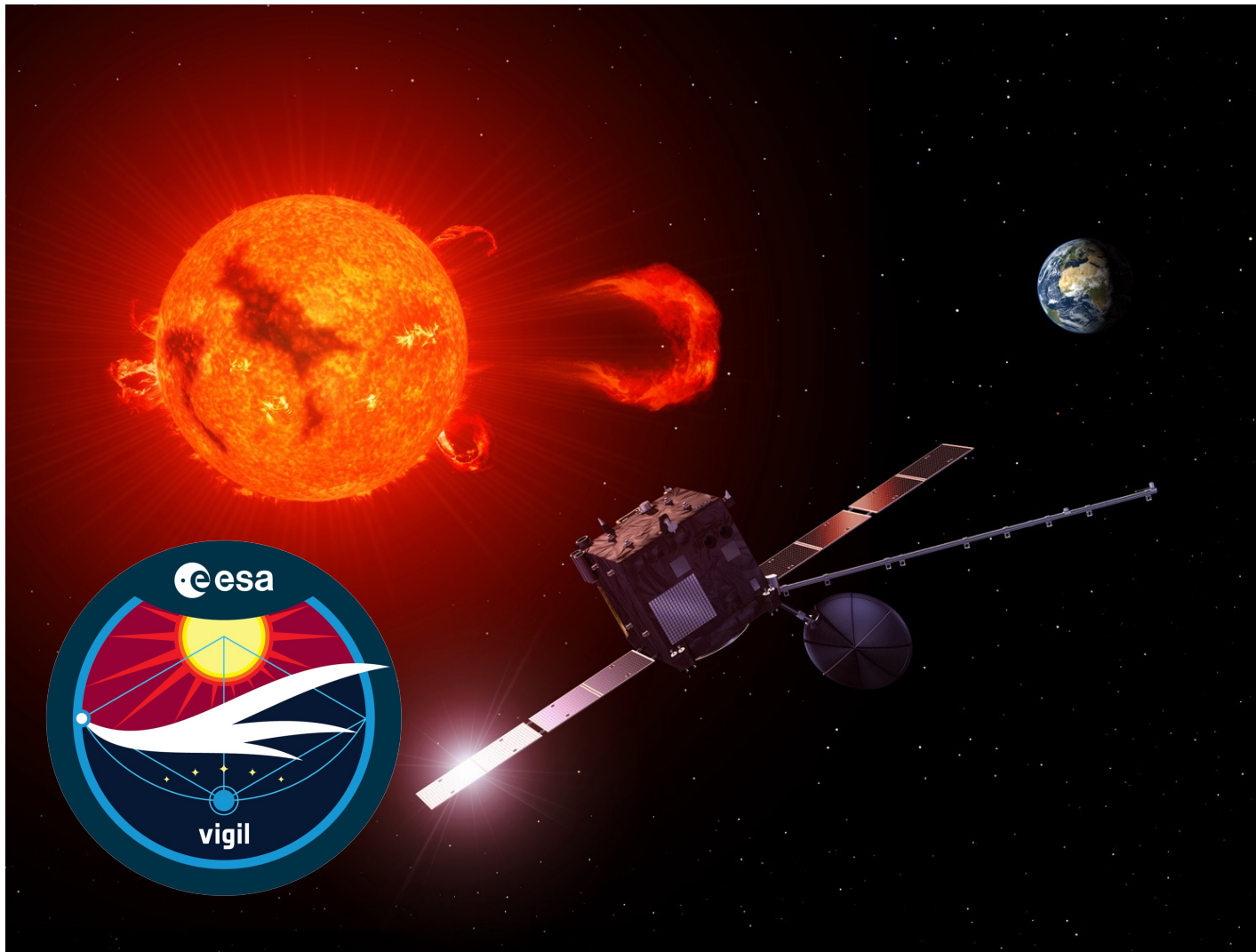




ESA Vigil (L5) and D3S missions update

Presented to CGMS-50 Space Weather Coordination Group session,
agenda item CGMS-50-ESA-WP-04

ESA L5 mission has been renamed!



