ESA SSA Lagrange mission to L5 point

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Enhanced Space Weather Monitoring System

- Forecasting
- Event detection
- Impact & State monitoring

D3S:
- Hosted payloads
- SmallSat missions
Measurements from L5

- Solar disk magnetic field
- EUV imaging
- Solar X-ray flux
- Solar wind characteristics
- Interplanetary magnetic field
- Solar proton, electron and ion flux

Wide-angle coronagraphy

Heliospheric imaging
Lagrange mission Phase A/B1 studies

- Two parallel Mission System Studies
  - Consortiums led by
    - Airbus Defence & Space
    - OHB System AG

- Remote Sensing Instrument Study
  - Consortium led by RAL Space

- In-situ Instruments Study
  - Consortium led by MSSL
Mission architecture

- Disposal
- Operation
- Transfer (1 or 2 y)
- Commissioning
- LEOP
- Pre-launch
- 24/7 operation using ESTRACK
- Science data via optical link

LEOP

Pre-launch

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Remote Sensing Instrument Package
Remote Sensing Instrument Package

- Vector magnetograph
- Spatial resolution: 5 (2) arcsec
- Dynamic range: ± 4 kG, 12 bits

- FoV: 10 to 60 deg (4 to 60 deg)
- Spatial resolution: 4 arcmin
- Accuracy: 20% of CME signal

- Vector magnetograph
- Spatial resolution: 5 (2) arcsec
- Dynamic range: ± 4 kG, 12 bits

- FoV: 3 - 22 Rs (2.5 - 30 Rs)
- Spatial resolution: 2 arcmin
- Accuracy: 20% of CME signal, SNR > 2 (>4)

- T: Full disk image in Fe XII 193 Å line
- G: also He II 304 Å and Fe VIII 131 Å
- Spatial resolution: 5 (2) arcsec
In-situ Instrument Package

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CAU
Kiel University
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Imperial College
London

ÖAW IWF
In-situ Instrument Package

- **IMF vector (3 components)**
- **Velocity range:** 200 to 2500 km/s (100 to 3000 km/s)
- **Density range:** 0.1 to 150 cm$^{-3}$ (0.1 to 200 cm$^{-3}$)
- **Temperature range:** 40,000 to 1,000,000 K (10,000 – 2,000,000)

- **Electrons:** 100 keV to 7 MeV
- **Protons:** 2 MeV to 200 MeV
- **Heavy Ions**
- **Range:** 1-8 Å (0.5-8 Å)
- **Dynamic range:** $2 \times 10^{-8}$ to $2 \times 10^{-3}$ W/m$^2$
- **Accuracy:** 15%

- **Electrons:** 30-600 keV (1 MeV)
- **Protons:** 60 keV to 2 (8) MeV
- **Dual FoV, 120 deg cone, backwards and sideways**

- **Electrons:** 100 keV to 7 MeV
- **Protons:** 2 MeV to 200 MeV
- **Heavy Ions**
- **Range:** 1-8 Å (0.5-8 Å)
- **Dynamic range:** $2 \times 10^{-8}$ to $2 \times 10^{-3}$ W/m$^2$
- **Accuracy:** 15%

- **IMF vector (3-components)**
- **0.1 to 200 nT**
- **Accuracy:** $\pm$ 1 nT ($\pm$ 0.5 nT)
Lagrange Mission Roadmap

- Phase 0 L1
- Phase 0 L5
- Phase A/B1
- Bridge / ITT
- Phase C/D
- LEOP Transfer

- Instrument pre-developments to TRL 6
- Instrument procurement
- Satellite procurement
- Ground Segment procurement

- MC 19
- ITT preparation
- Launch
- Operation

- Period 2
- Period 3
- Period 4
- Period 5

- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024