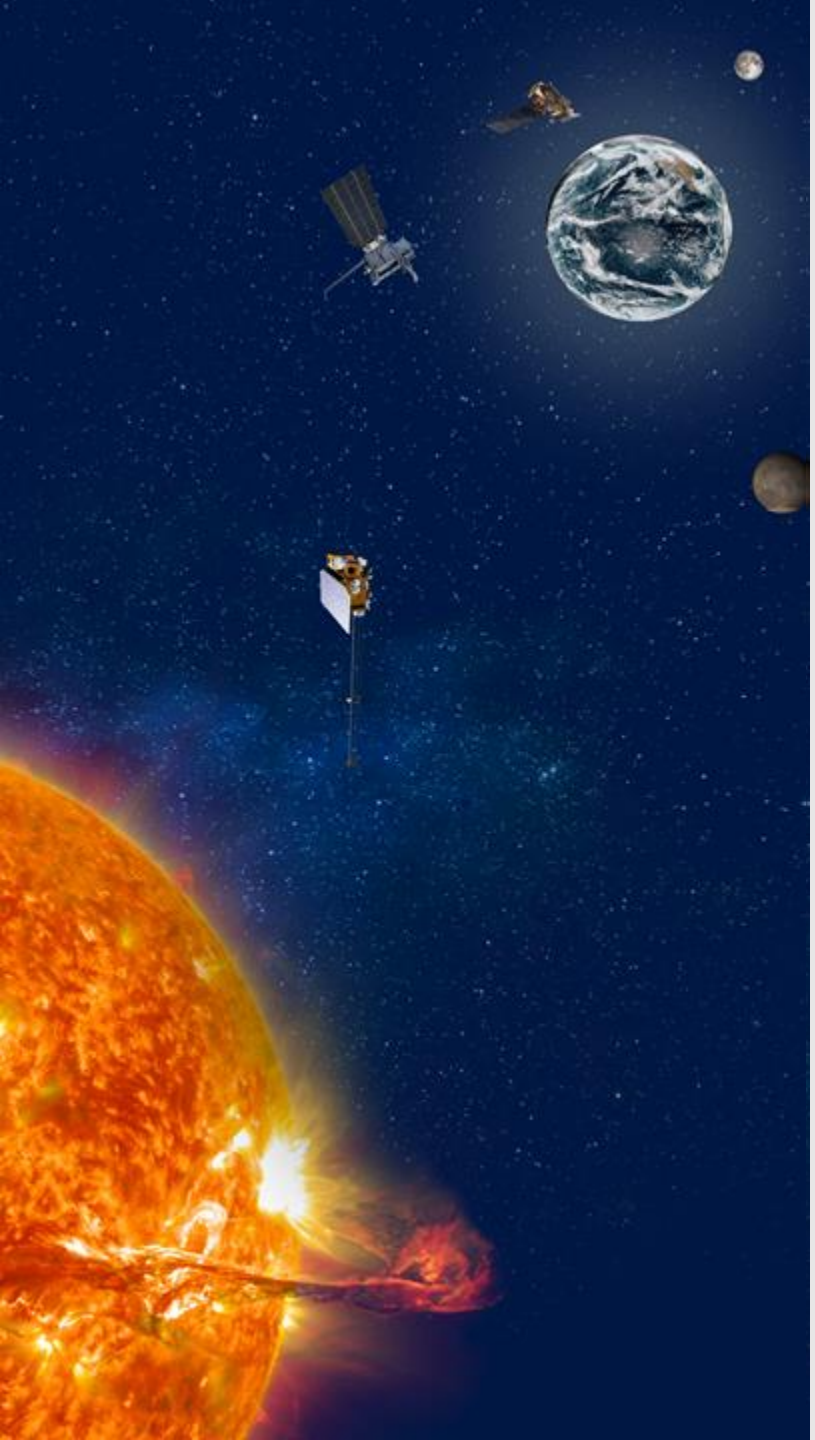


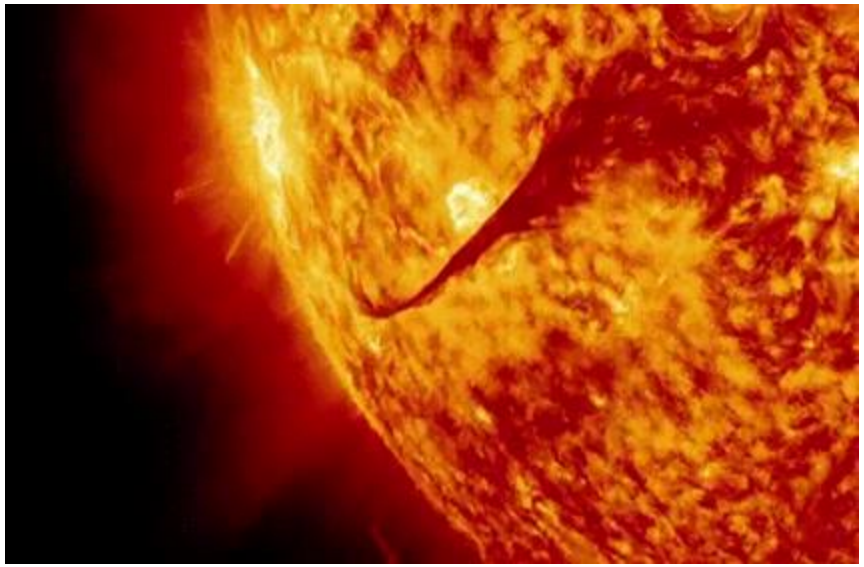
Space Weather Next – L1 Series

Dr. Yaireska (Yari) Collado-Vega
Project Scientist
NOAA-NASA Space Weather Observations Office
NOAA/ NESDIS

