Space Safety Period 2

ESA S2P Team,

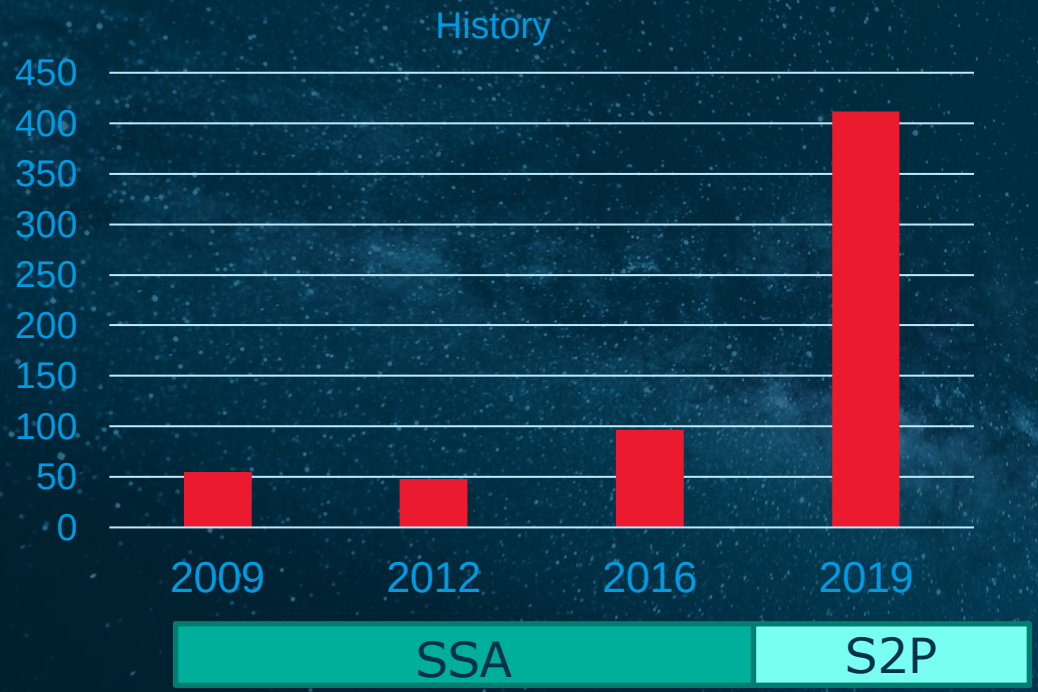
27.10.2022

STRATEGIC OBJECTIVES

Space Safety Goals

- Space Weather early warning system tailored to European user needs
- Early warnings for asteroids >40 m about three weeks in advance,
- Capability to deflect asteroids smaller than 0.5 km (2 years before)
- Established European players for a growing market of space-traffic technologies and products
- Prepare European industry for a zero-debris policy and a circular economy in space

From SSA to Space Safety



Joint Understanding of
ESA and European Comission

PROGRAMME ENVELOPE

ADRIOS (Active Debris Removal, In-Orbit Servicing)
- Clearspace-1
- In-Orbit Servicing

