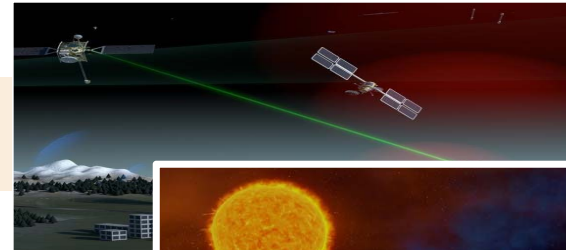


# Space Safety for Space19+

# Space Safety - Cornerstones



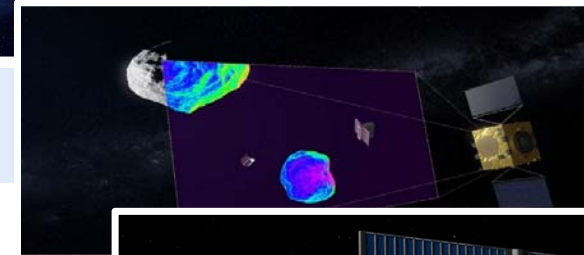
1 Core



2 Space Weather L5 Mission



3 HERA



4 In-Orbit Servicing/Removal Mission



5 CREAM

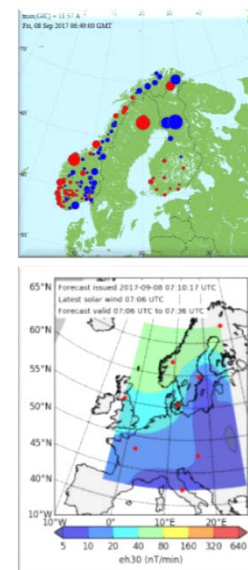
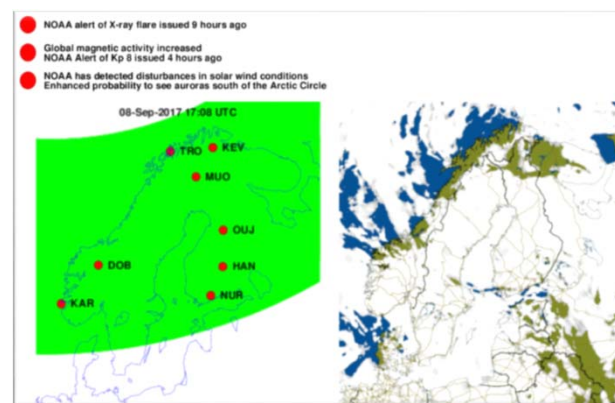
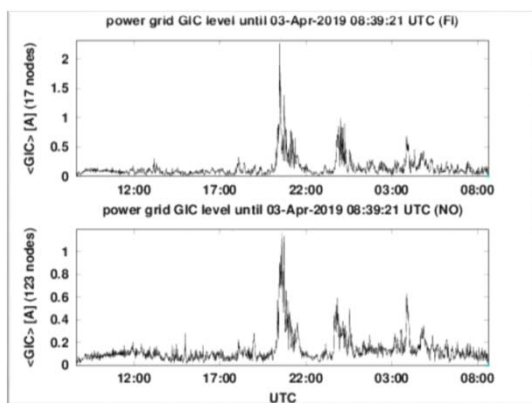


# 1 Core



## Space Weather Service Network

- System development towards operational maturity
- Regional products for impacted users at high latitudes including underpinning modelling
- Exploitation of new and developing facilities e.g. EISCAT 3D



