

Space Safety Period 3

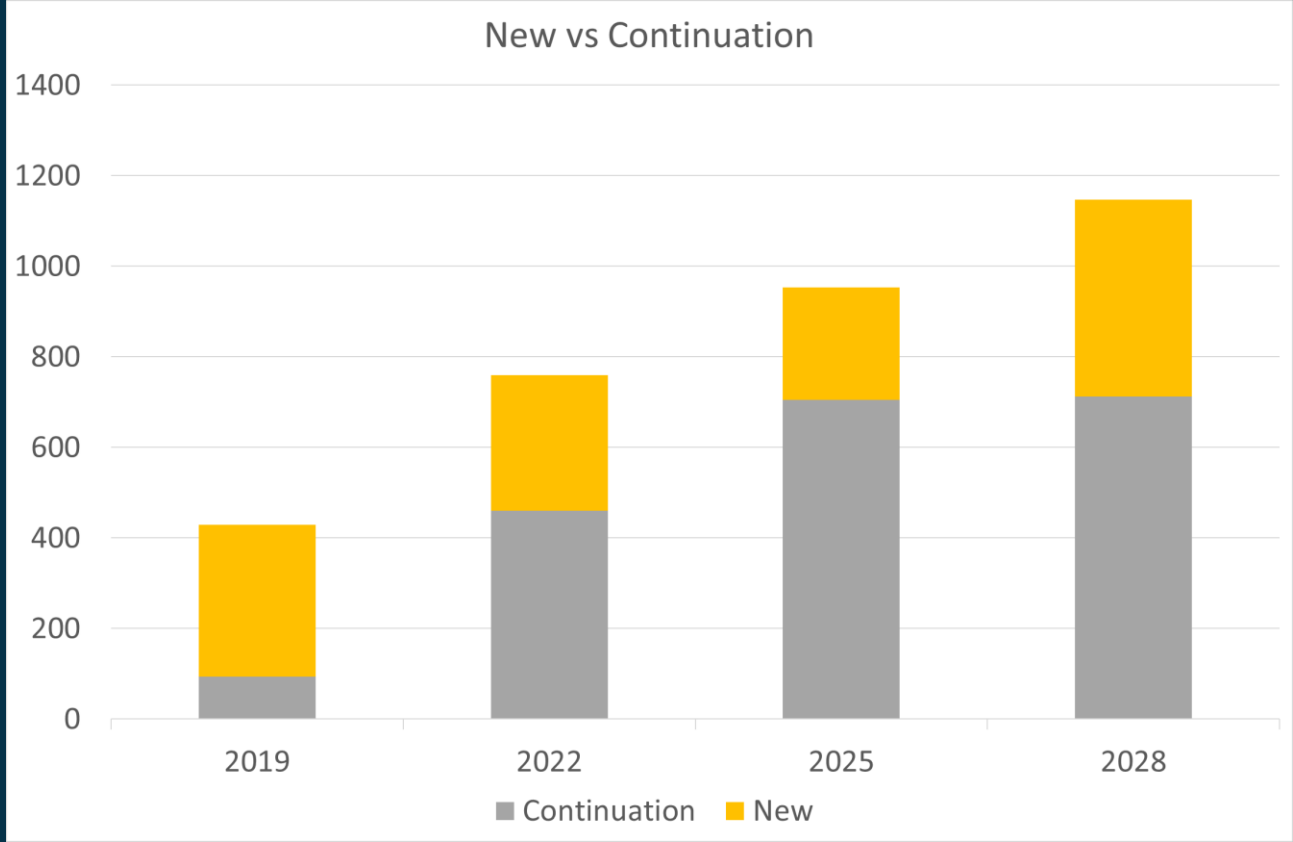
Holger Krag

ESA, Space Safety Programme Manager

19/09/2024

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Space Safety Period 3



Space Safety Programme Content – Period 3

RAMSES

(Apophis Inspection Mission for Planetary Defense)

ADRIOS

(Debris Removal + In-Orbit Servicing)

VIGIL

(Operational Space Weather Mission)

COSMIC
(Small
Missions and
Projects)

