

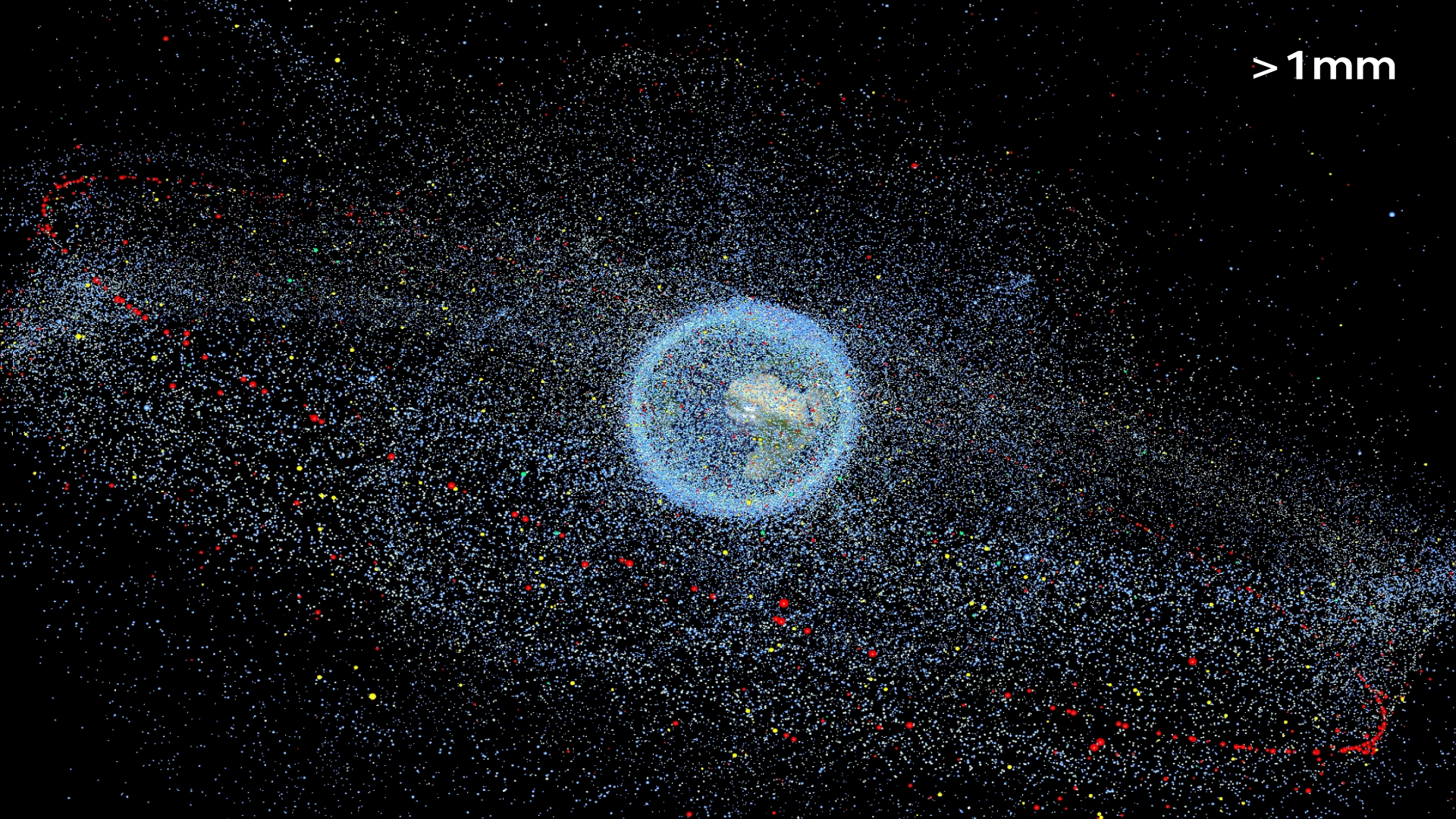
Space Debris and Space Traffic Management