<http://swe.ssa.esa.int>



European Space Agency

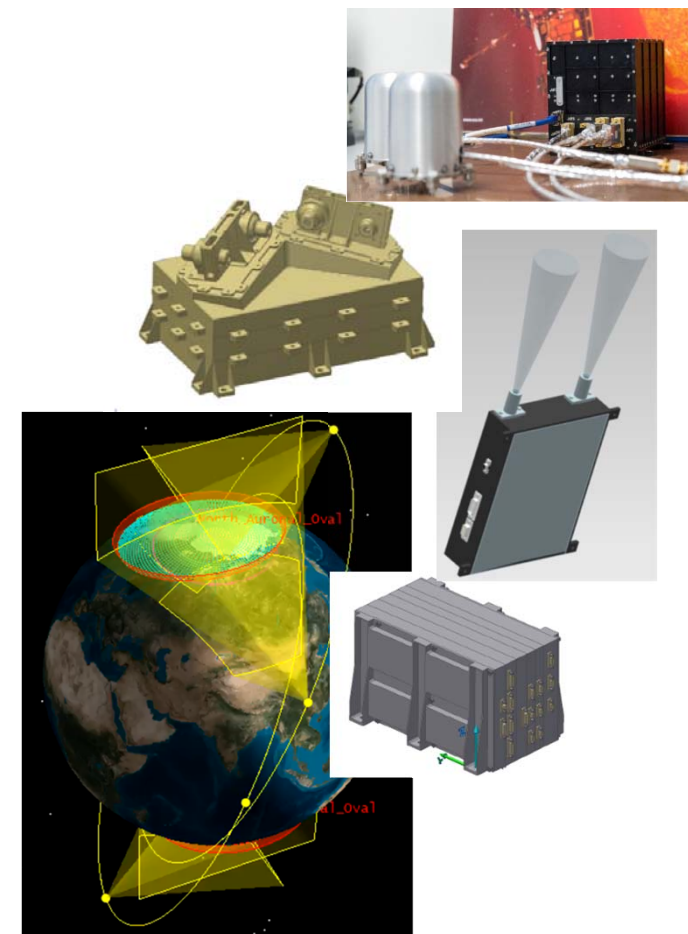


# 1 Core



## D3S: Space Weather Hosted Payloads & Small Satellites

- Monitoring space weather conditions from inside the magnetosphere
- Ensure & improve underlying data availability for SWE Services
  - Procurement of recurring instruments
  - Dedicated SmallSats



## 2 Space Weather L5 Mission



## 2 Space Weather L5 Mission



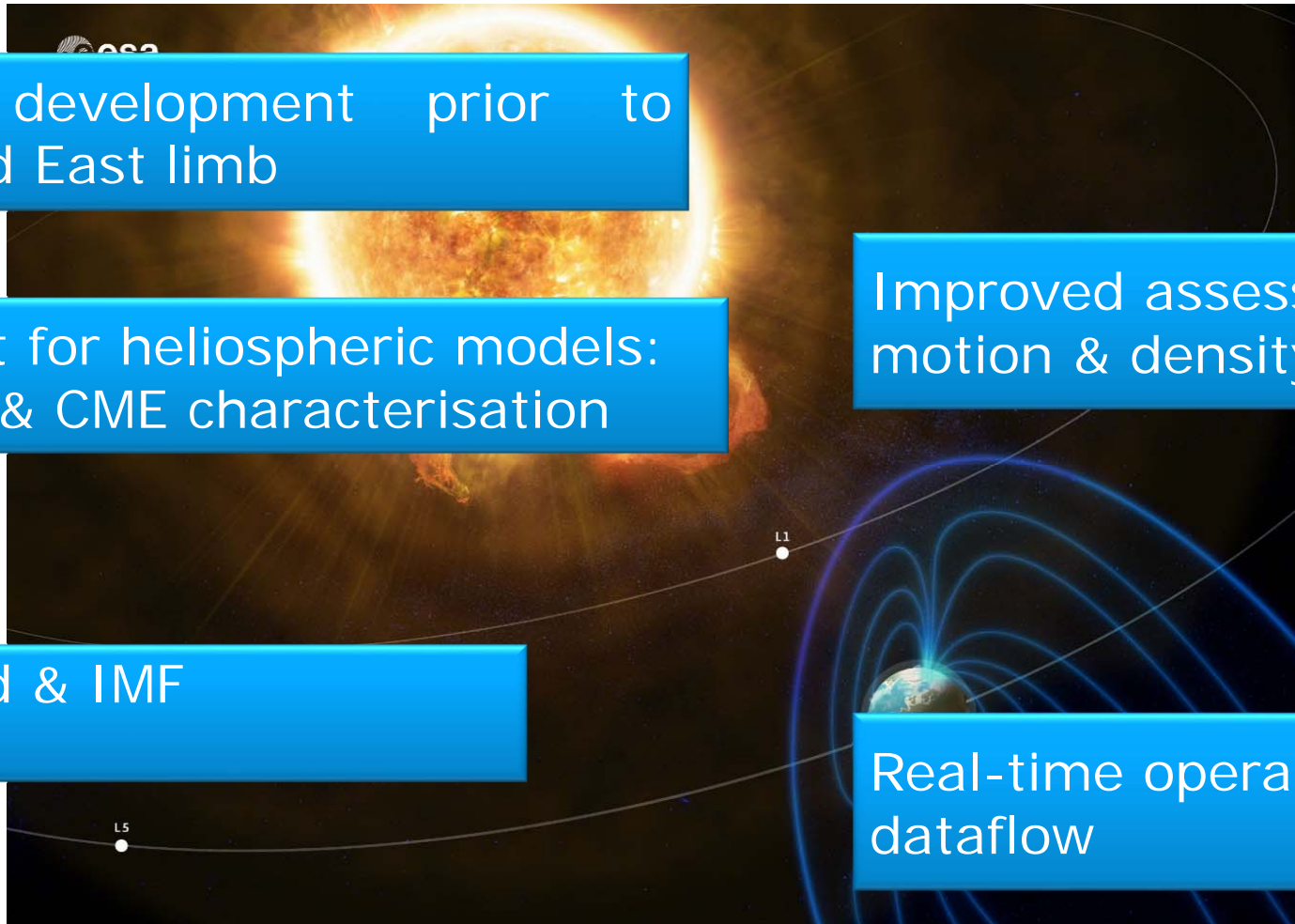
Monitor AR development prior to rotation around East limb