Towards a Zero
Debris Future

Technologies for a
Growing Space
Traffic

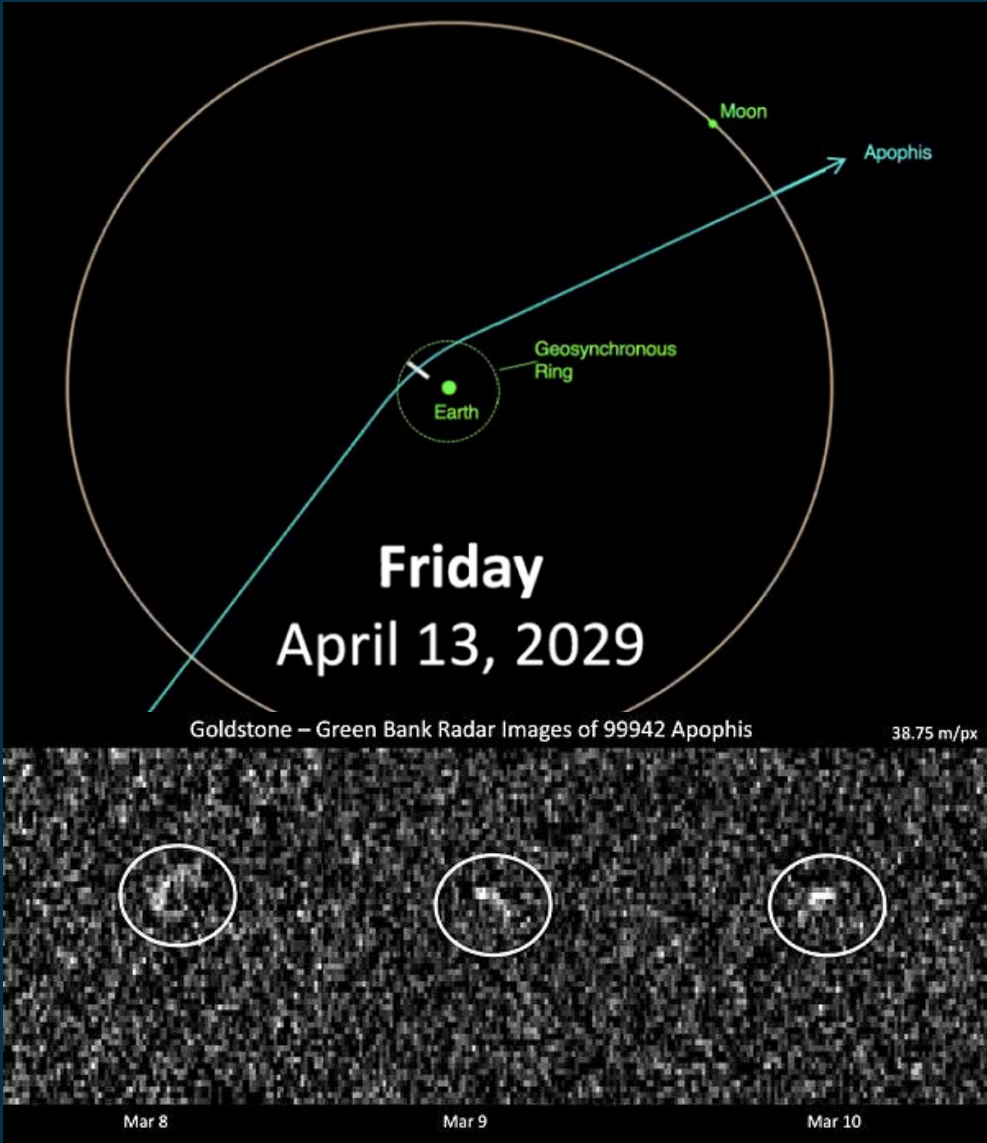
Predicting
Asteroid Impacts

Develop Space
Weather Services

Space weather
Sensors

Competitiveness

RAMSES – Mission to Apophis



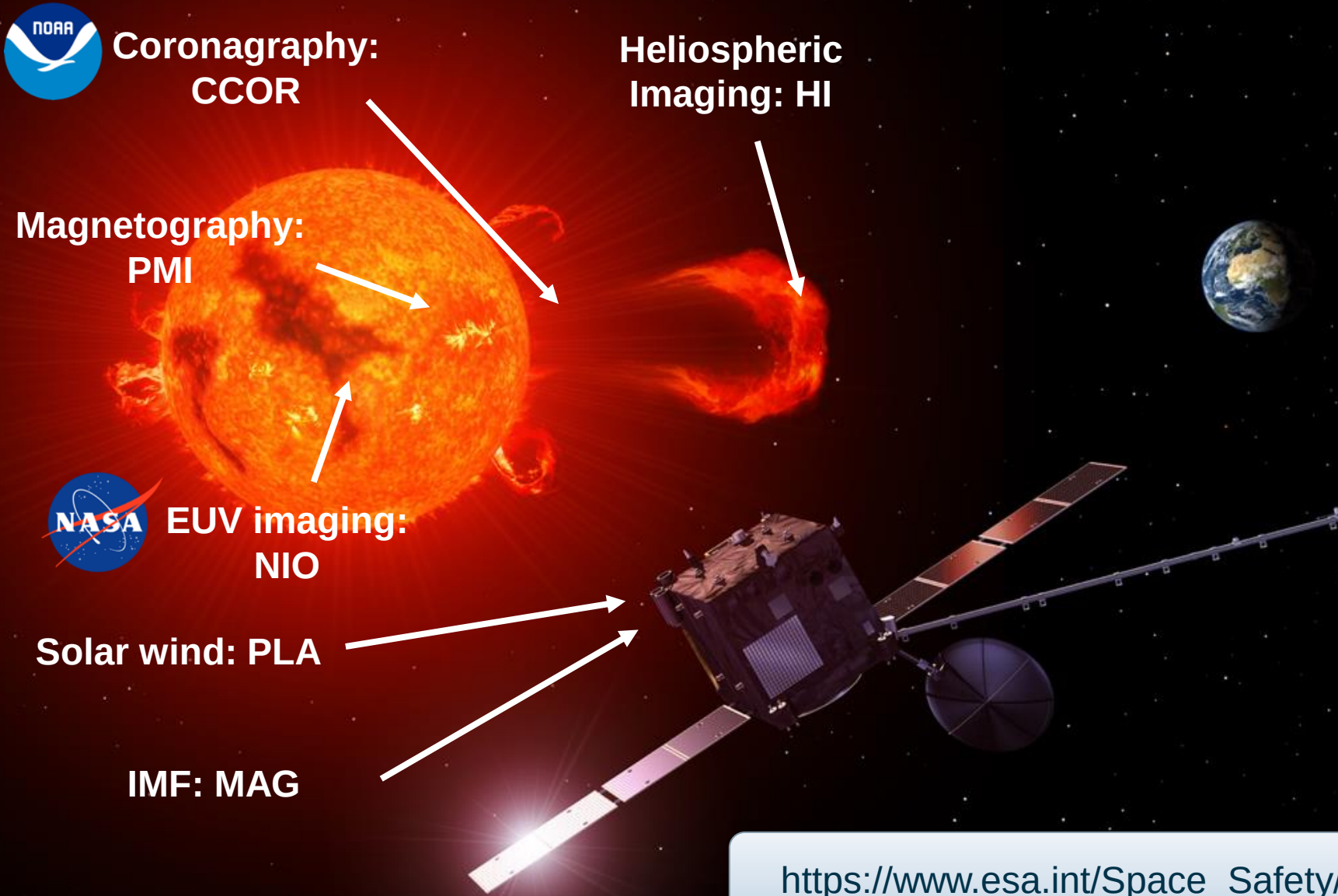
High-level mission objectives

- Characterize Apophis with high-resolution before (and after) the encounter
- Monitor Apophis with high temporal resolution (1min) during the encounter