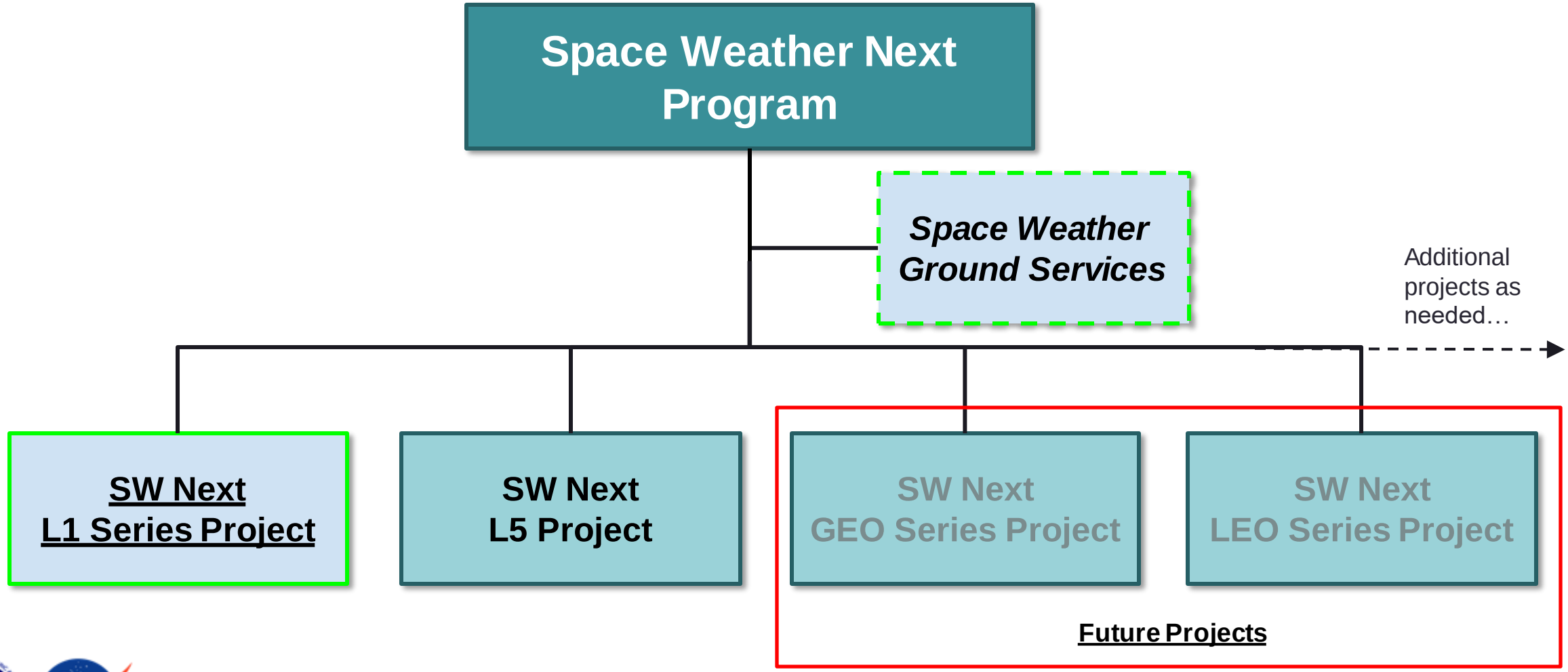
NOAA's Space Weather Role

NOAA's responsibilities include:

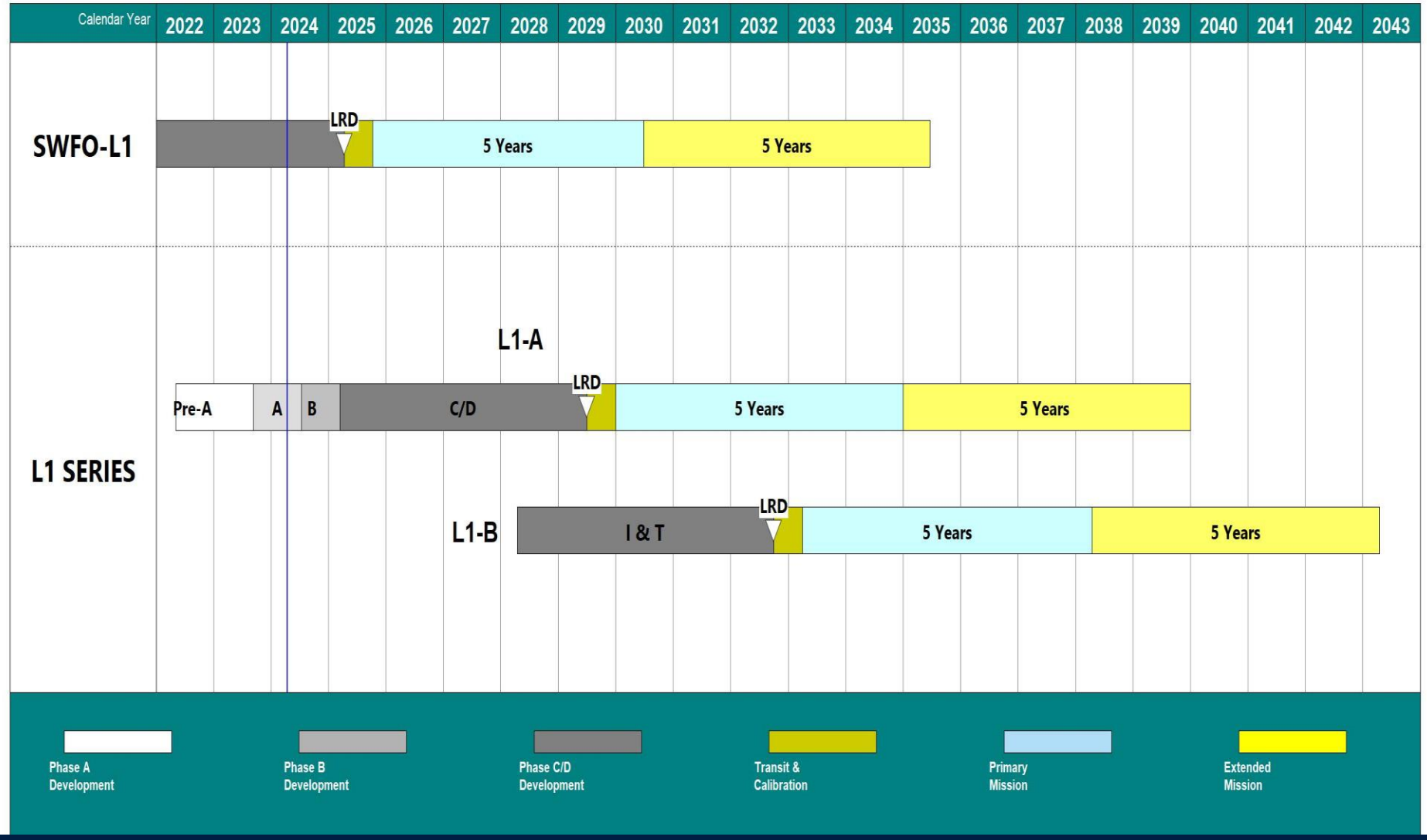
- provide operational space weather monitoring, forecasting, and long-term data archiving and access for civil applications,
- maintain ground-based and space-based assets to provide observations needed for space weather forecasting, prediction, and warnings,
- provide research to support operational responsibilities, and
- develop requirements for space weather forecasting technologies and science.