Improved input for heliospheric models: b/g solar wind & CME characterisation

SEP, Solar wind & IMF measurement

Improved assessment of CME motion & density

Real-time operational dataflow

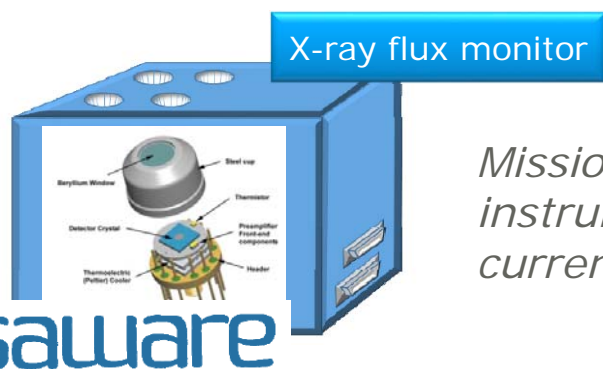


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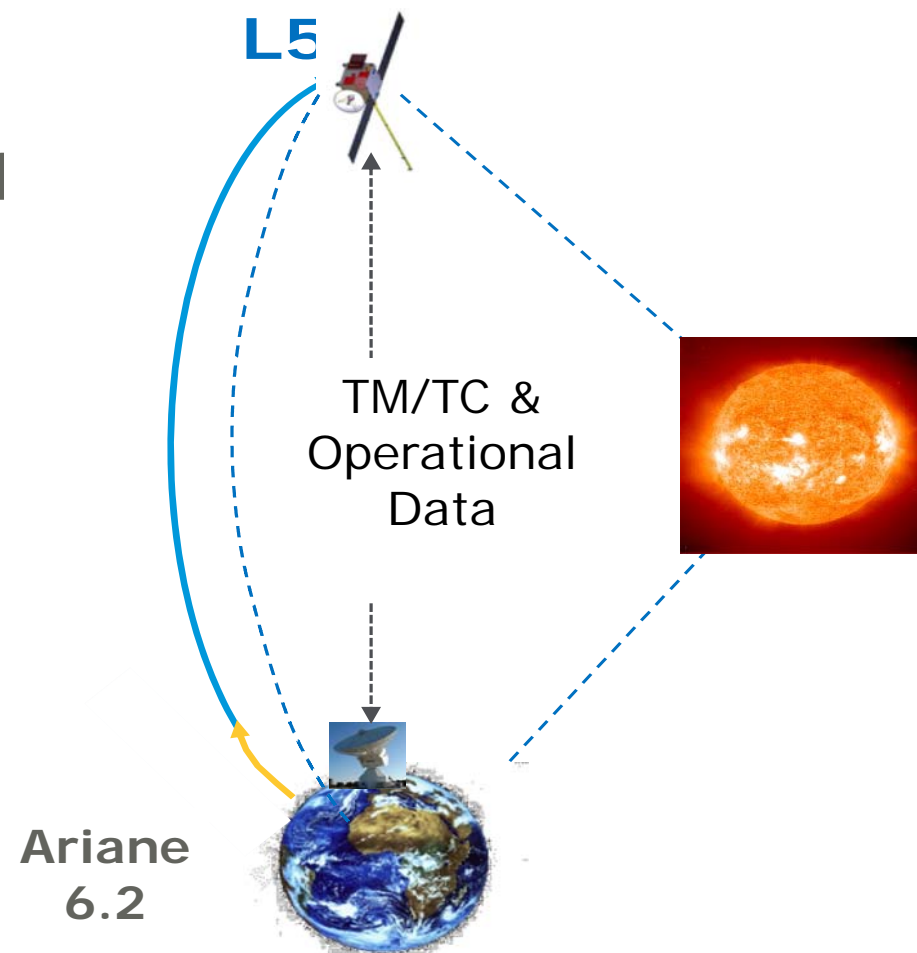
## 2 Space Weather L5 Mission