Dr. Rolf Densing, ESA/ESOC,
Space Working Group of the Belgian Senate

27.05.2021



> 1mm



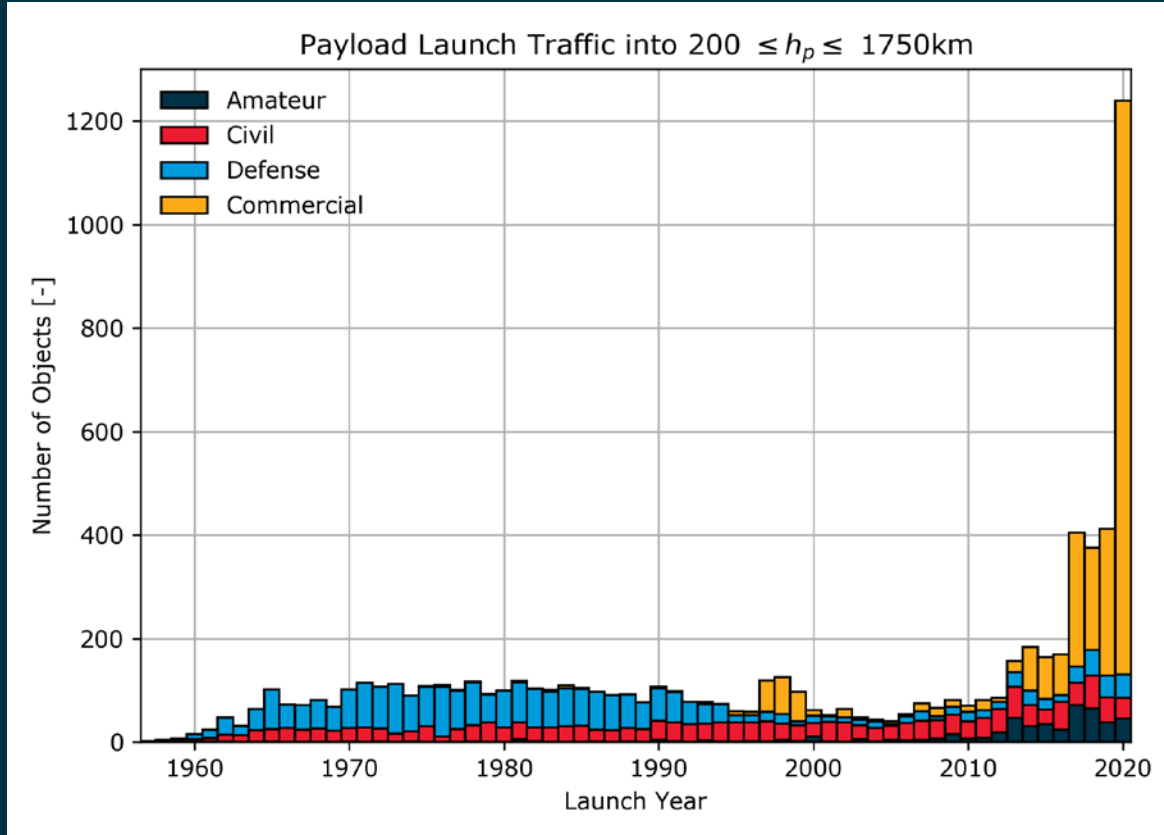
Sentinel 1A

April 2014

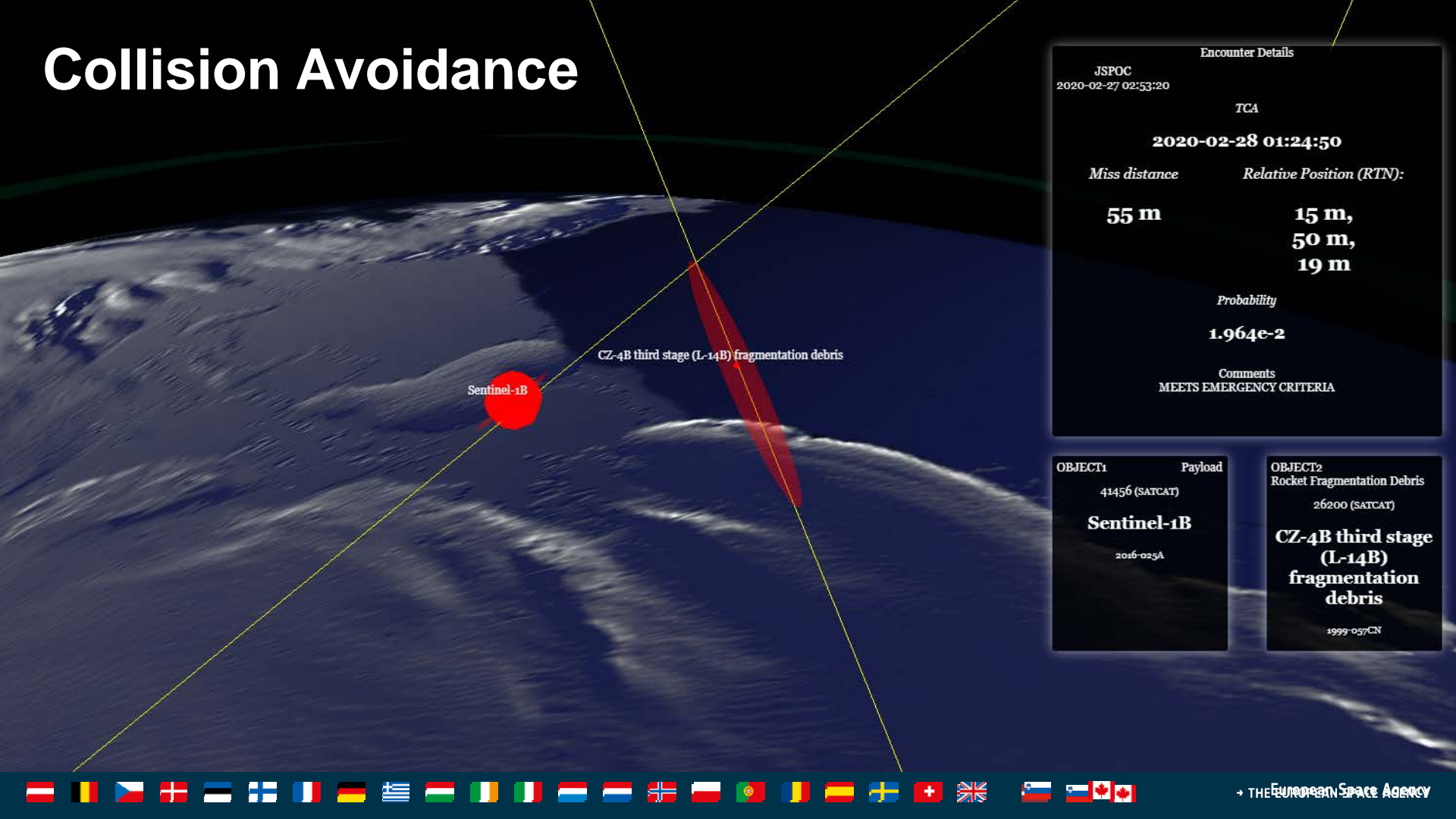


August 2016





Collision Avoidance



Sentinel-1B

CZ-4B third stage (L-14B) fragmentation debris

Encounter Details

JSPOC