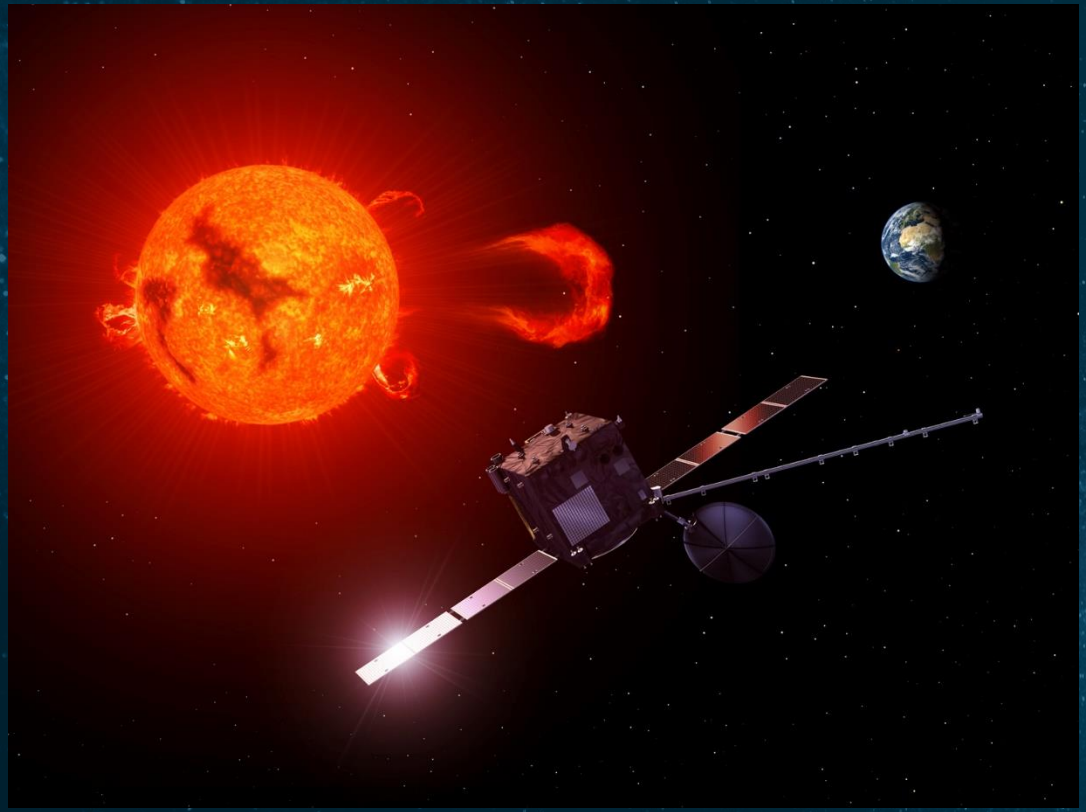
Hera – validating asteroid deflection

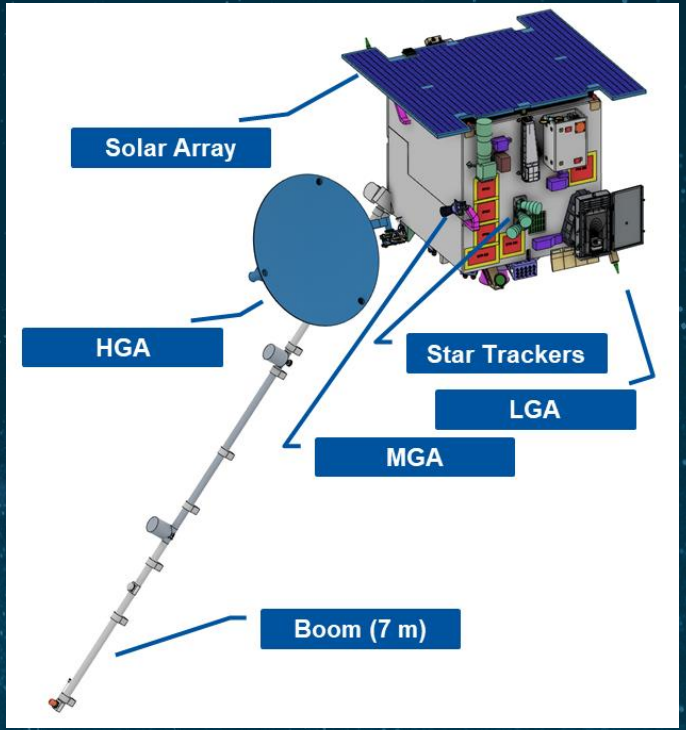
Vigil – monitoring the Sun from a unique perspective

COSMIC (COre, Small Missions Including CREAM and Competitiveness)
- Core (Space Weather, Planetary Defence, Space Debris, Clean Space)
- Small Missions & Projects (Aurora Monitor, Nanosats, VISDOMS, DRACO, NEOMIR, De-Orbiting Kit, LMT, Apophis, CREAM, NEO Survey System)
- Competitiveness – preparing for S2P markets

