

BELSPO Space Talks



7 July 2022 at the Residence Palace, Wetstraat 155, 1040 Brussel

ESA's Science Program



Günther Hasinger

Director of Science

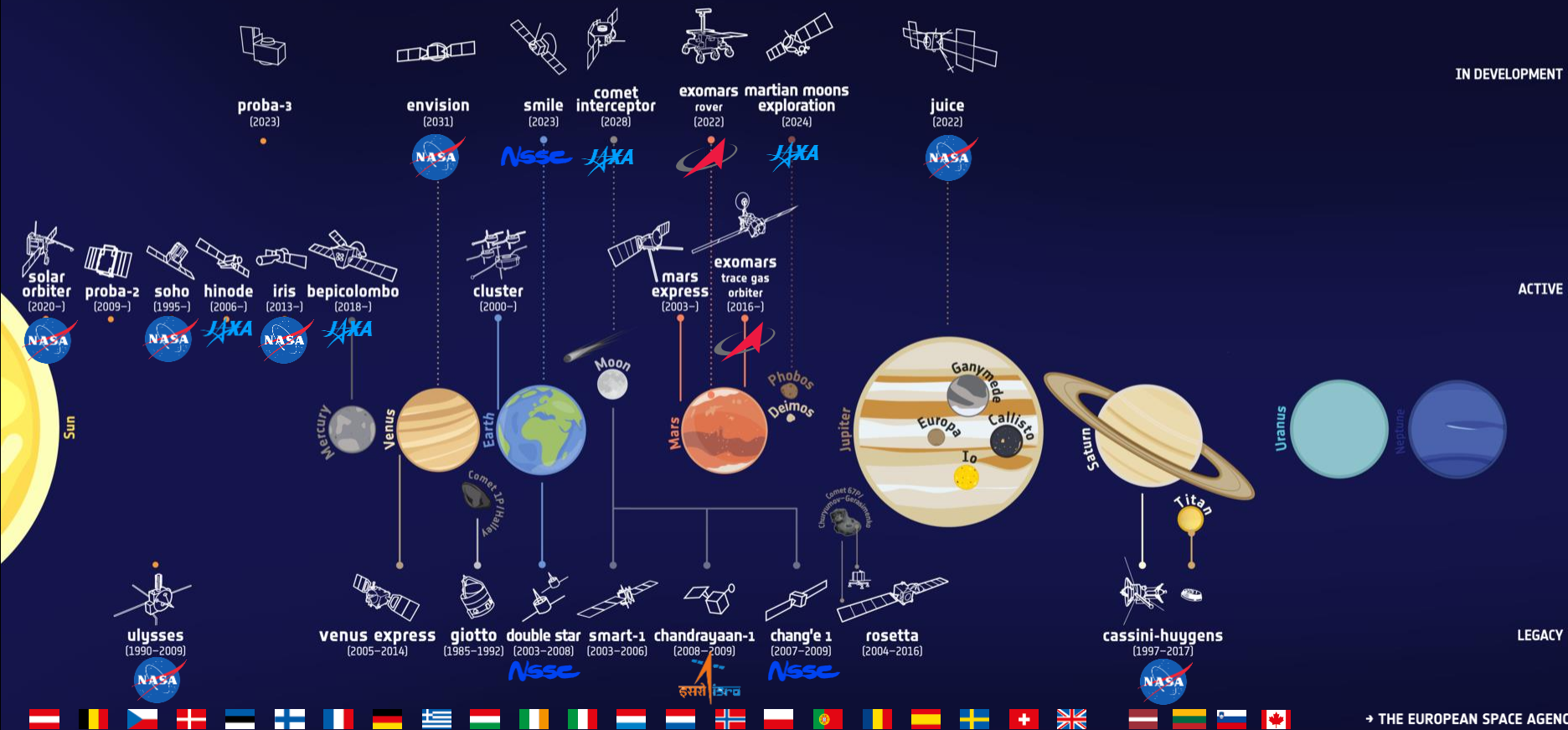
BELSPO Space Talks

7/7/2022



→ THE EUROPEAN SPACE AGENCY