- Mission development Phase-B2/C/D/E1
- Remote sensing and in-situ instrument packages



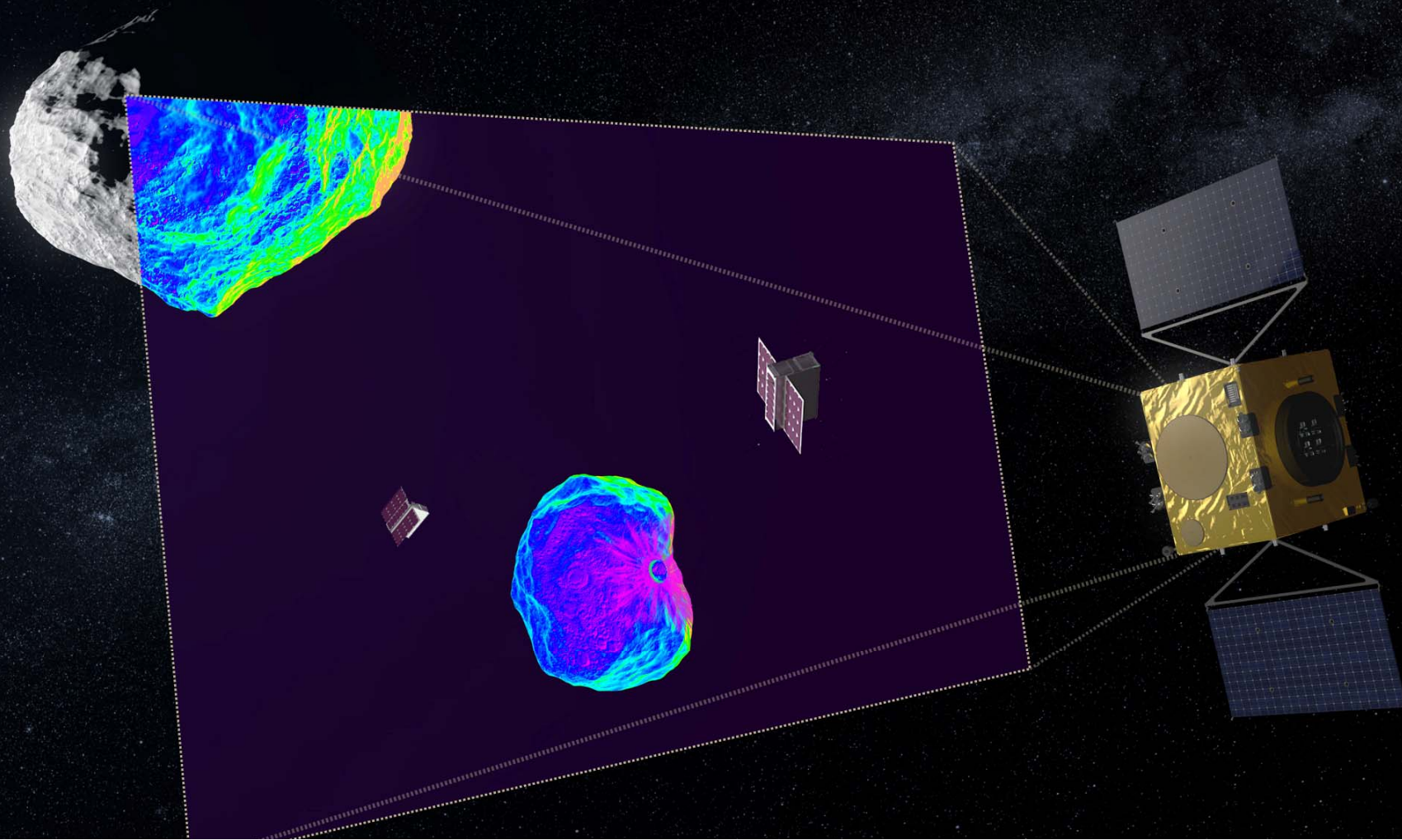
*Mission Phase B1 study & instrument pre-developments currently ongoing*