2020-02-27 02:53:20

TCA

2020-02-28 01:24:50

Miss distance

Relative Position (RTN):

55 m

**15 m,
50 m,
19 m**

Probability

1.964e-2

Comments

MEETS EMERGENCY CRITERIA

OBJECT1

Payload

41456 (SATCAT)

Sentinel-1B

2016-025A

OBJECT2

Rocket Fragmentation Debris

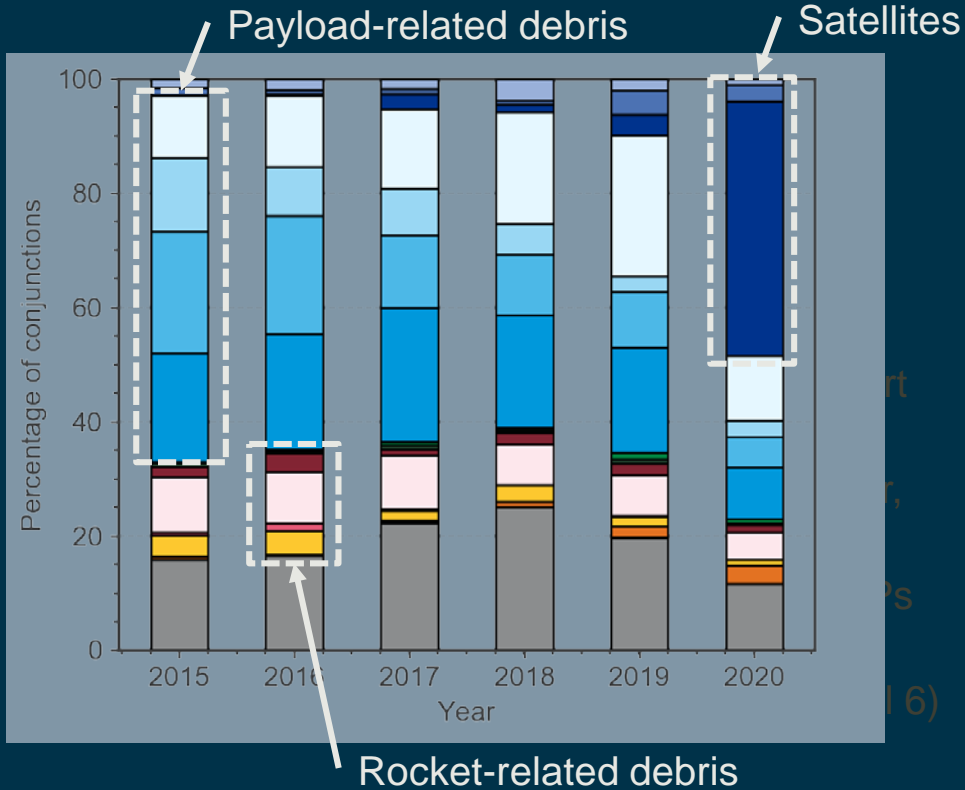
26200 (SATCAT)