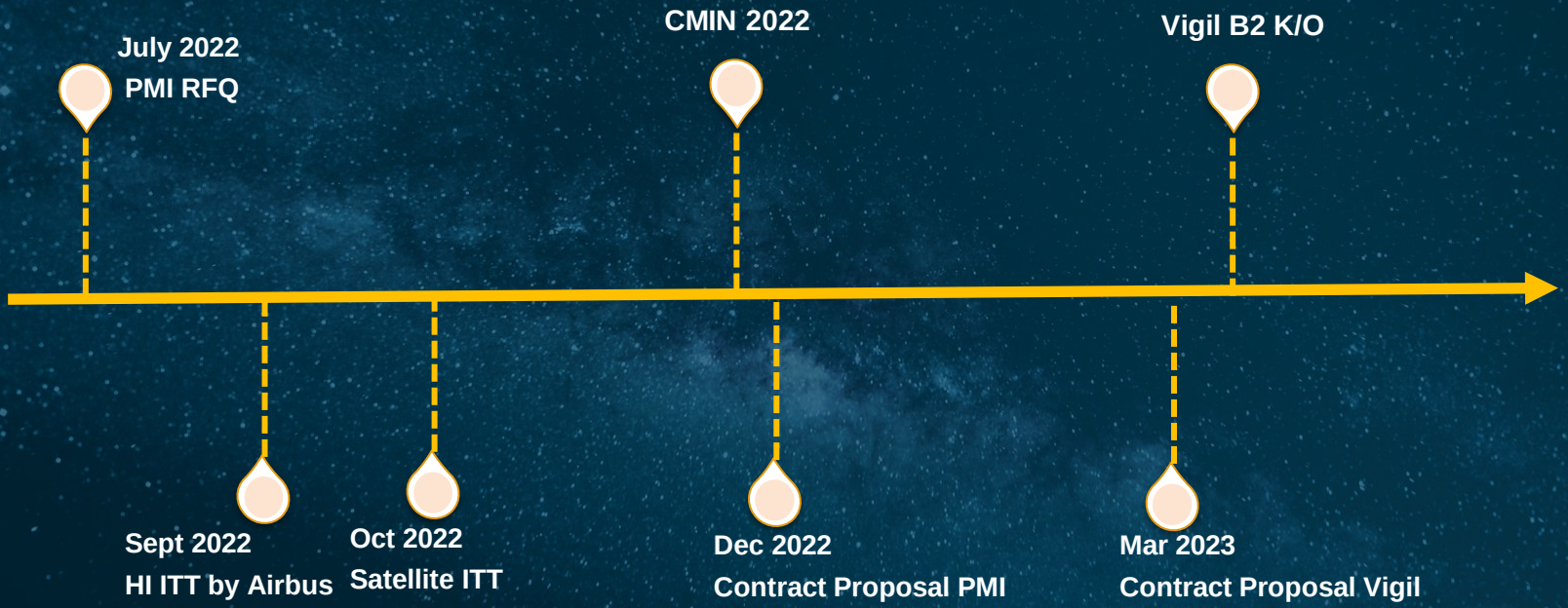
Programme Envelope

Vigil – Space Weather Warnings

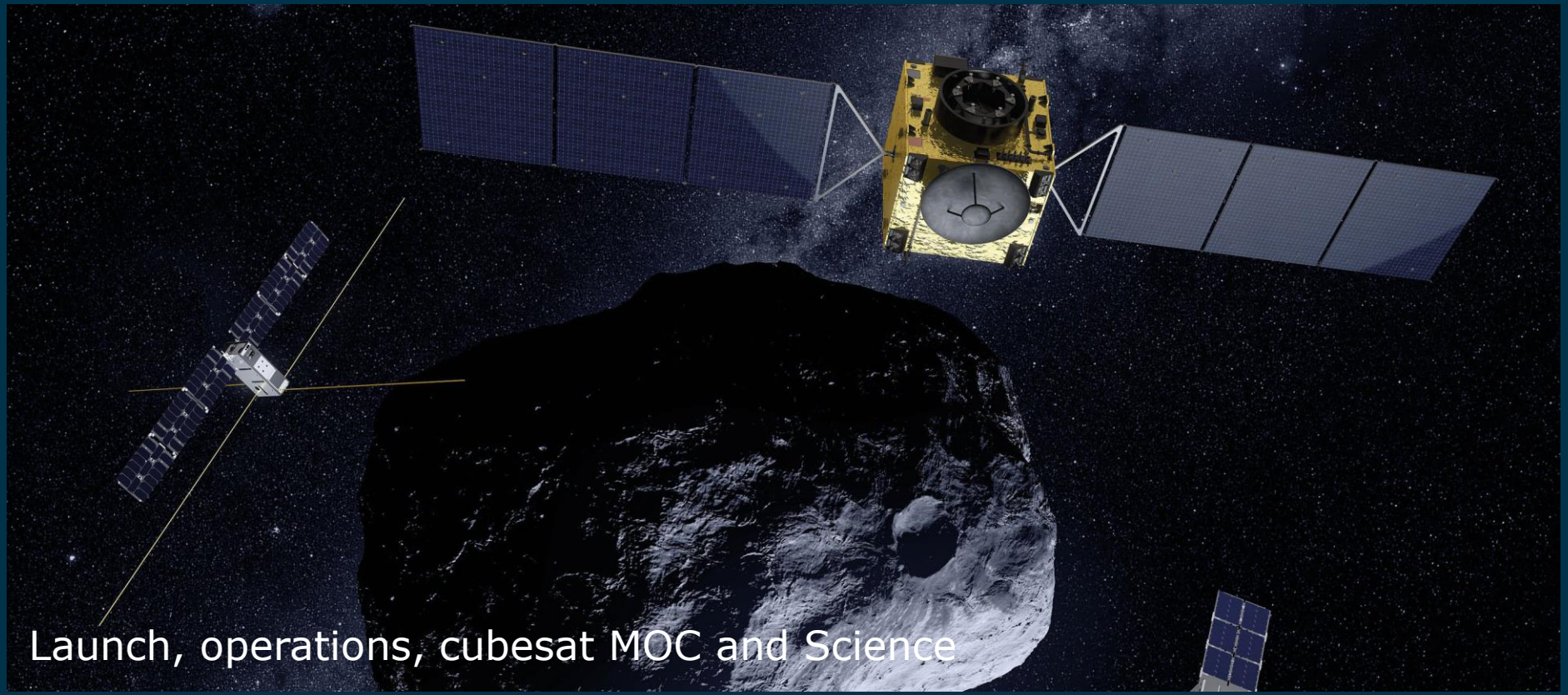




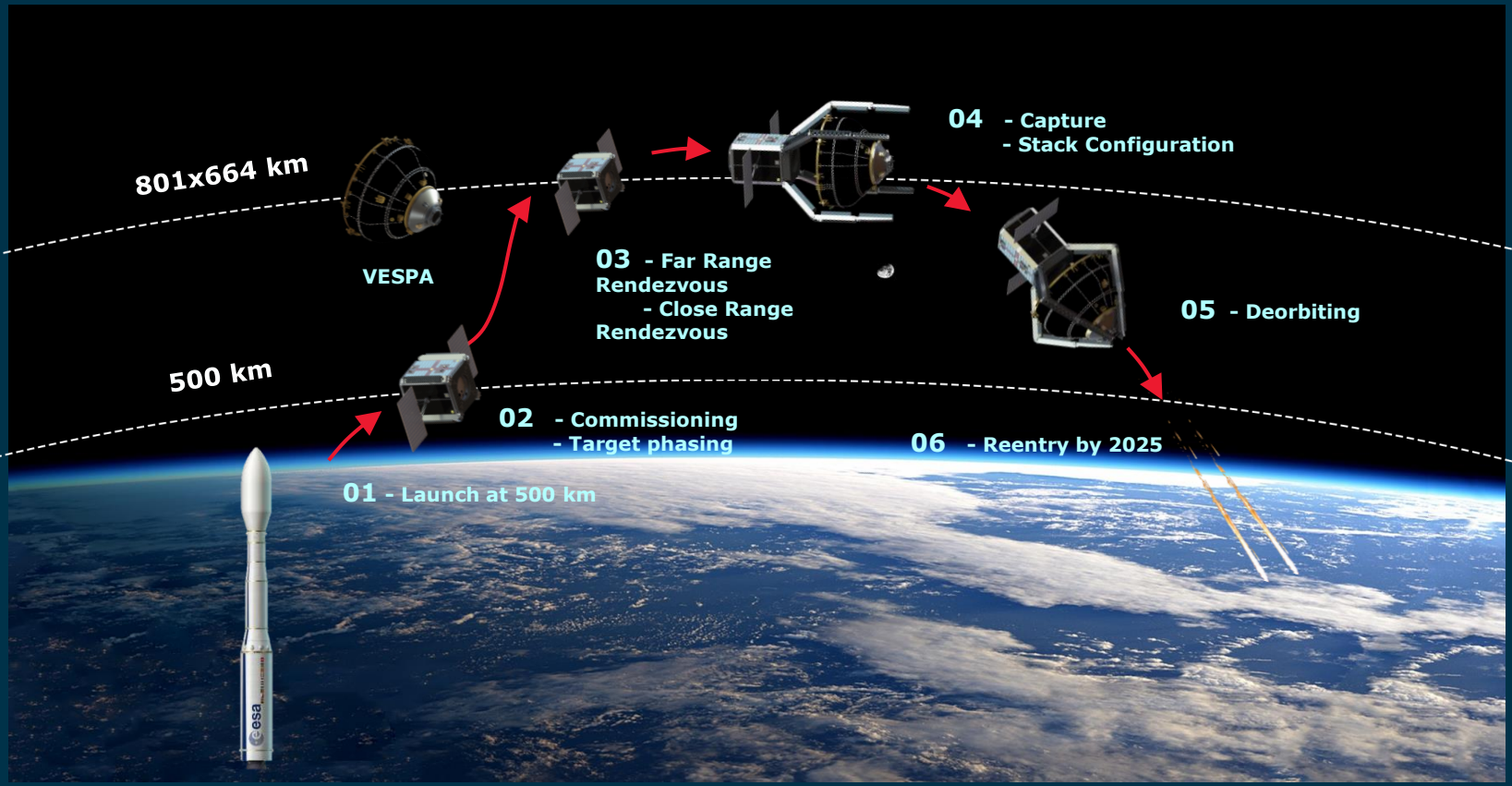
Vigil Period 2 – Procurement Schedule



Hera – Planetary Defense



ADRIOS/Clearspace-1



Zero Debris Approach

This approach is inline with the Net Zero Space charter, which was launched Nov. 12 during the Paris Peace Forum in France

By 2030

Design and operate for **probability of successful disposal well above 90%**

Removal services for remaining in-orbit failures

Current focus

By 2050

Circular economy in space: reuse or recycle 50% of the launched mass.

ADRIOS/IOS – The first European commercial in-orbit servicing mission

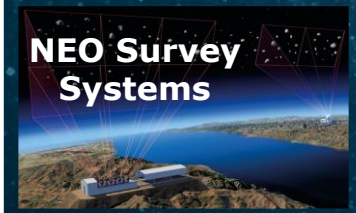
OBJECTIVES

1. To enable a **commercial** service involving a **service provider** and **customer**.
2. To **limit further losses** of **potential market share** for European IOS service providers.

