will fly on the Vigil mission to L5

- CCOR-3 is **being built** by NRL as a near-copy of the CCOR-2, which is to fly on SWFO-L1.
- There is an agreement **to exchange data** from all SWFO and Vigil instruments
- **The L5 Project will manage the CCOR-3** development effort, the integration of the instrument into the ESA mission, and the development of data services.
- Launch (planned) for **2031**
- The first of its kind, Vigil will keep constant watch of the Sun where it can **see the 'side' of the Sun and observe activity on the surface of the Sun days before it rotates into view from Earth.**

# Preparing for a Space Weather Ready Nation



- Current **notional, unofficial** flyout chart of our planned SWO architecture
- The first SW Next L1 launch is planned to overlap with SWFO for calibration and validation
- Planned architecture supports resiliency of observations at L1 and at GEO for critical observations

# A Planetary System Observing Challenge