**CZ-4B third stage
(L-14B)
fragmentation
debris**

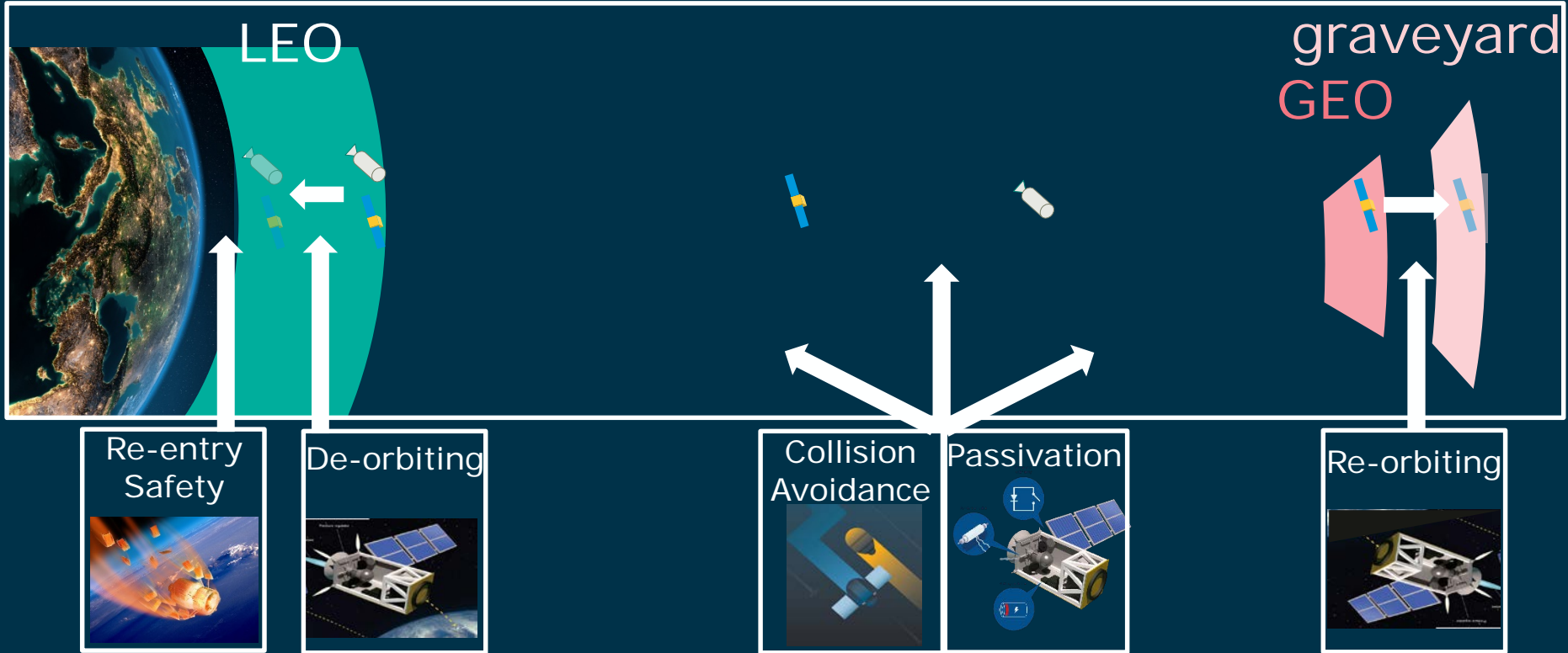
1999-057CN



Space Traffic Management Solutions



Mitigation of Space Debris





SPACENEWS

UNIVERSAL ROBOTS
Schneller als der Wandel in Ihrer Elektronikproduktion



Meer erfahren

Chinese rocket stage predicted to reenter atmosphere around May 8

by Andrew Jones — May 4, 2021



Rollout of the first Long March 5B to the pad at Wenchang, South China in April 2020. Credit: CASC

HELSINKI — A large rocket stage that launched China's first space station last week is likely to reenter the atmosphere around May 8, according to early space tracking predictions.

U.S. Department of Defense spokesman Mike Howard in a statement May 4 said that "U.S. Space Command is aware of and tracking the location of the Chinese Long March 5B in space, but its exact entry point into the Earth's atmosphere cannot be pinpointed until within hours of its reentry, which is expected around May 8."