Vigil mission status

- Evaluation in 2021 considered the mission baseline cost high
=> high risk of not achieving sufficient support in MC22
- Mission currently in extended Phase B1 (B1X)
 - Revisit the mission and satellite objectives to meet the budget constraints
 - Optimise the payload suite and define industrialisation requirements/constraints
 - Preparation of the proposal for MC22
- First Vigil mission objectives critically analysed in Mission Advisory Group (MAG) meeting on 1st February 2022
=> Payload baseline update consolidated

Vigil mission objectives vs. observations (endorsed by MAG)

	Objective	Observations	
A	<ul style="list-style-type: none"> Improved assessment of CME motion and density, in the corona and heliosphere, in combination with L1 observations Observations necessary to improve solar activity onset detection and identification 	Coronagraphy Heliospheric imaging Magnetography (EUV imaging)	Highest priority
B	<ul style="list-style-type: none"> Measure vector components of the IMF Determine the characteristics of solar wind features rotating towards Earth 	Plasma spectrometry Magnetometry (EUV imaging)	2 nd priority
C	<ul style="list-style-type: none"> Enable assessment of developing solar activity, through the monitoring of active region development up to 4 or 5 days beyond the East limb 	X-ray flux monitoring ¹⁾ EUV imaging ²⁾ Magnetography	Highest priority
D	<ul style="list-style-type: none"> <i>Detection of SPEs, monitoring of low energy ion signatures (secondary objective)</i> 	Radiation monitor	Enhancing

¹⁾ Supports objectives, measurements partially compensated by EUV images

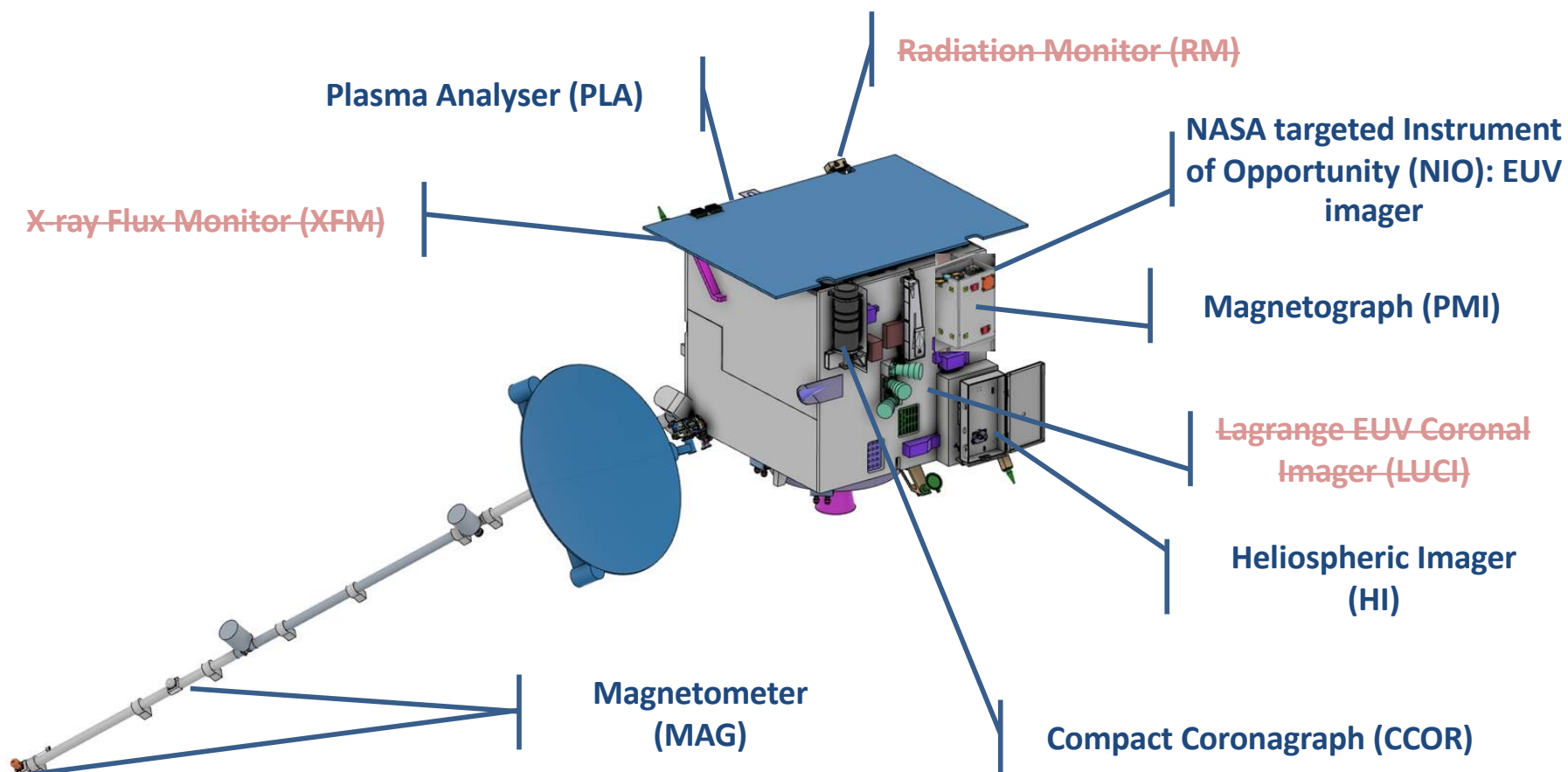
²⁾ Strongly supports objectives in C, contributes to A and B. Not mandatory for 1st priority objectives