Mission highlights

- Maximum **re-use** of the **heritage Hera/Comet-I** (cost and schedule enabler)
- Launch in **April 2028**, 10 Months transfer
- **Ride-share** opportunity for small sat fly-by

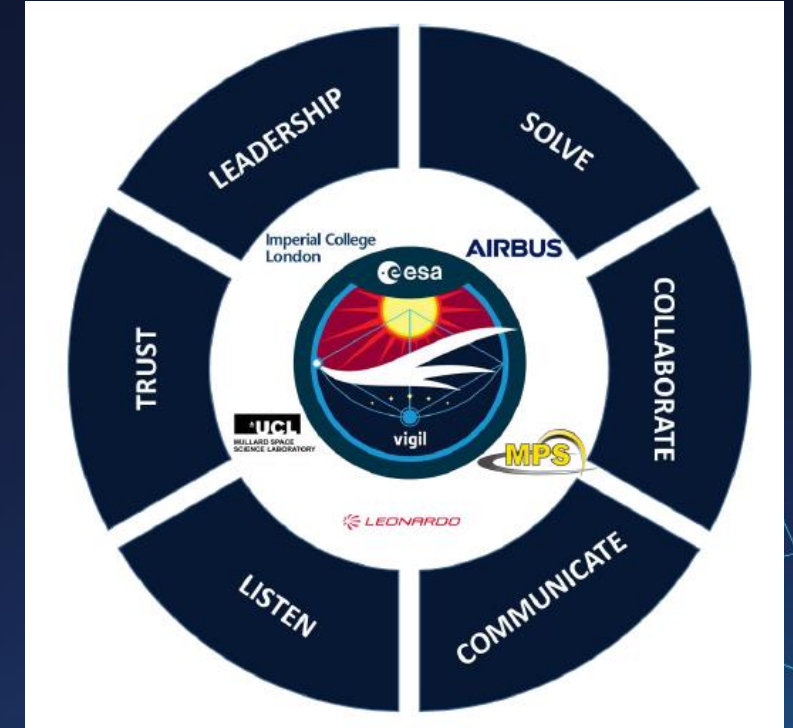
Vigil mission to L5



https://www.esa.int/Space_Safety/Vigil

S2P – Vigil Summary

- Good mix of large and SME suppliers - ESA /ADS-UK making dedicated efforts to support SMEs;
- ADS will coordinate industry partners