SWO's SW Next Program Organization



Notional Flyout of L1 Series Missions

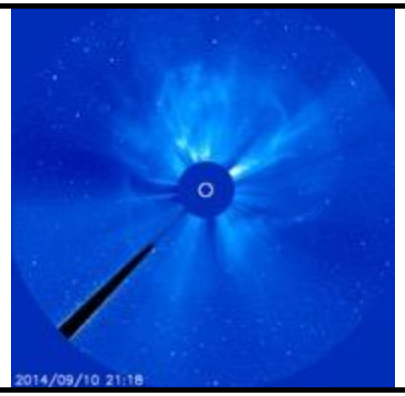




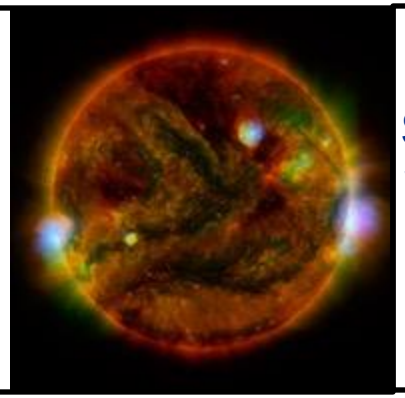
L1 Series Science: Sun and Heliosphere Areas

Solar Observations

Coronal imagery

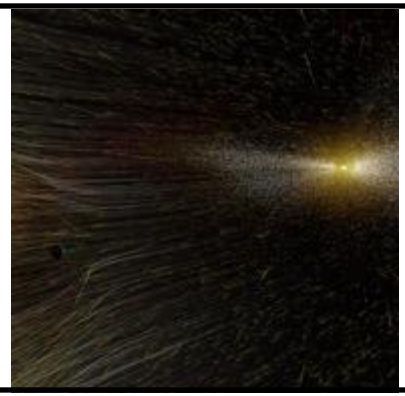


X-ray emissions

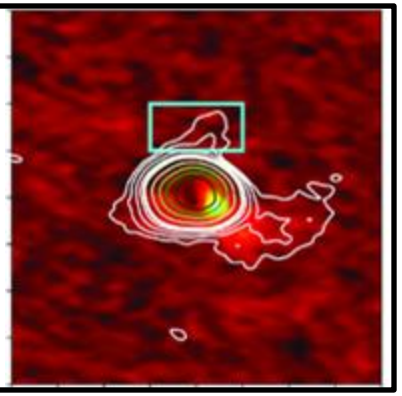


Heliospheric Observations

Solar wind

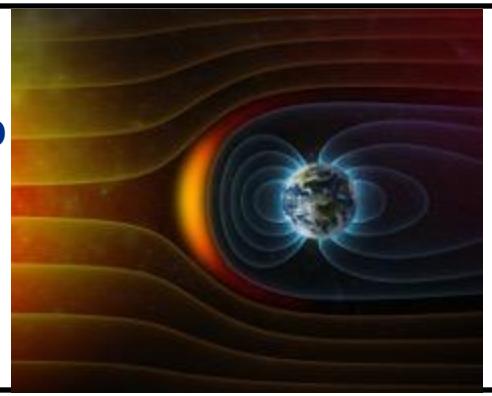


Heliospheric B-field

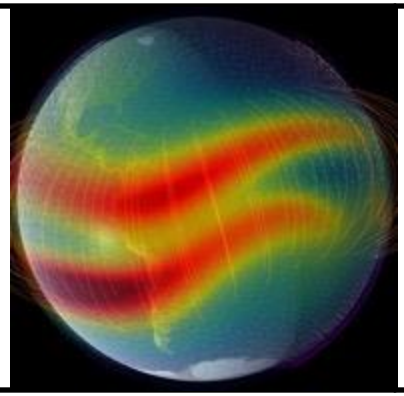


Drivers of Geospace Weather

Magneto sphere

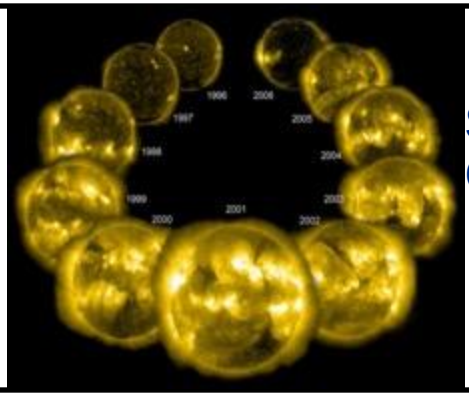


Iono sphere

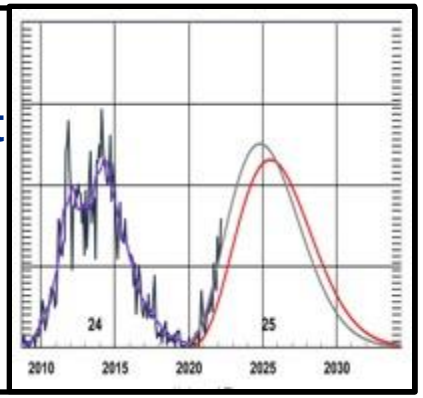