The Customer is fundamental for In-Orbit Servicing

COSMIC

Small Missions and Projects

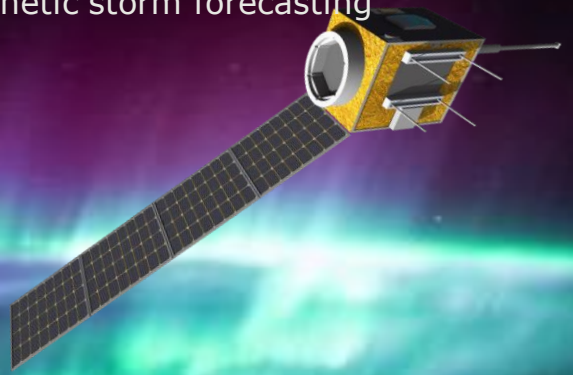


Core

Competitiveness Segment

COSMIC: Aurora Mission

- Class 100 kg plus payload, robust, agile, reliable
- imaging data of day and night side of the Auroral Oval for geomagnetic storm forecasting (GNSS, communications, tourism…)
- Opportunities for European Micro-launchers
- Demo Mission in Period 2
- Constellation in following periods



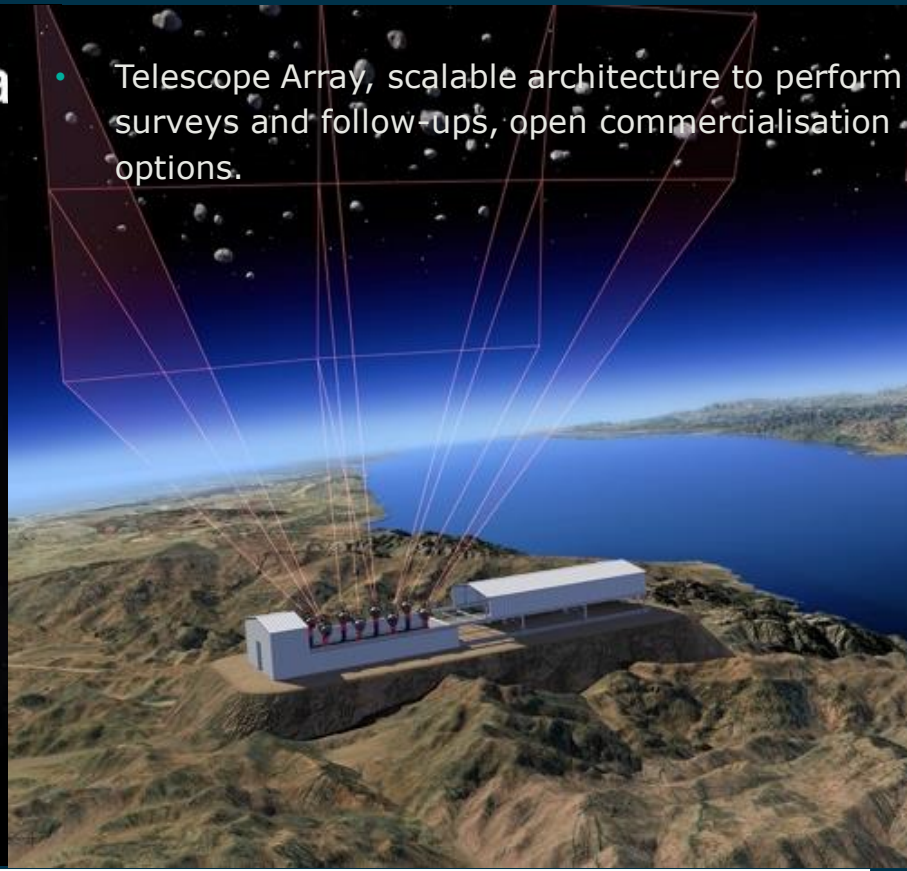
COSMIC Space Weather Nanosats

- Use of nanosatellites for SWE monitoring for operational applications
- Following New Space approach, greater flexibility miniaturised instruments and dynamics, cost-effectiveness
- First mission(s) to be implemented in Period 2