De-Orbiting Technology

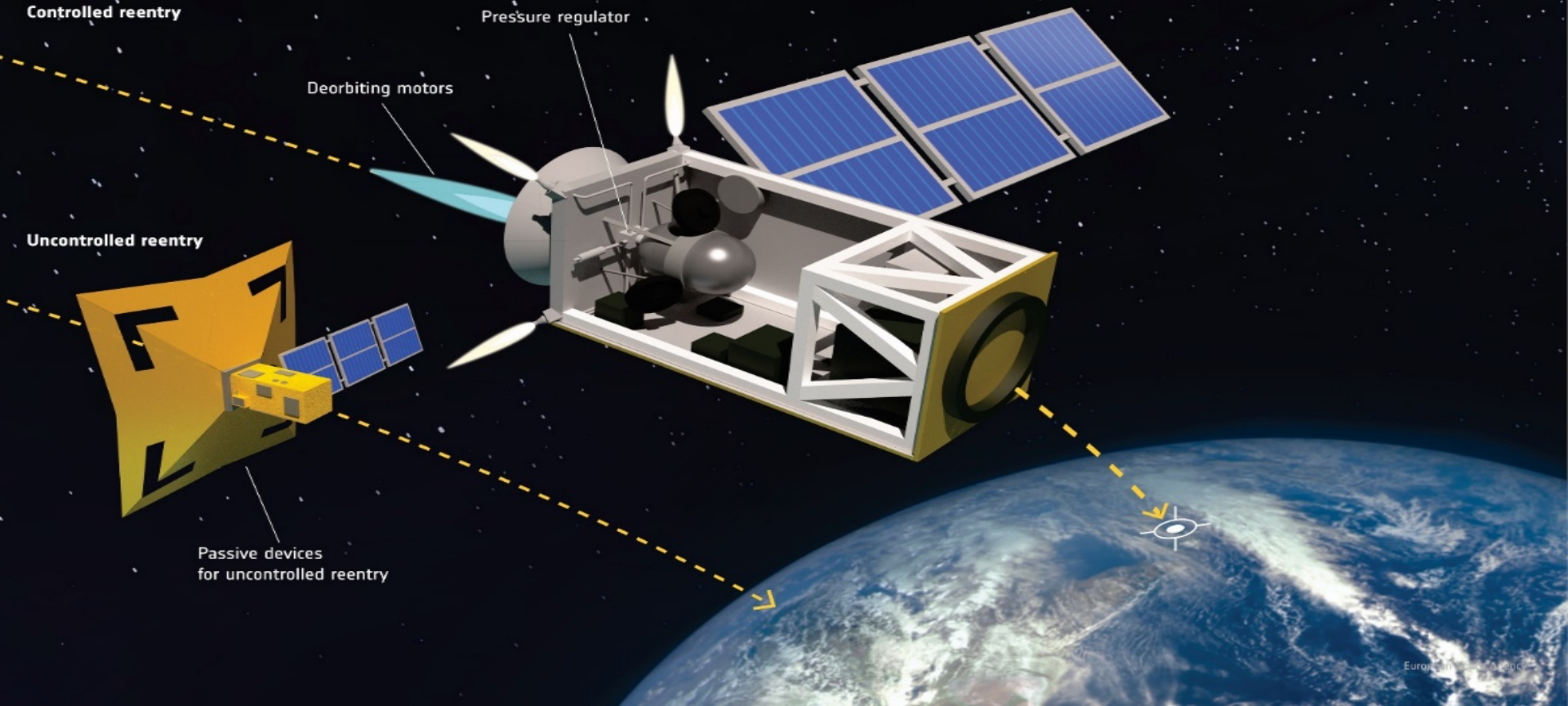
Controlled reentry

Pressure regulator

Deorbiting motors

Uncontrolled reentry

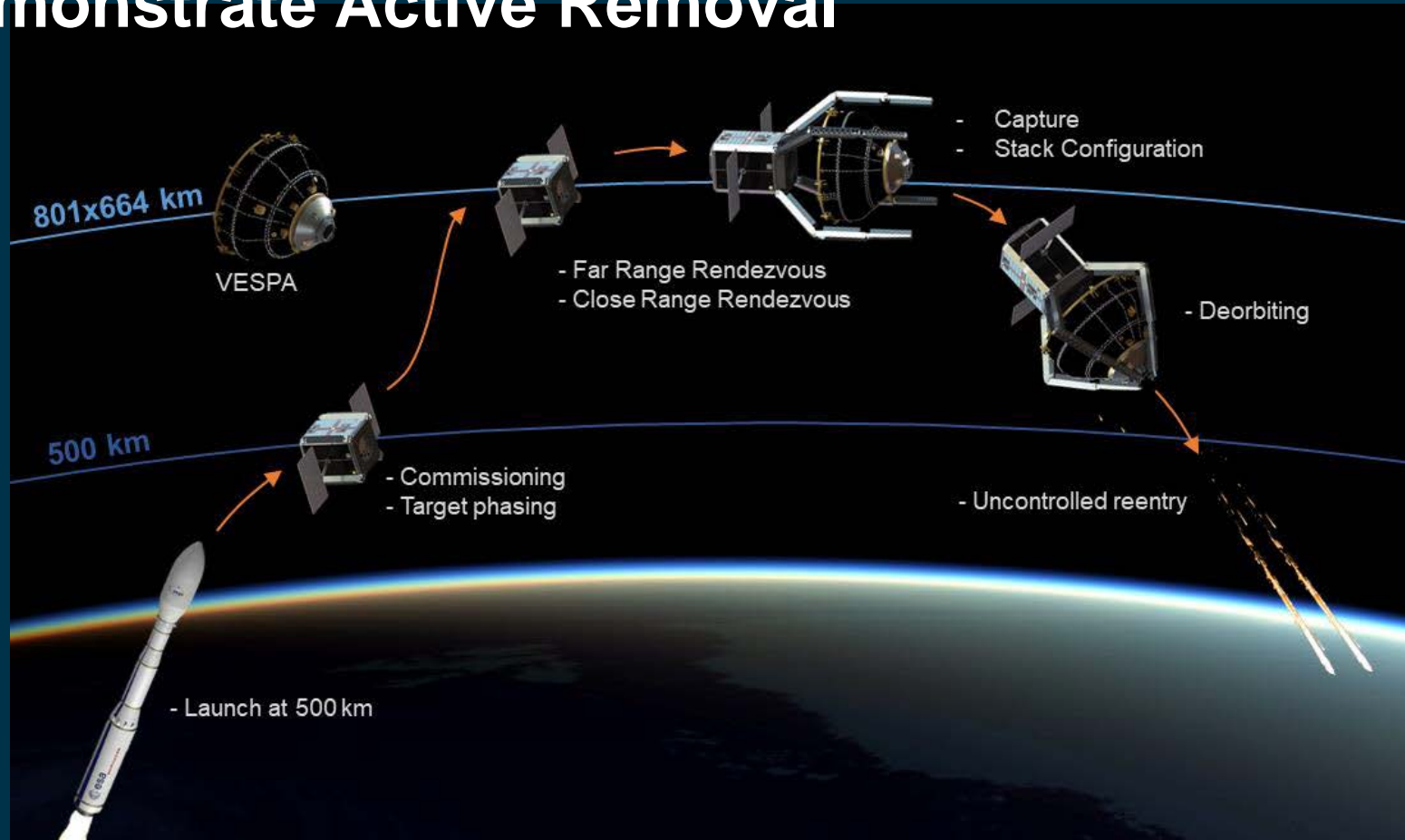
Passive devices
for uncontrolled reentry