Long-Term Variations

SC-25

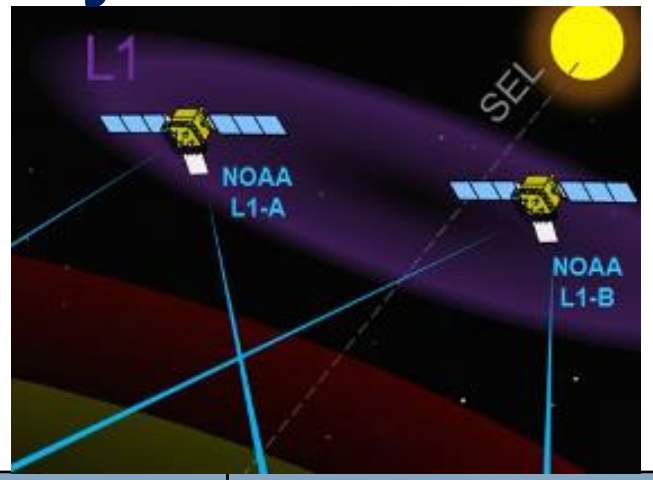


Sunspot Cycle



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
  - X-band downlink at 450 kbit/sec: S-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



Milestone Event	Date
Mission Concept Review (MCR)	Mar 2023
Systems Requirements Review (SRR)	Sep 2024
Preliminary Design Review (PDR)	Jun 2025
Critical Design Review (CDR)	Mar 2026
Systems Integration Review (SIR)	Apr 2027
Pre-Environmental Review (PER)	Sep 2027
Pre-Ship Review (PSR)	Jun 2028
Launch Readiness Date (LRD)	Jun 2029
Post Launch Acceptance Review (PLAR)	Dec 2029