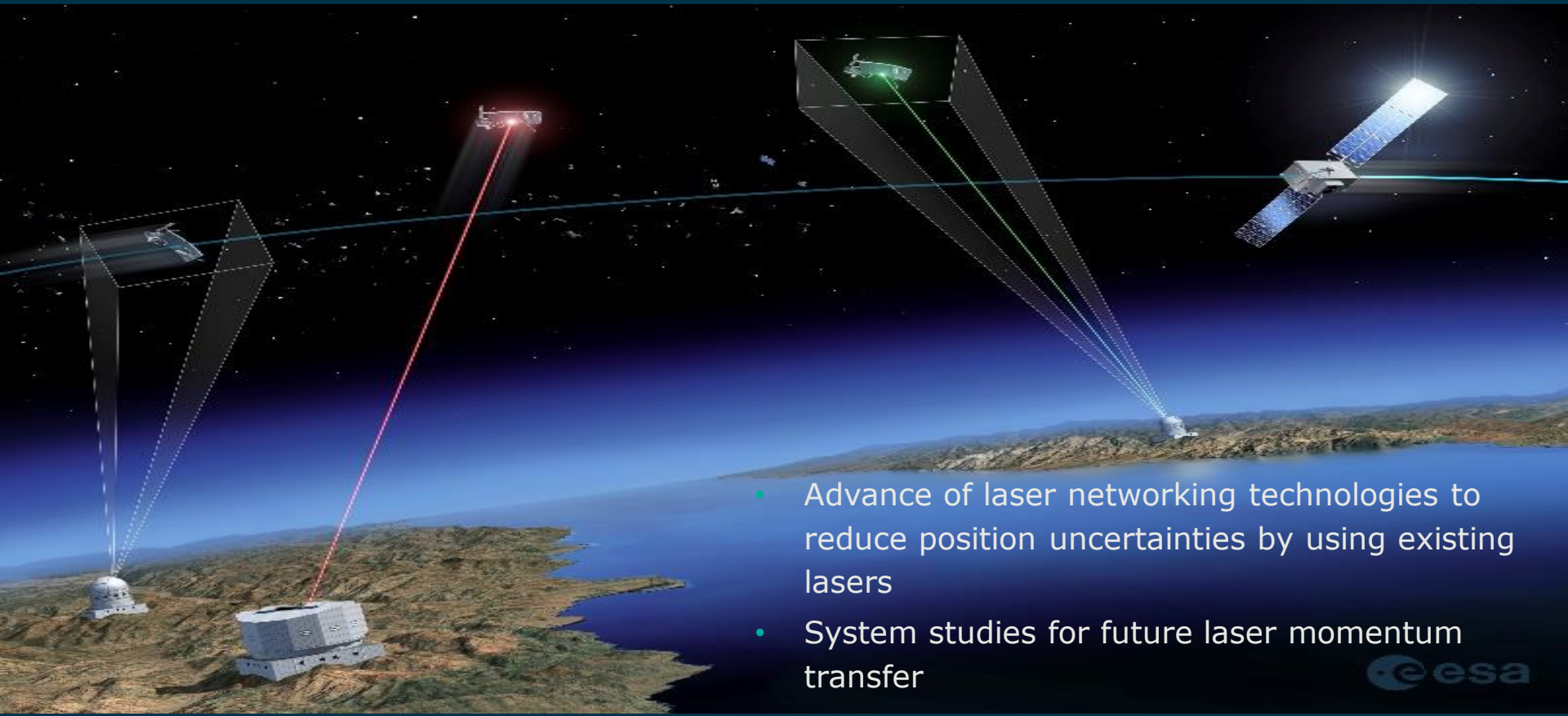
COSMIC: Near-Earth Object Survey System

- Flyeye-2 telescope, featuring a fully revised design

- Telescope Array, scalable architecture to perform surveys and follow-ups, open commercialisation options.