Vigil payload baseline update

- Mission streamlining by removal of supporting instruments from baseline
=> New Proposed Baseline “3+2”:
 - Priority instruments for Objectives A and C:
 - CCOR¹⁾, PMI, HI
 - Secondary priority instruments for Objectives B:
 - PLA, MAG
- LGR-MAG strong recommendation: Vigil should carry EUV imager to support space weather forecasting (Objectives C)
=> bilateral discussion with NASA in progress
- ESA will provide an XFM¹⁾ instrument for SWFO

¹⁾ CCOR provided by NOAA, ESA provides XFM as part of the instrument exchange

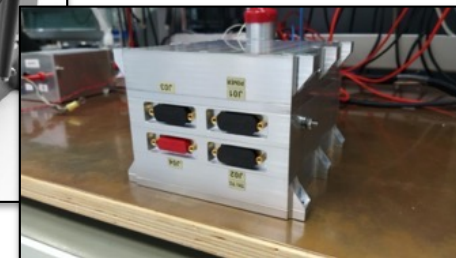
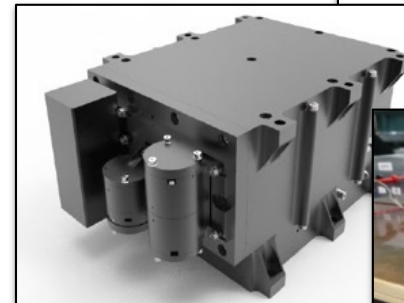
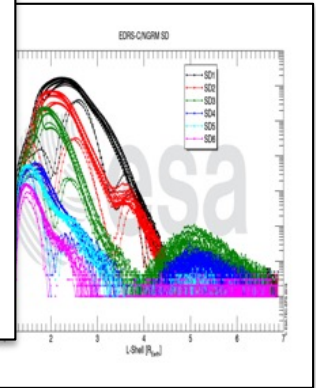
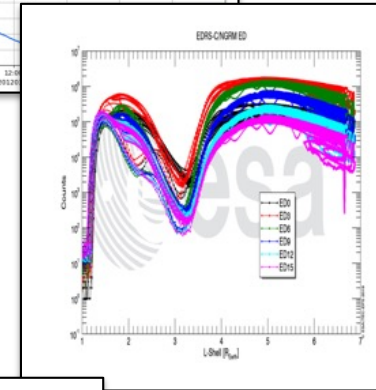
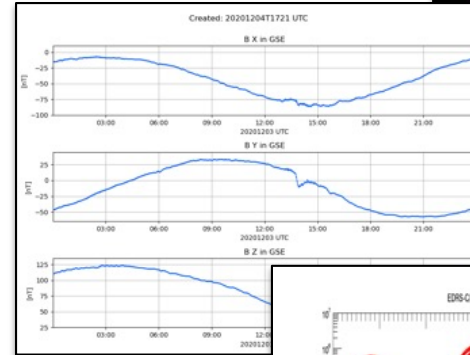
Vigil payload baseline (updated)