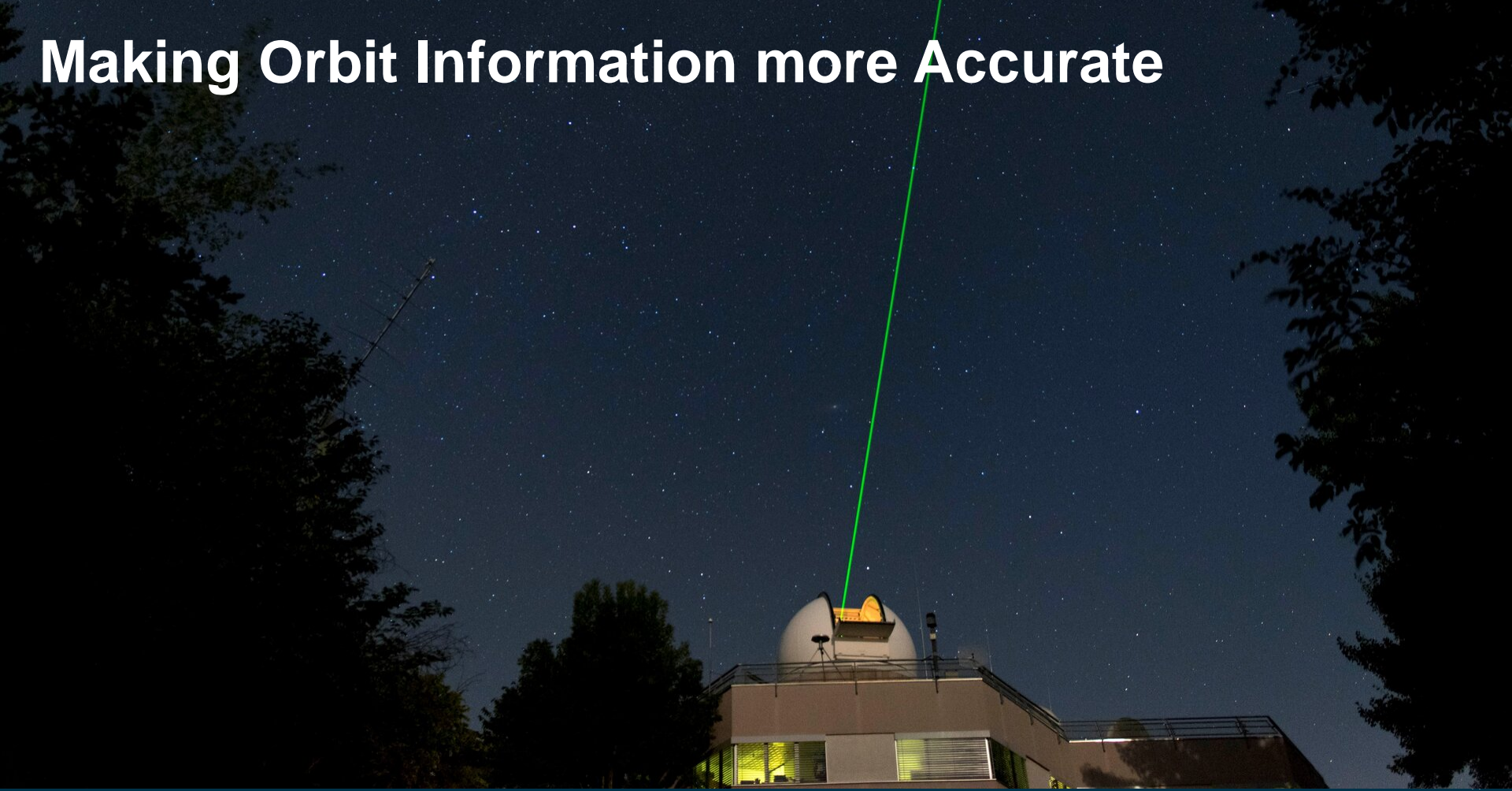
European Space Agency



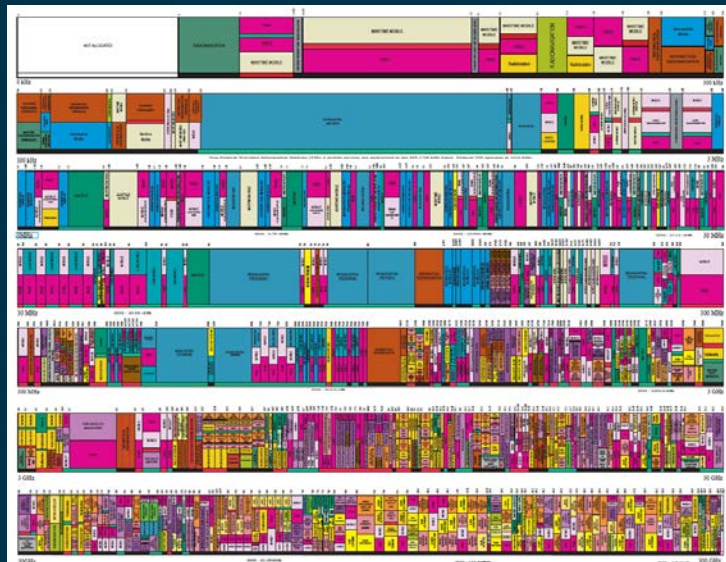
Demonstrate Active Removal



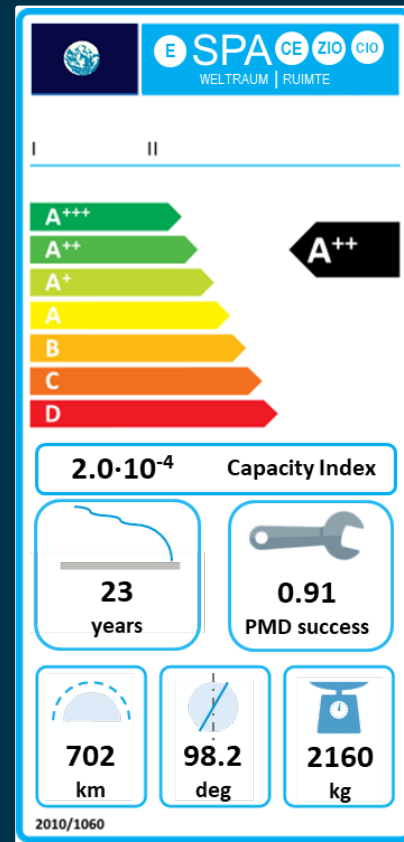
Making Orbit Information more Accurate



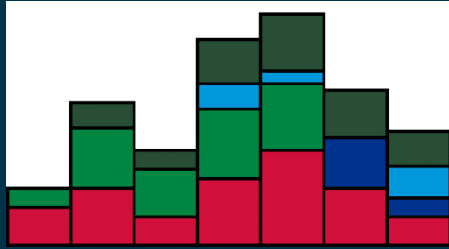
Impact of a mission on the space environment



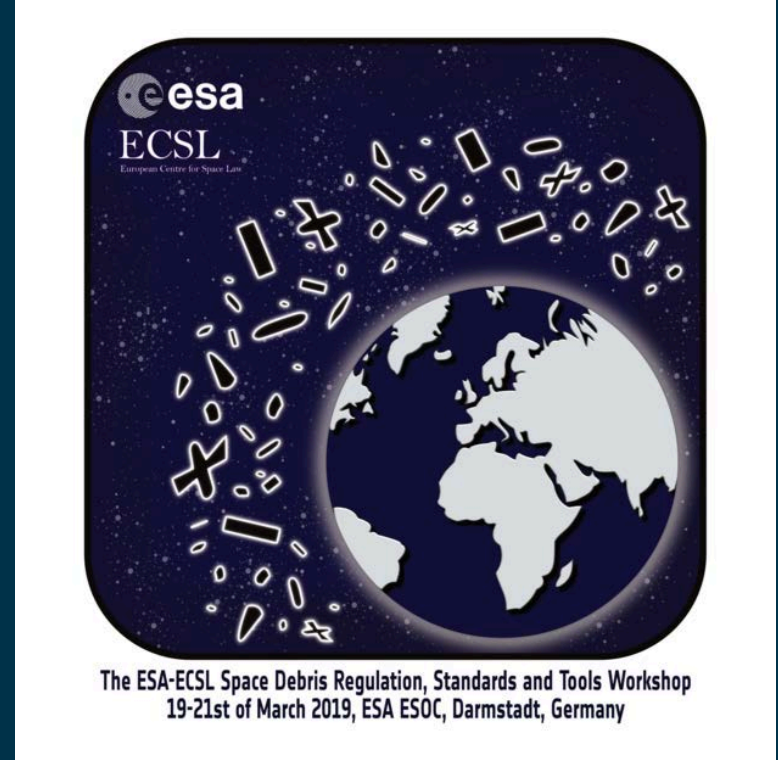
Frequency coordination (example)



ESA Tools offered



DISCOS



For our Services (NEO Coordination Centre, SWE Payload Data Centre)

- Risk of Misinformation, malicious intent, damage to the S2P image