COSMIC Laser Technology



- Advance of laser networking technologies to reduce position uncertainties by using existing lasers
- System studies for future laser momentum transfer

COSMIC VISDOMS (**V**erification of **I**n-**S**itu **D**ebris **O**ptical **M**onitoring from **S**pace)

- Enhance statistical knowledge about LEO debris by detecting and characterising objects with a diameter of 1 mm or larger.
- Period 2: hosted payload mission and preparation of a dedicated small satellite mission.
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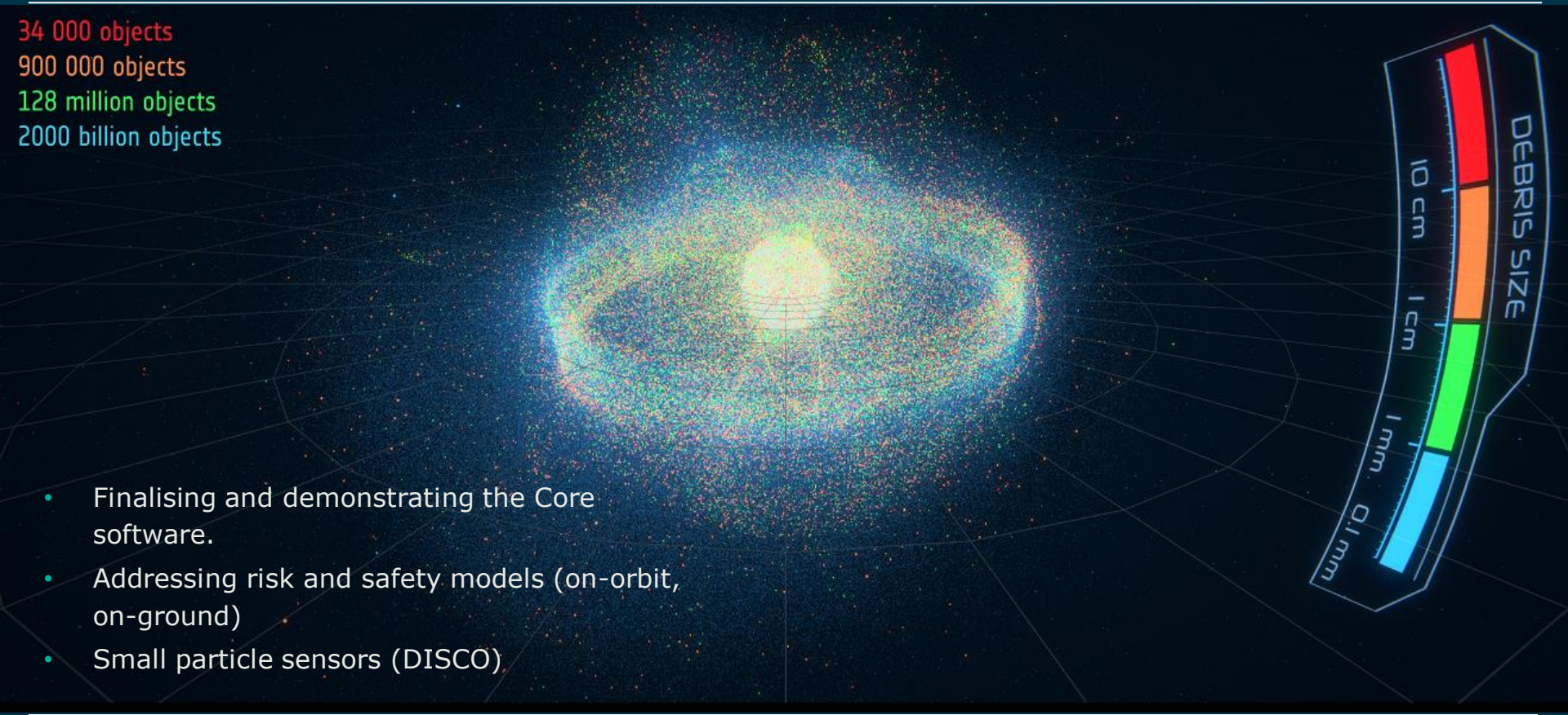
Deorbiting Kit

- In-flight demonstration of kit for direct reentry of spacecraft and launcher adaptors
- important building block to the envisaged "zero-debris approach"

Space Debris (Core)



- Finalising and demonstrating the Core software.
- Addressing risk and safety models (on-orbit, on-ground)
- Small particle sensors (DISCO)

Competitiveness Segment

- Development of a market for space safety products and services.
- ESA will act as a trial user and early adopter of the industry's products/services to reduce business risks.


Thank You !