European Space Agency



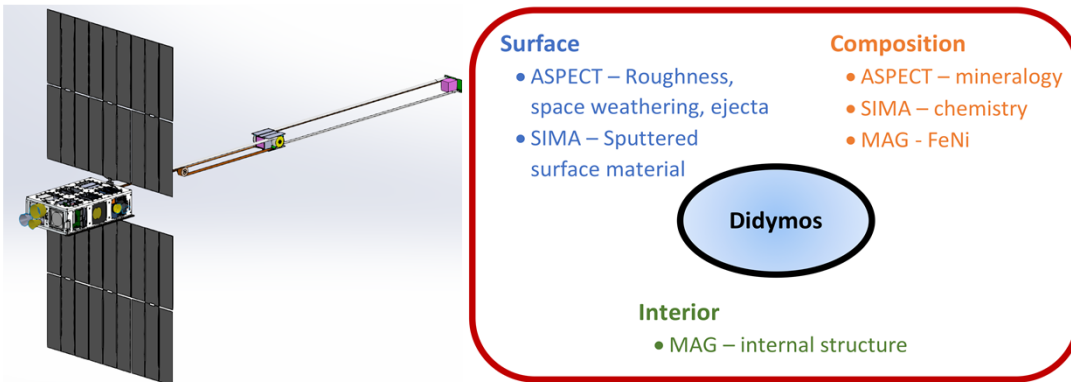
# 3 HERA



European Space Agency



# APEX cubesat and HERA spacecraft contributions

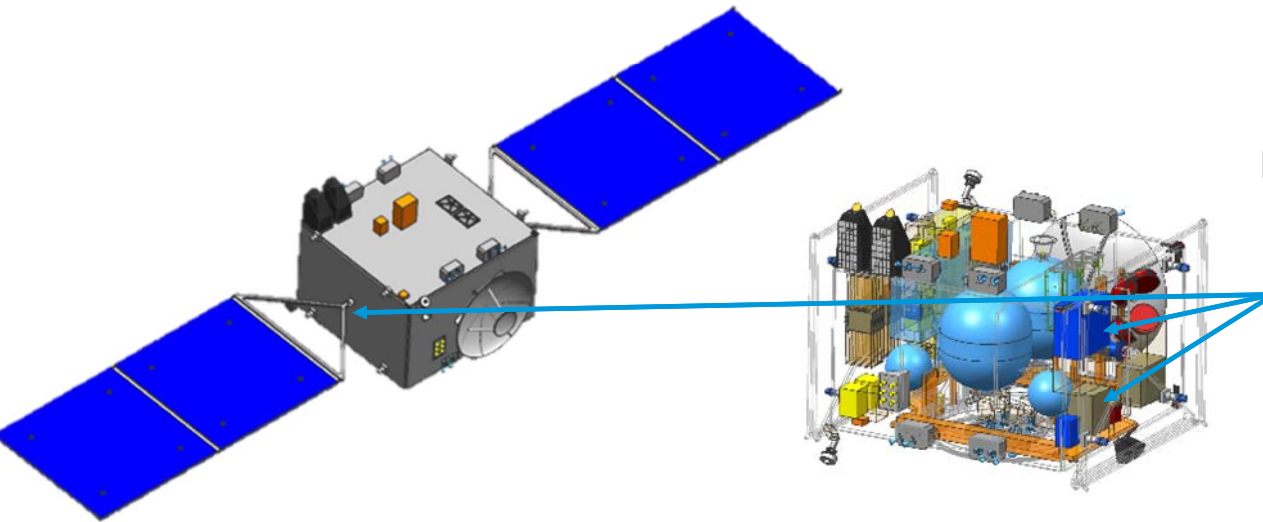