ADRIOS Future Vision

DEBRIS REMOVAL



CS-1 Mission

TRANSPORTATION



PoC In-Space
Transportation

INSPECTION



e.inspector

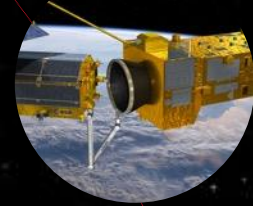
AOCS TAKEOVER/
LIFETIME EXTENSION



RISE Missions

ENCORE Mission

REFURBISH-
MENT



ASSEMBLING /
MANUFACTURING



RECYCLING

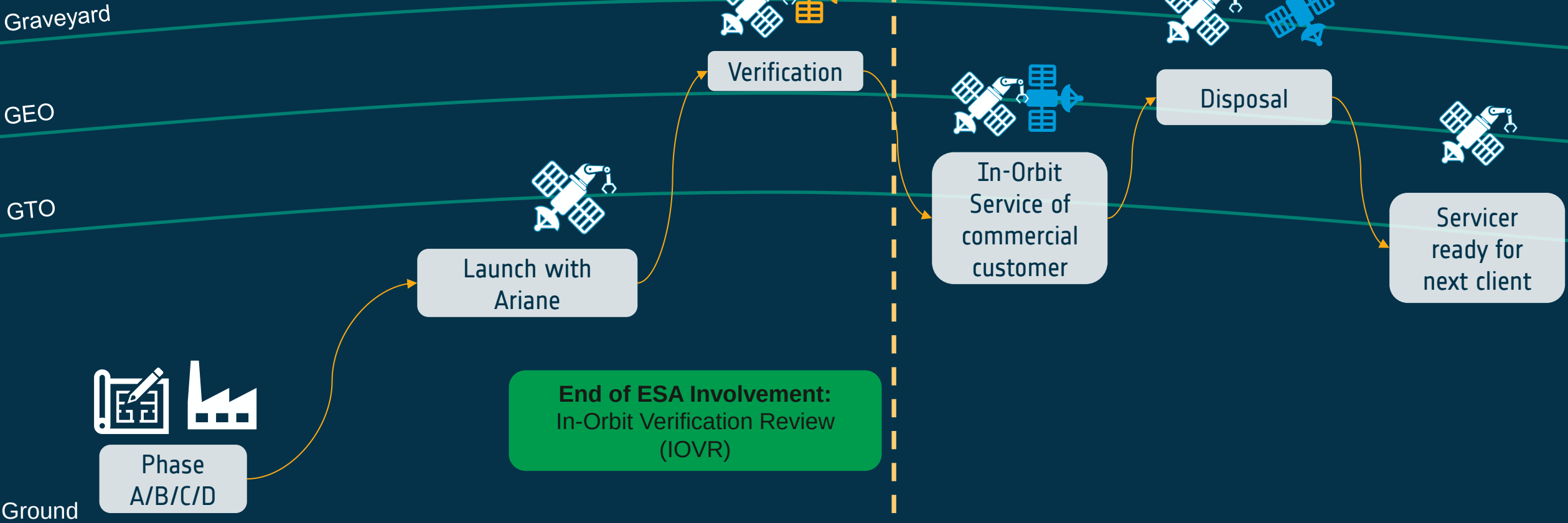


ADRIOS

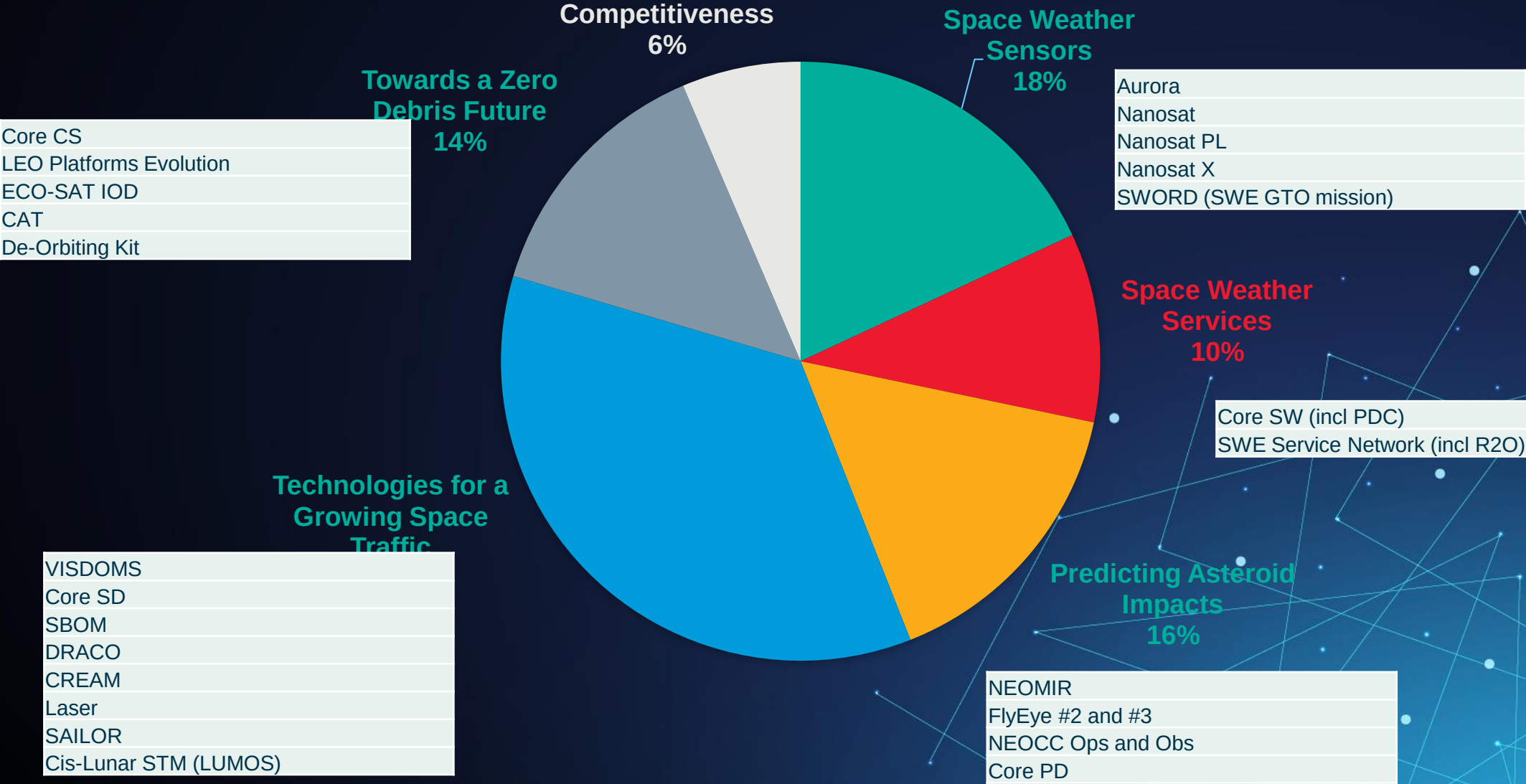
Circular Economy

ESA RISE Mission (In-Orbit Verification)