SOLAR SYSTEM EXPLORERS



→ THE EUROPEAN SPACE AGENCY

COSMIC OBSERVERS



IN DEVELOPMENT

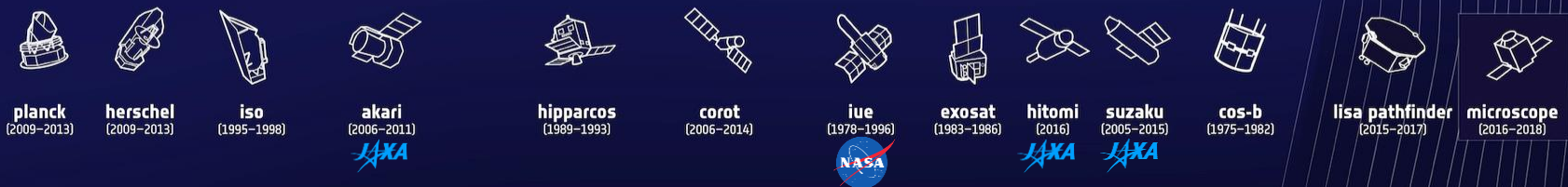


ACTIVE



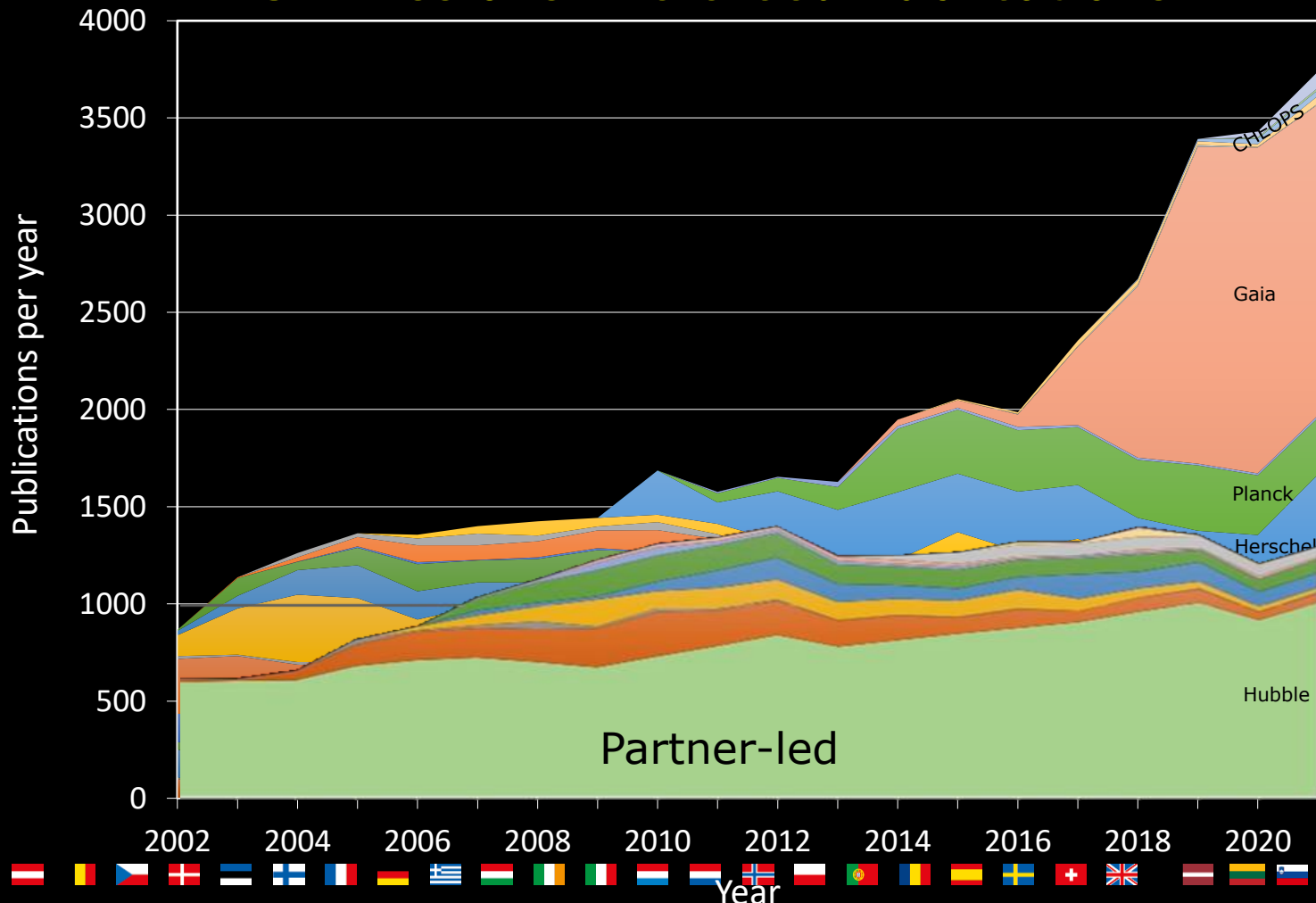
microwaves sub-millimetre infrared optical ultraviolet x-rays gamma rays gravitational waves