## Baseline Payload

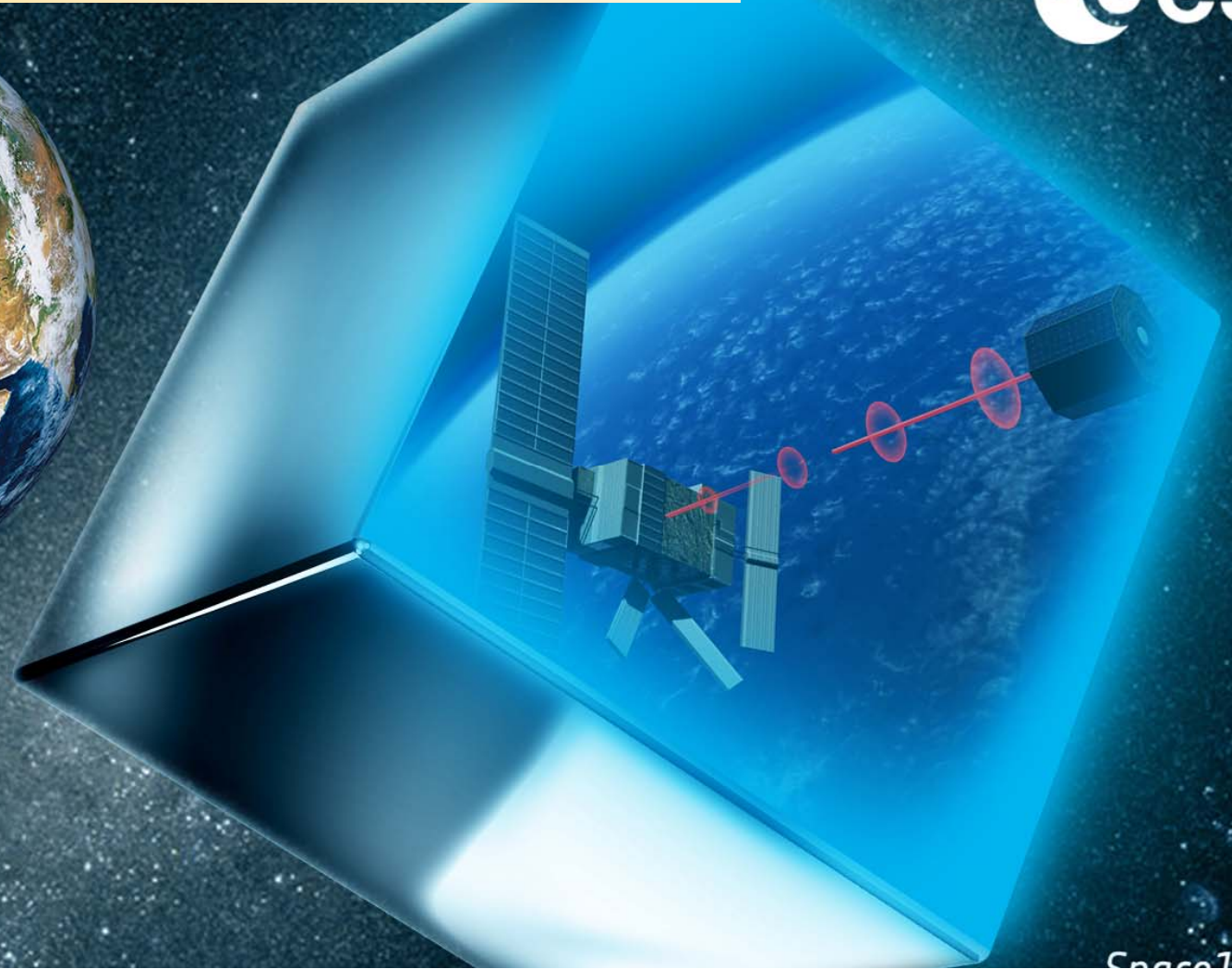
- Asteroid Spectral Imager (ASPECT)
- Magnetometer (MAG)
- Secondary Ion Mass Analyser (SIMA)
- Optical Navigation Camera (NavCam)
- Laser Ranging Sensor (Lidar)
- Three-axis