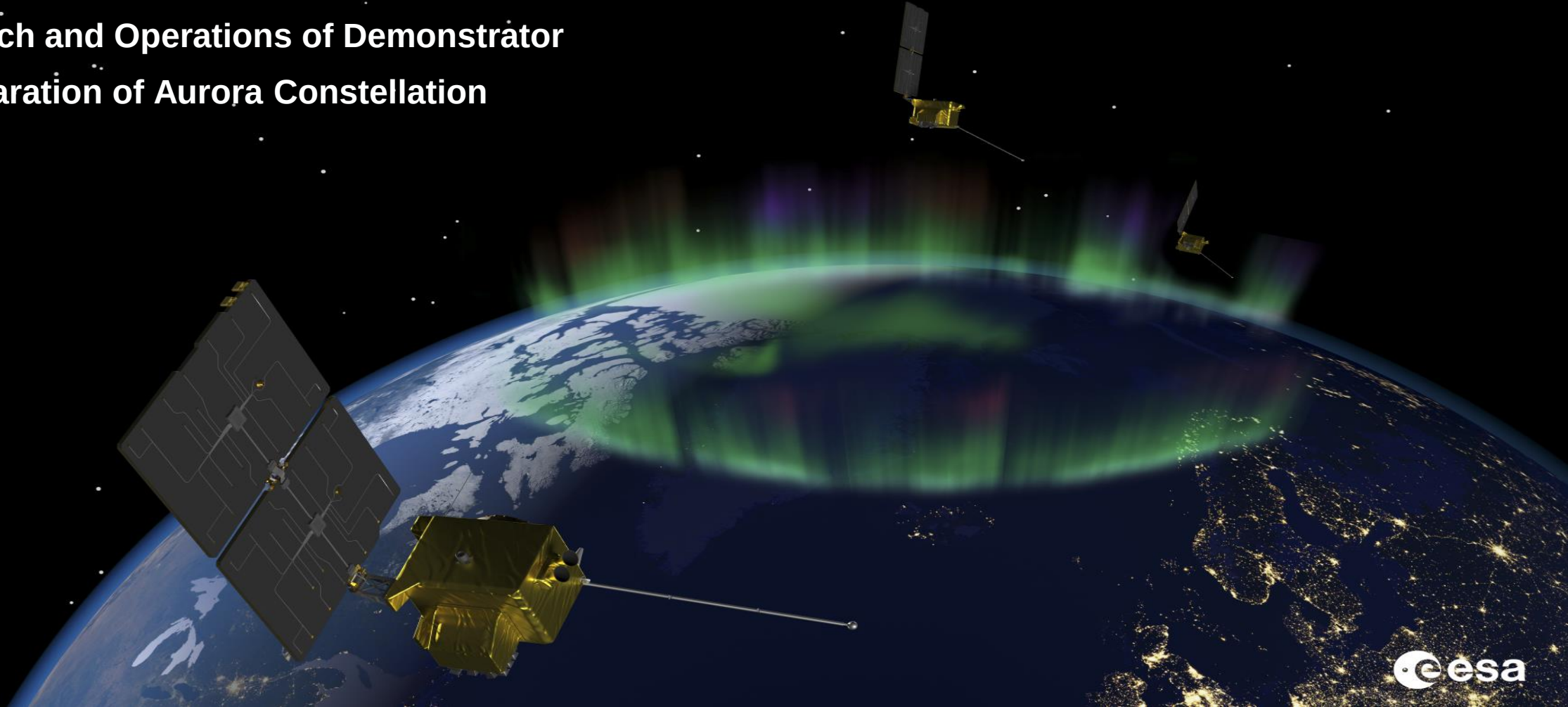
Service Provision



COSMIC Draft Breakdown



- AURORA Mission:
 - Launch and Operations of Demonstrator
 - Preparation of Aurora Constellation



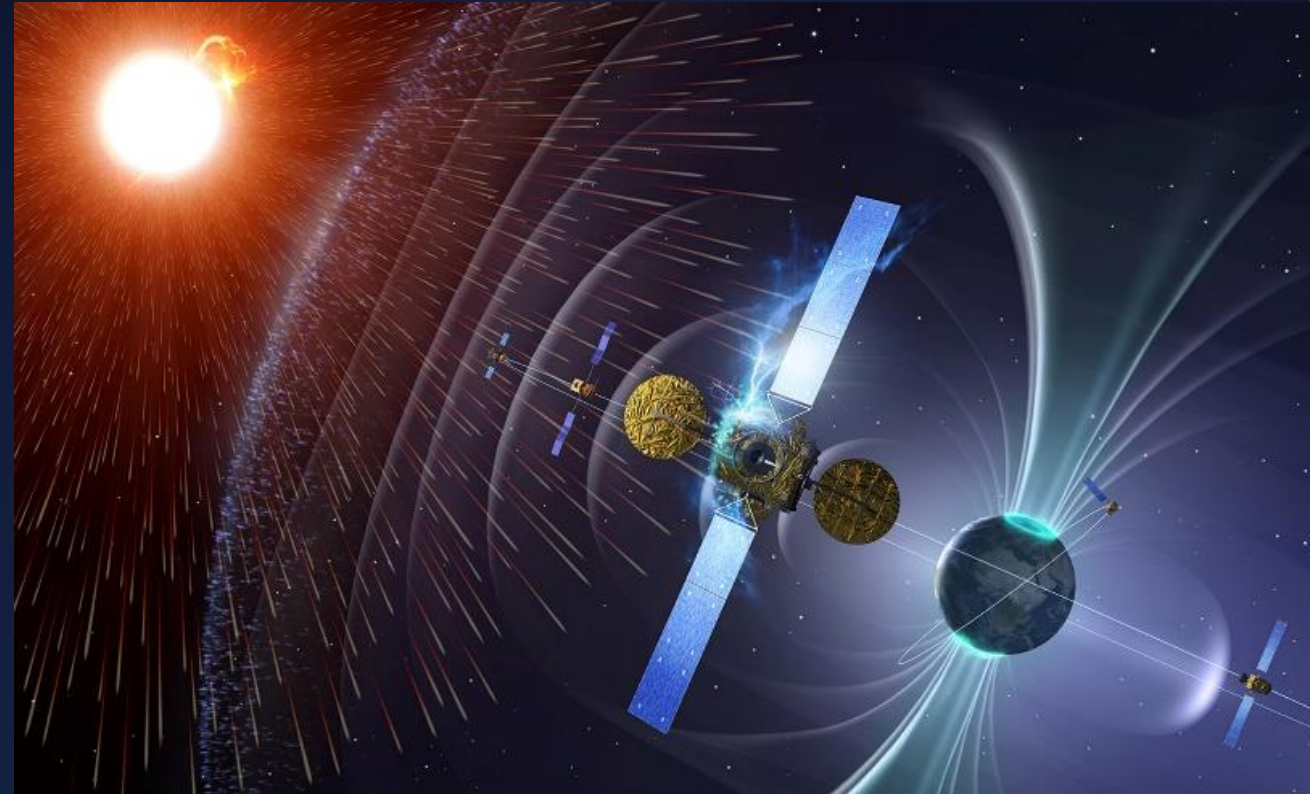
COSMIC – Space Weather Sensors

Future Space Weather Nanosat-based Services



- Additional Nanosat mission opportunities to be funded in CM25

SWORD (GTO) Mission (Phase A/B1)