A	B	C	D

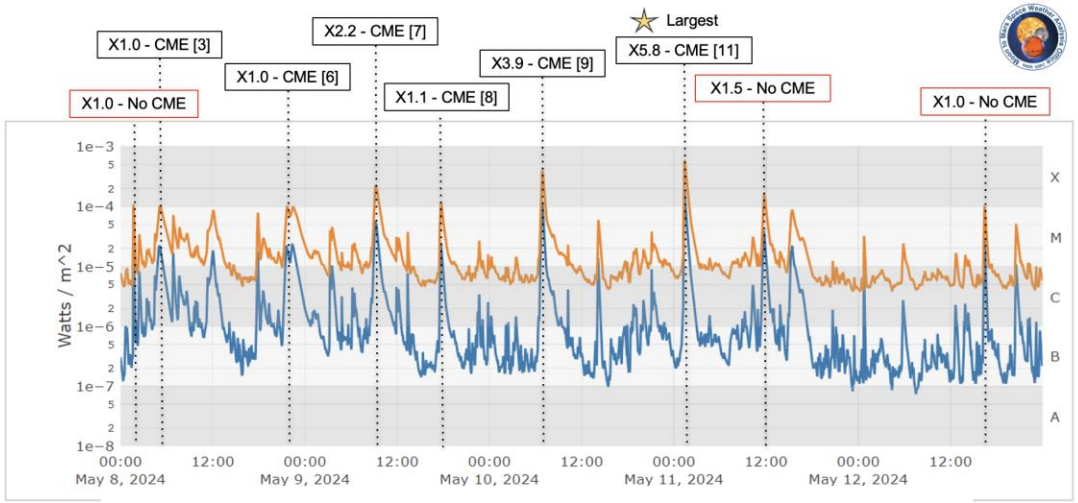
[Ref: SW Next Program Objectives document, Table 3, March 2023]

Instrument	Status
Coronagraph	**Blackout Phase**
Solar Wind Plasma Sensor	
Suprathermal Ion Sensor	
Magnetometer	
X-ray Flux Monitor	ESA-contributed, flown on L1-A only
X-ray Irradiance	RFI Open
Instrument of Opportunity (IoO)	Both missions scarred for IoO

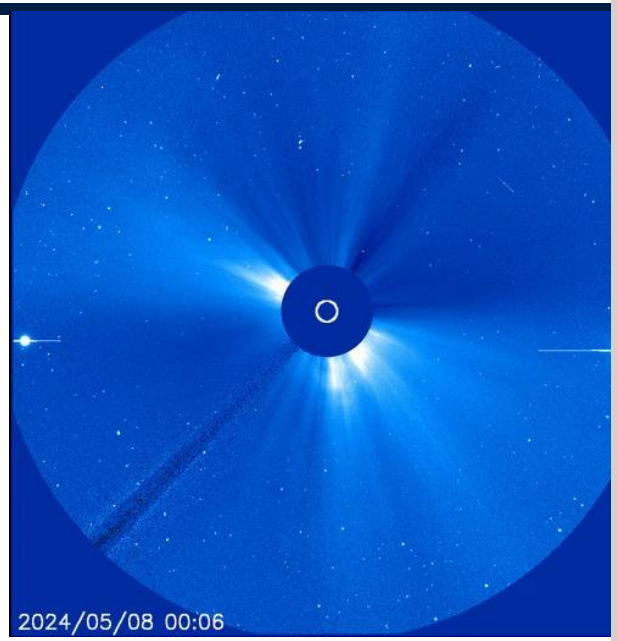
XRIS RFI https://sam.gov/opp/18d06a31717340f9a466509885ed5870/view