## Potential technology contributions

- Onboard software (SFF)
- Power and avionics (RUAG Space Finland)

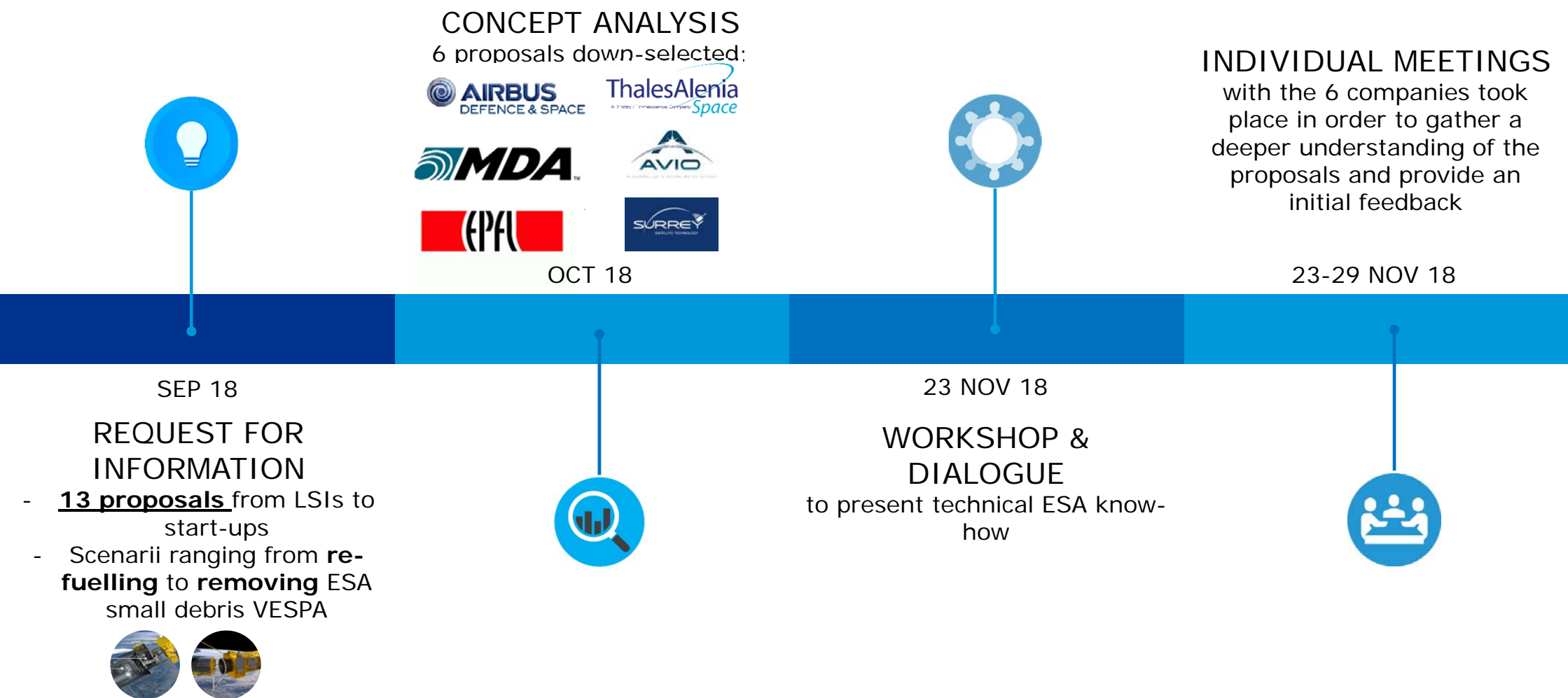


## 4 In-Orbit Servicing/Removal Mission





# 4 In-Orbit Servicing/Removal Mission

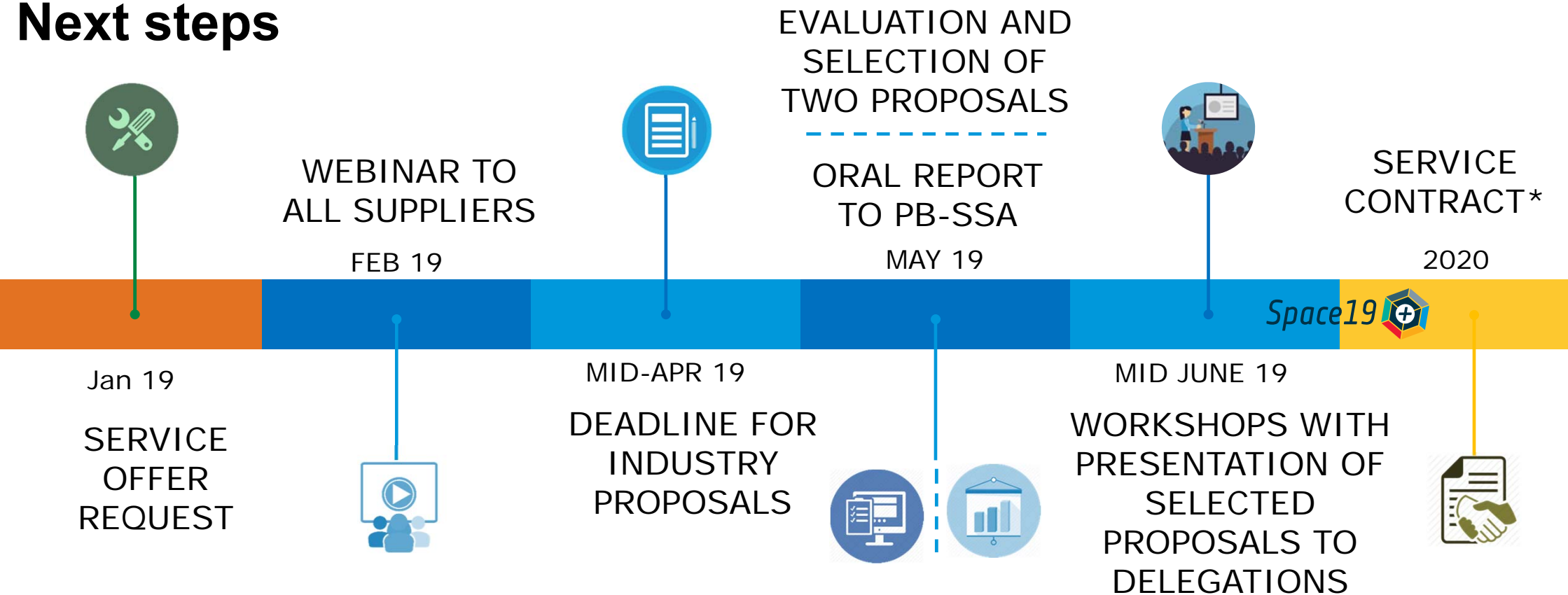




## 4 In-Orbit Servicing/Removal Mission



### Next steps

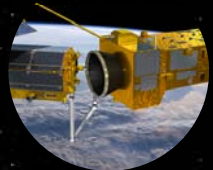


\*pending Space19+ decisions by MS

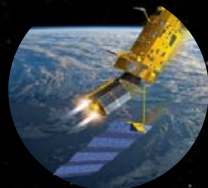


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# 4 In-Orbit Servicing/Removal Mission



DEBRIS  
REMOVAL



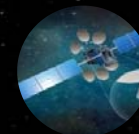
LIFE  
EXTENSION



REFUELLING



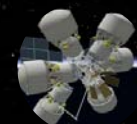
RECYCLING



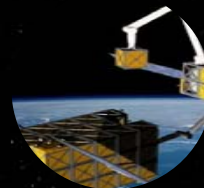
ASSEMBLING



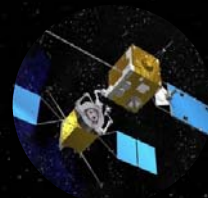
HUMAN  
EXPLORATION



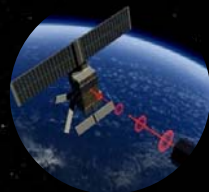
FUEL  
DEPOTS



DESIGN  
FOR  
SERVICING



MAINTENANCE



PROXIMITY  
OPERATIONS



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# 5 CREAM



esa

COLLISION AVOIDANCE

AVOIDING SPACE JUNK



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**THANK YOU**

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