- Dedicated mission to provide nowcasts of the radiation belts

COSMIC – Develop Space Weather Services

- New network management tools and procedures & preparation for operational transition
- **Performance assessment campaigns** as a community standard
- *Position Europe to take a leading role in international efforts towards community consensus in performance assessment & R2O(2R) practices*



Flyeye-2 finalisation

- **Observatory**
 - Site development and acceptance
- **Ground Segment**
 - Design and implementation
- **Telescope**
 - Transport to site, installation, acceptance and commissioning

Flyeye-3

- **Telescope**
 - Design updates
 - Long-lead item procurement (Primary Mirror, Cameras, Secondary Optical Tubes)



COSMIC – Predicting Asteroid Impacts

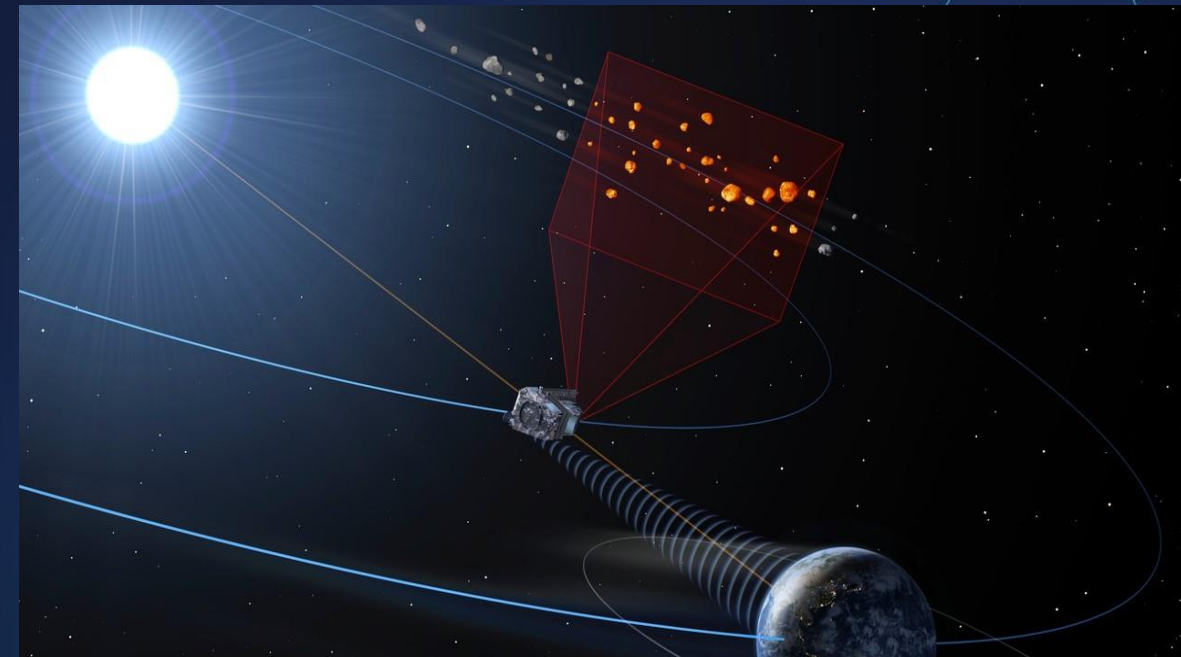
NEOCC

- Orbit determination and impact monitoring system
- Further improvements to NEO Observation Network, new technology and methodologies
- Secure provision of reliable information to international partners and the general public



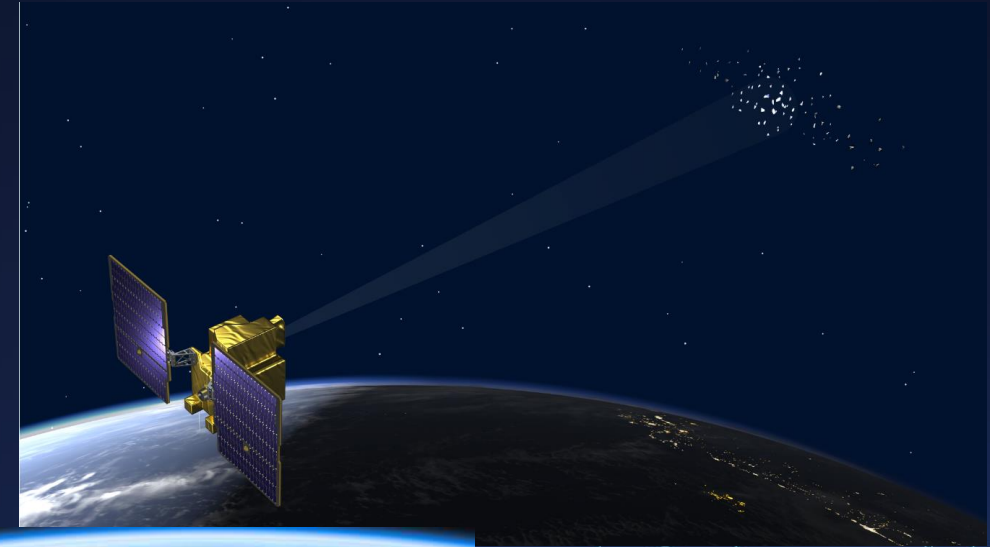
NEOMIR

- Focus on critical technologies (detectors, thermal design) as separate activity
- Mission Phase B1