Lagrange 1 (L1) Series Project Observations

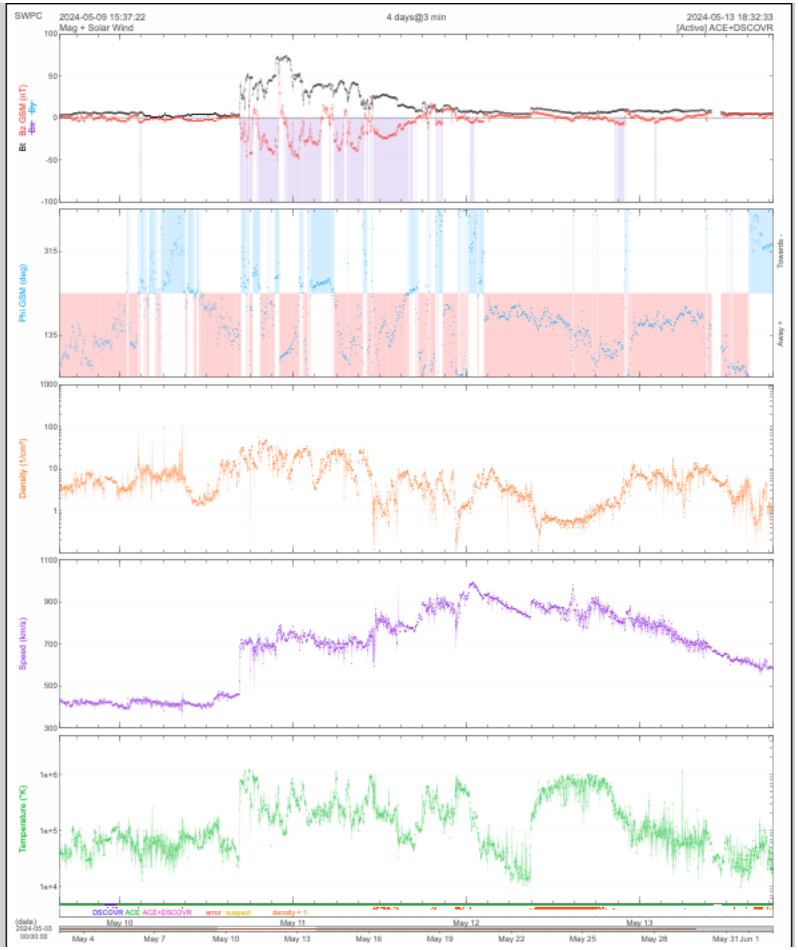
Looking at the latest G5 Geomagnetic Storm (Gannon Storm)



GOES Primary X-ray Flux



SOHO LASCO C3



L1 Series will provide continuation of real time observations of flares, coronal mass ejections, suprathermal ions, and solar wind plasma and magnetic field data. These are essential observations to understand, forecast, and improve our understanding of space weather. These observations drive our operational models that help us deliver actionable information to our stakeholders, end users, and public about the possible impacts. This latest storm caused considerable disturbances across various sectors. However, proactive measures and existing protocols helped mitigate potential damages and operational impacts.



L1 Series Project Overview

Observational requirements provide continuity with SWFO-L1

- In addition, L1 Series includes an instrument of opportunity and x-ray flux monitor (L1A) and an x-ray irradiance sensor (L1B)