LEGACY



→ THE EUROPEAN SPACE AGENCY

ESA Missions: Refereed Publications



Most papers ever in 2019-2022 (>3500)

About half of these were from Gaia

Strong positive trend with doubling time ~8yr

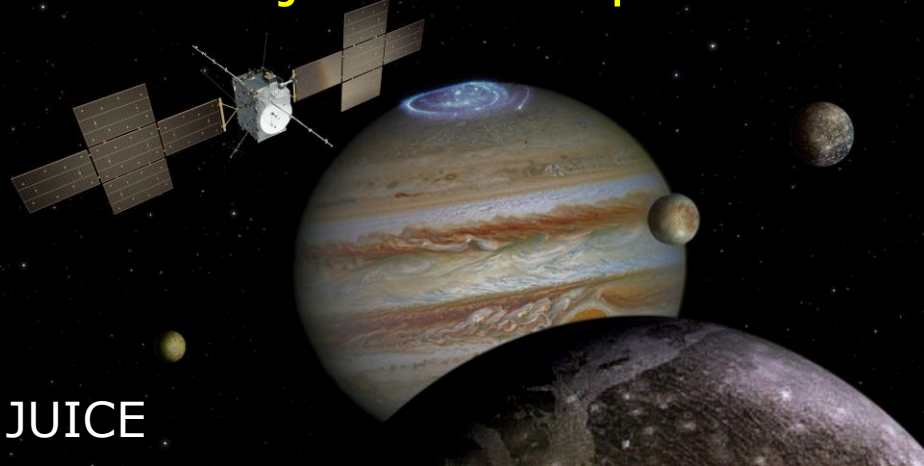
Pandemic caused some slow-down, but has recovered

~12% of worldwide "market share", including all ground based and theoretical astrophysics (16% including partner missions).

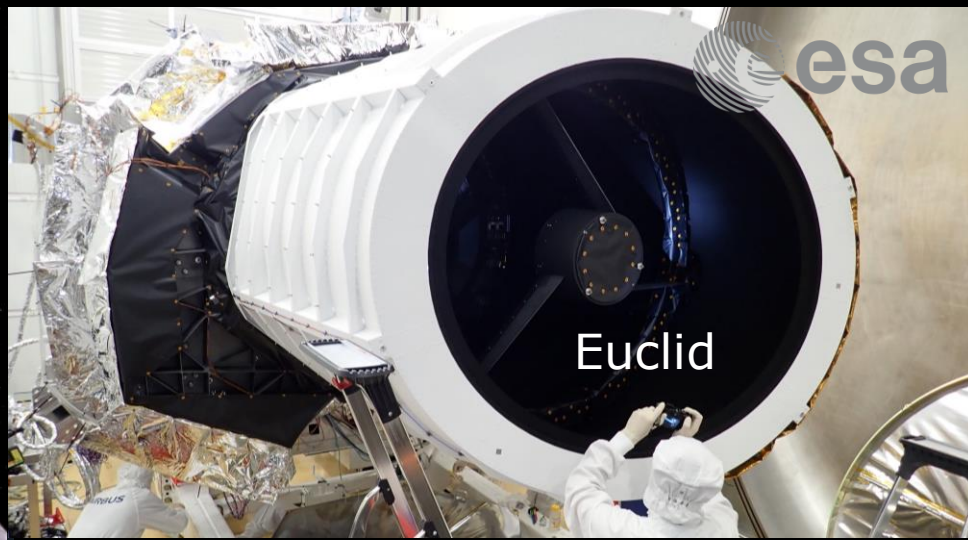
Citation impact strongly increasing.