- Launch of the first Vigil mission in 2028
=> follow-on missions are foreseen

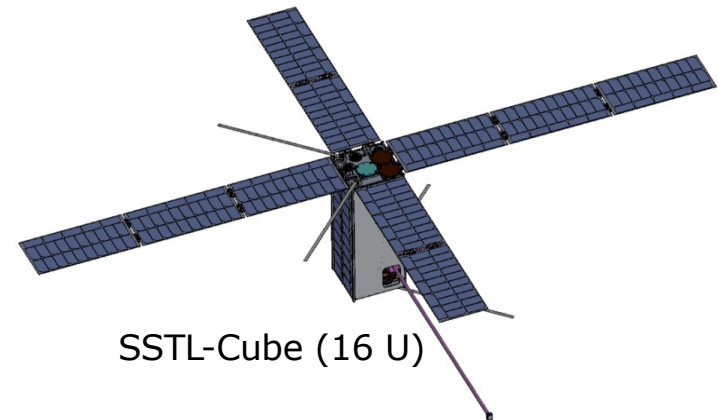
Space Weather hosted payload missions

- SOSMAG/GK2A
 - Instrument working well
 - Measurement accuracy meeting expectations
 - NRT data available from <https://swe.ssa.esa.int>
- NGRM/EDRS-C
 - Instrument working well
 - NRT data available from <https://swe.ssa.esa.int>
- NGRM/Sentinel-6
 - Instrument working well
 - NRT data processing under implementation
- ICARE-NG²/HotBird F1
 - Instrument integrated to s/c
 - Launch in 2022
- ICARE-NG²/Lunar Gateway
 - Instrument assembly in progress

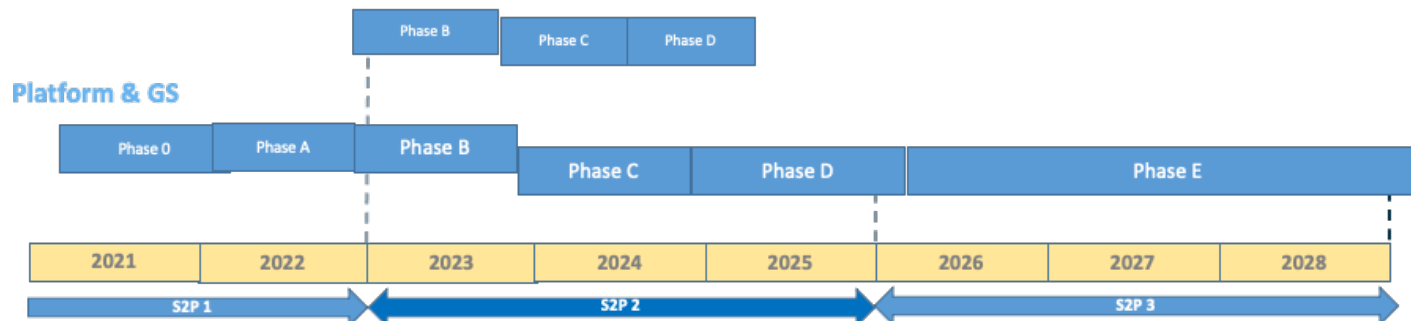


Nanosatellites Phase 0/A - LEO constellation

- Prime: SSTL (UK)
- Monitoring of the Magnetosphere, Ionosphere and Thermosphere
- Payload:
 - 2x Radiation Monitor
 - Magnetometer
 - Radio Beacon
 - Ions and Neutrals Spectrometer
- 2 x 16 U Cubesat in approx. 550 km LEO, 10:30 SSO
- 3 years nominal mission lifetime
- Phase B/C/D budget proposed in MC22