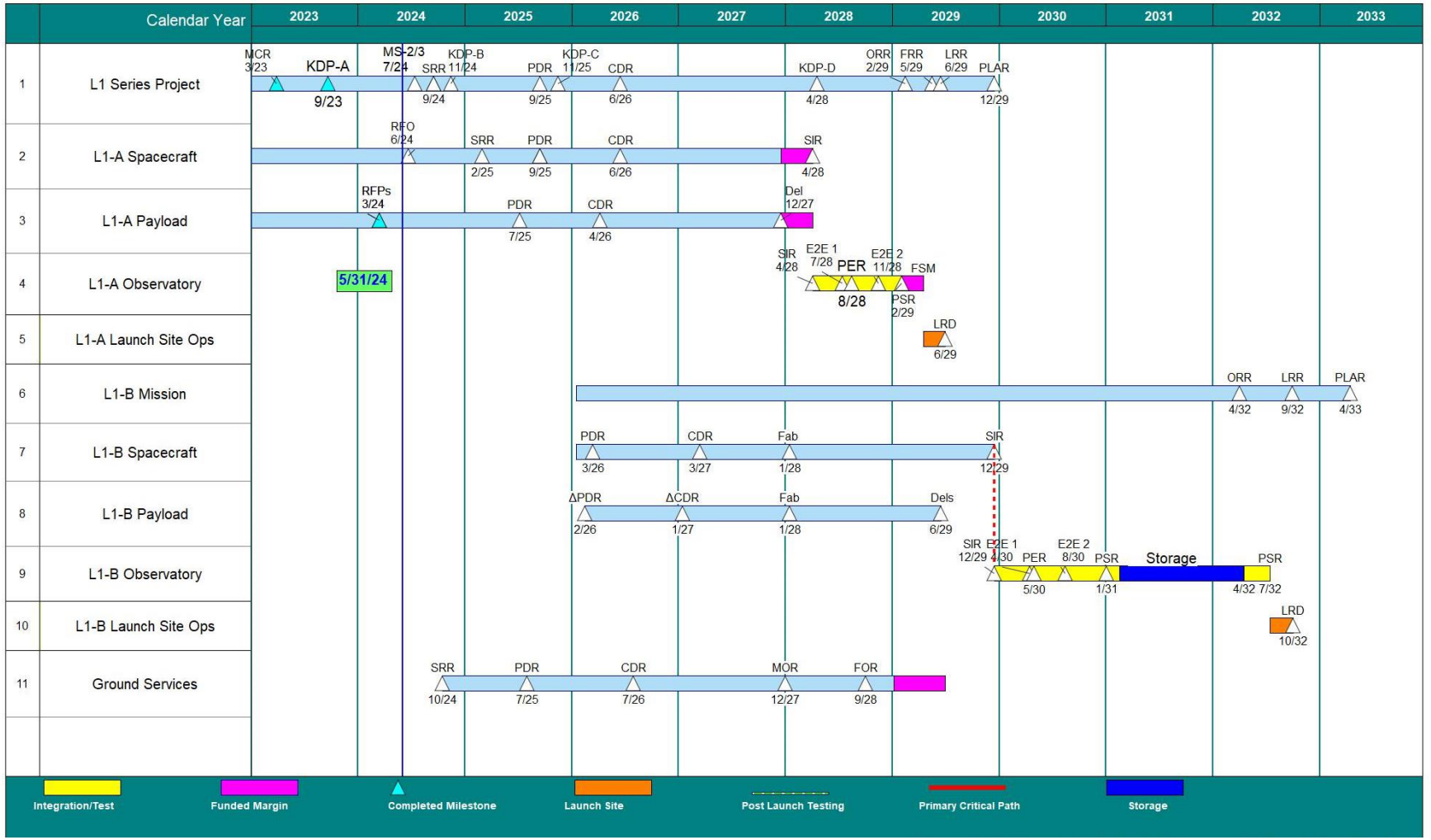
The L1 Series consists of two independently launched spacecraft (L1-A and L1-B) targeting launch of L1-A in 2029 and L1-B in 2032

- Project working to enable a launch by 2029 in order to provide sufficient calibration and validation overlap with SWFO-L1 mission before the end of its design life, assuring high availability product (HAP) continuity.

The biggest difference from SWFO-L1 is the L1 Series is not a rideshare.



L1 Series Project
L1-A/B Preliminary Summary Schedule



Summary

- NESDIS SWO will provide continuity of critical observations from all applicable orbits (L1, GEO, LEO)
- The Space Weather Next Program is working on providing longer-lead times and more accurate solar storm warnings that require operational off-Sun-Earth-axis with (L5) observations with our ESA collaboration.
- L1 Series will provide continuity observations of solar flares, coronal mass ejections, suprathermal ions, and solar wind plasma and magnetic field data.
- The instruments acquisition are all in blackout phase, except the X-ray Irradiance Sensor which the request for information (RFI) is currently open.
- These are critical observations to improve space weather forecasting in support of our users including aviation, space commerce, energy, and defense.