For all our Missions

- Mission availability and continuity

For resilience of data exchange

- Blockchain for CREAM



Belgium in Space Safety

Space Weather

- Operate the European Space Weather Data System
- Coordination of Space Weather Service Centres
- EUV-Imager for the Lagrange mission

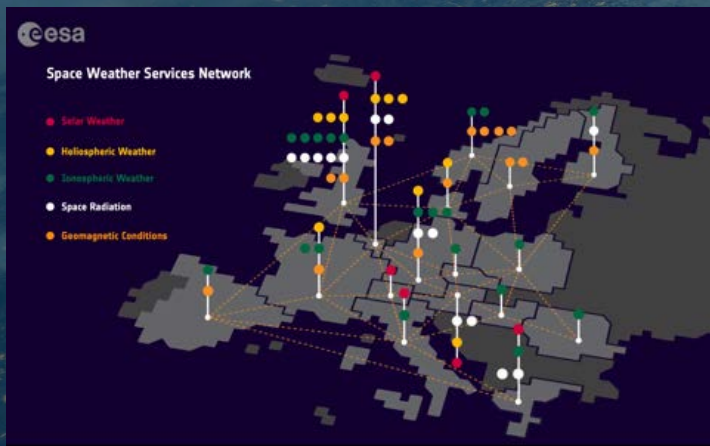


Planetary Defense

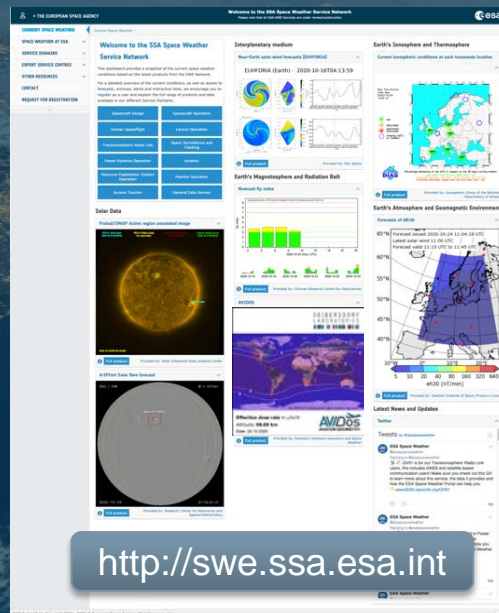
- First deep-space cubesat operations for Hera (ESEC)
- Infra-red detectors for Hera