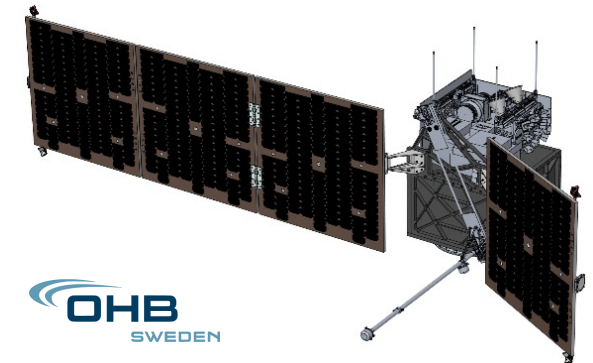
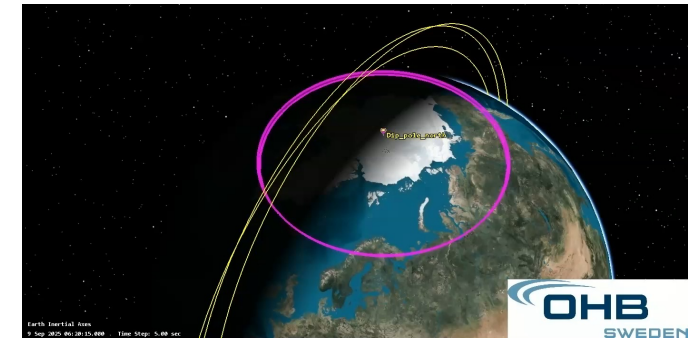


Instruments Procurement

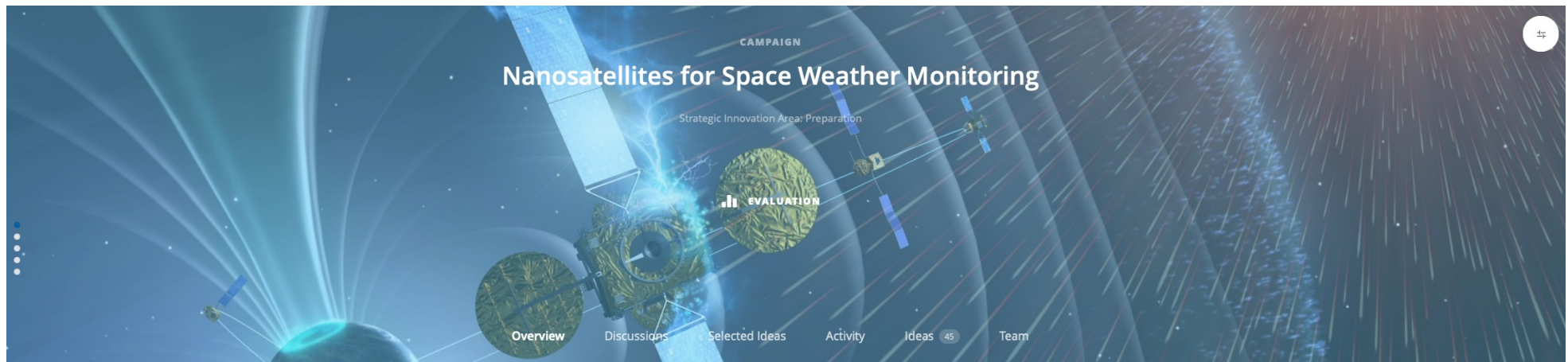


SmallSat mission for Auroral oval monitoring: Aurora

- Objectives:
 - 24/7 monitoring of the auroral oval
 - Identification, monitoring and nowcasting geo-magnetic storms and sub-storms
 - NRT data for operational space weather services for Arctic region
 - Optional: observations of energetic particles, magnetic field and plasma environment
- Payload:
 - Main: Aurora Optical Spectral Imager (AOSI) & Aurora UV Imager (AUI)
 - Options: Plasma Analyser, magnetometer, Langmuir probe, neutral mass spectrometer
 - Radiation monitor as part of the platform
- Implementation in two phases:
 - Aurora-D (mission concept demonstration): launch 2027
 - Aurora-C (full constellation): launch 2030
- Aurora-D budget proposed in MC22



Nanosatellite Community Challenge



- Call for mission proposals released in September 2021 in ESA Open Space Innovation Platform (OSIP)
- Initial response: 45 proposals
- 11 project teams invited to submit full technical proposals
- 5 proposals selected for Phase 0 mission concept studies
- Mission objectives include space weather impacts on s/c operations, ionosphere and thermosphere modelling, plasmasphere, magnetosphere and solar burst monitoring
- Selected missions proposed for Phase A/B/C/D in MC22



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**Coordination Group for
Meteorological Satellites**