VISDOMS

- Optical detection of mm-sized debris
- Platform Procurement (Phase B2/C/D/E)
- Ground Segment
- Instrument Finalisation



SAILOR

- In-situ Detection of mm-sized debris
- Phase B2/C/D/E



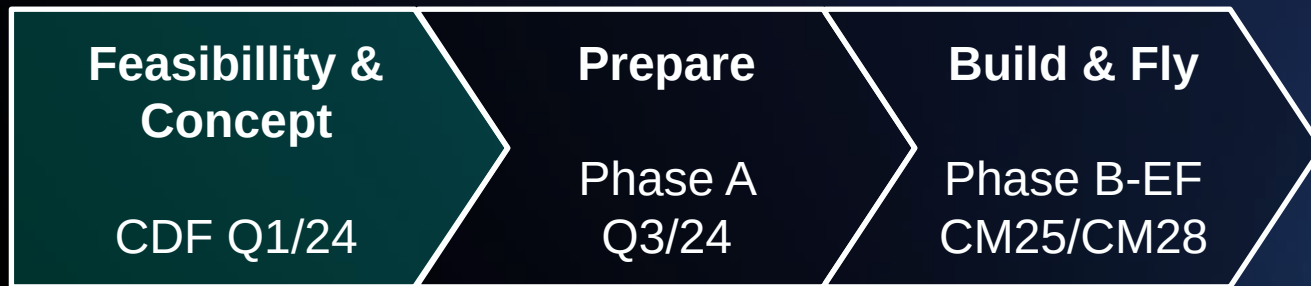
LASER

- Demonstration of debris tracking and orbit determination
- Phase A/B1 for Momentum Transfer verification mission



LUMOS

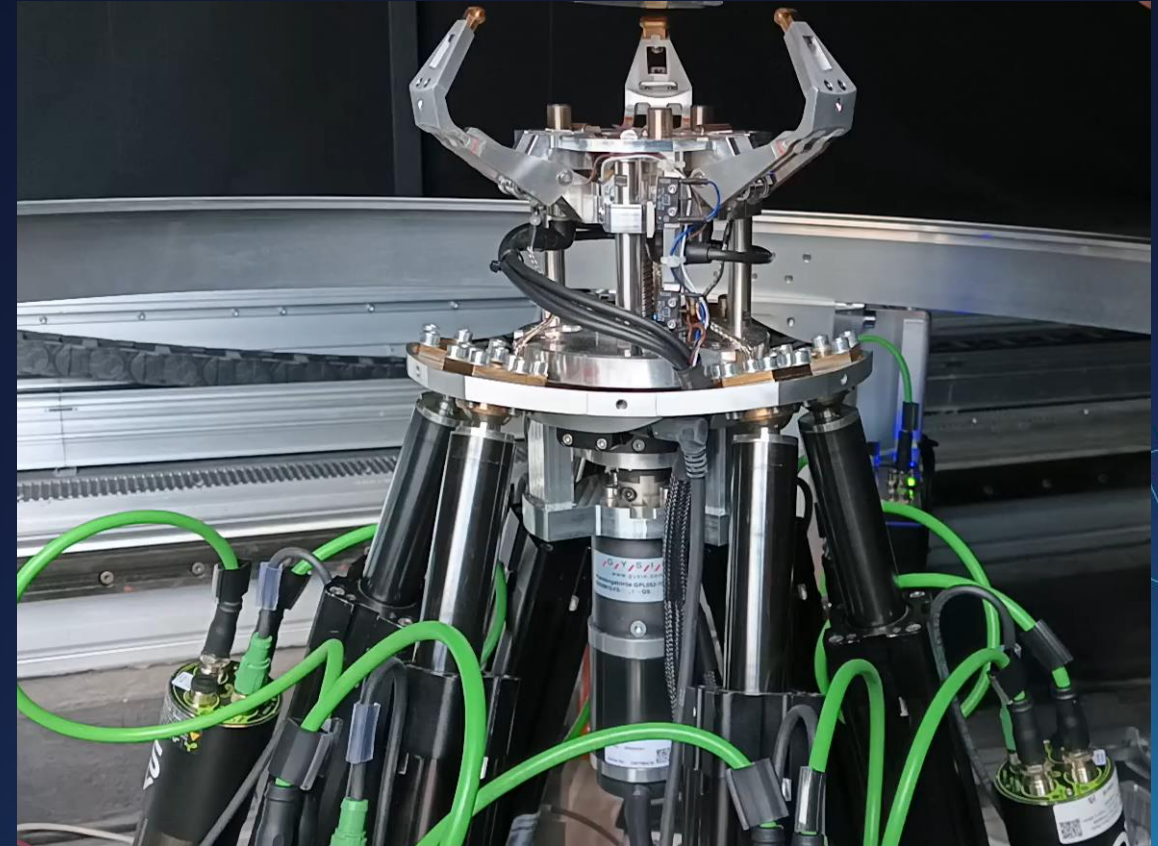
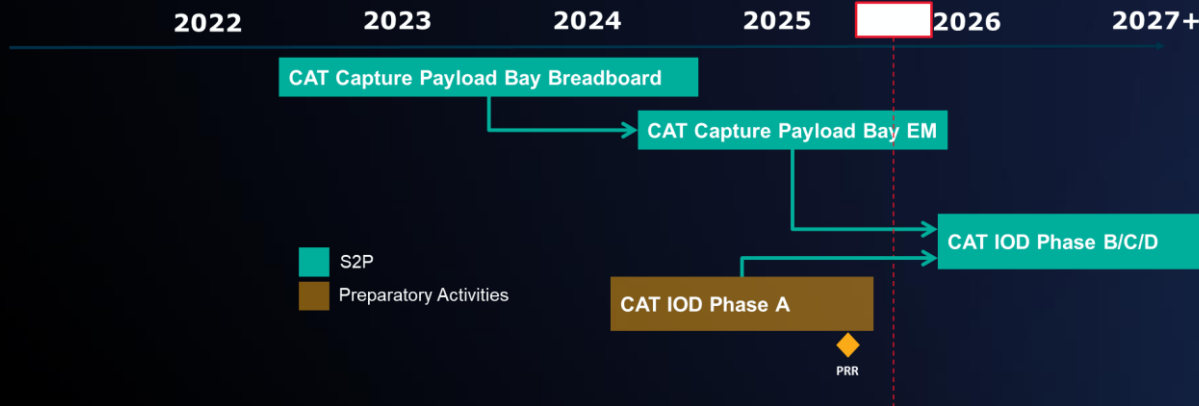
- CIS-Lunar Space Traffic Management