SPACE WEATHER SYSTEM TODAY



Space Weather Service Network



Portal hosted by the Space Weather Data Centre in Redu

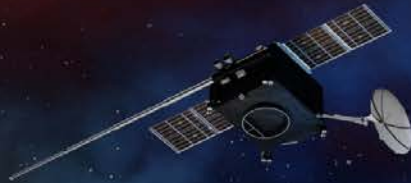


Space Weather Coordination Centre (Brussels)

LAGRANGE – FIRST EVER OPERATIONAL SPACE WEATHER DEEP SPACE MISSION



LAGRANGE EUV Coronal Imager (LUCI):



Lagrange



D3S



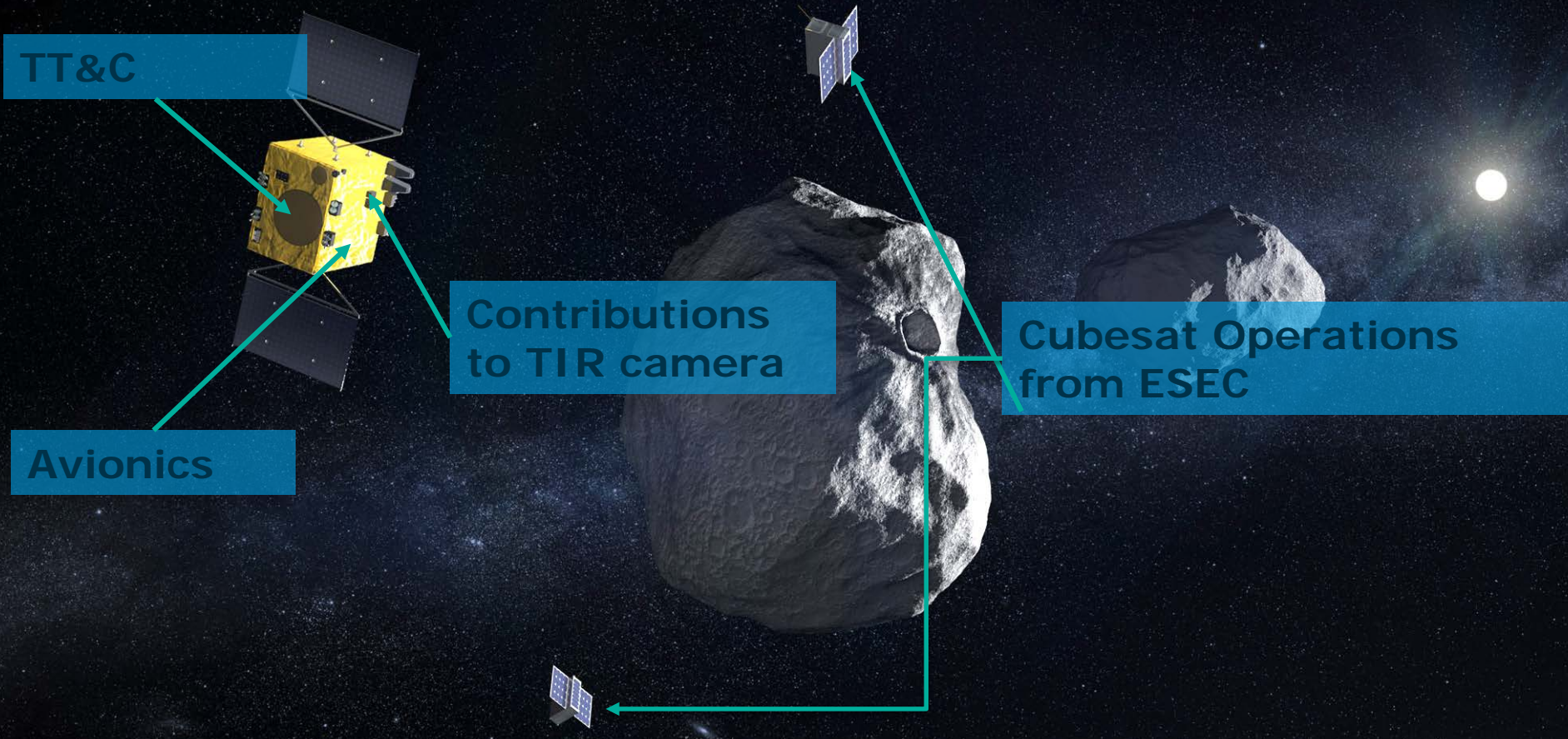
HERA – BELGIAN CONTRIBUTIONS

TT&C

Avionics

Contributions
to TIR camera

Cubesat Operations
from ESEC





THANK YOU

www.esa.int