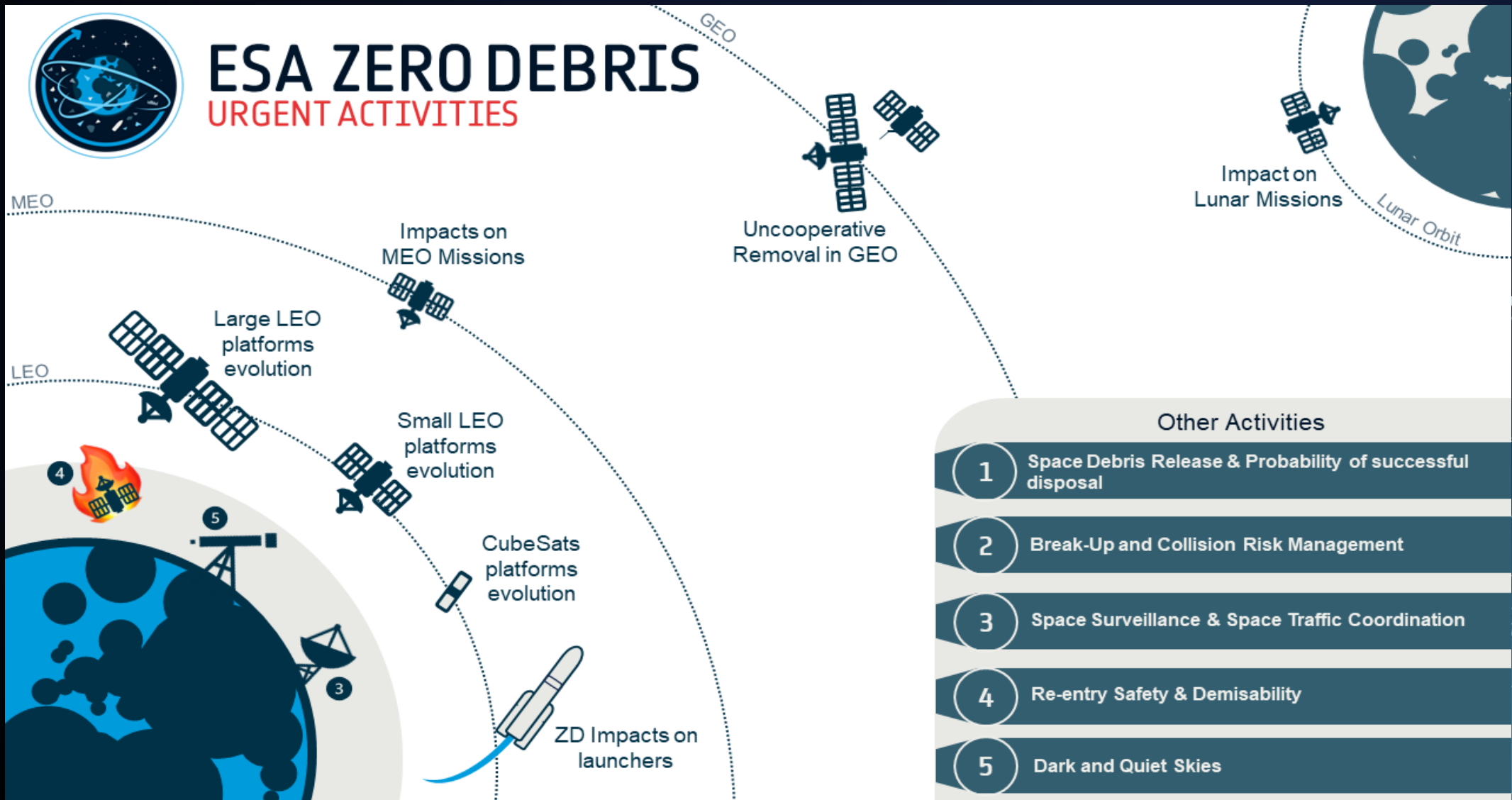
COSMIC – Towards a Zero Debris Future

CAT

- Demonstrating the Capture of a Cooperative target
- CATR Payload Bay achieved TRL4 – End-to-End test in laboratory environment
- LUR-1 satellite (launched) is first satellite to fly ESA's removal interface



COSMIC – Towards a Zero Debris Future



COSMIC – Competitiveness

The competitiveness segment in ESA's Space Safety Programme aims at developing the space safety market and at exploiting commercialisation dimensions.

→ *Use of a novel, two-staged industry-driven procurement process via Call for Proposals (CfP)*



Credits: AVS

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<https://www.linkedin.com/showcase/esa-space-safety/>

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