Projects in Preparation



JUICE

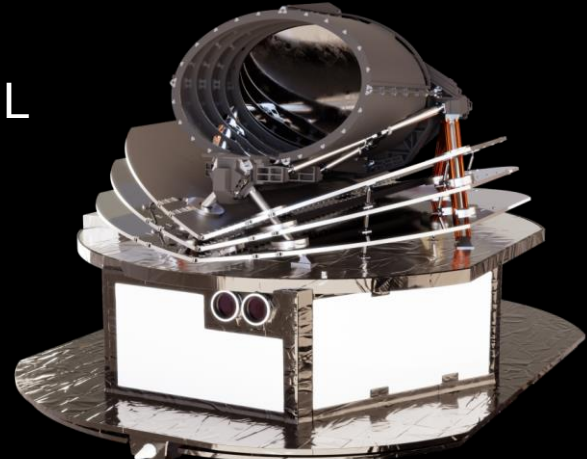


Euclid

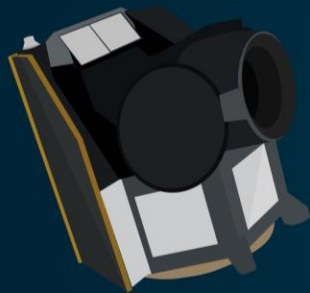
PLATO



ARIEL

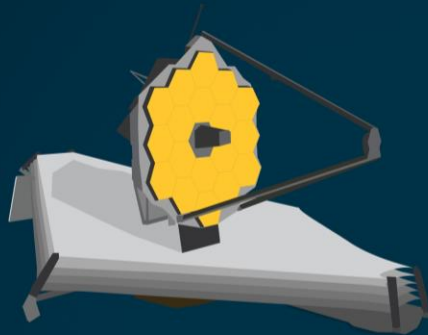


ESA'S NEW AND FUTURE EXOPLANET MISSIONS



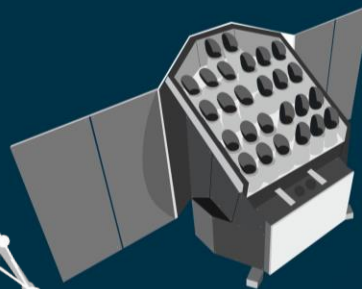
Cheops

First step characterisation of known Earth-to-Neptune size exoplanets



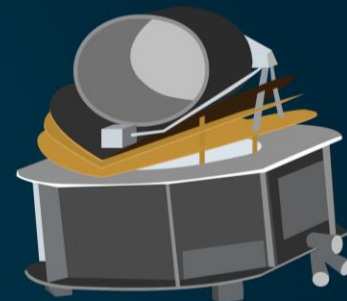
Webb

Detailed characterisation of exoplanet atmospheres through transit studies and direct imaging



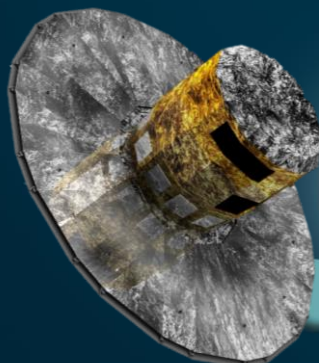
Plato

Studying terrestrial planets in orbits up to the habitable zone of Sun-like stars, and characterising these stars



Ariel

Performing a chemical census of a large and diverse sample of exoplanets by analysing their atmospheres



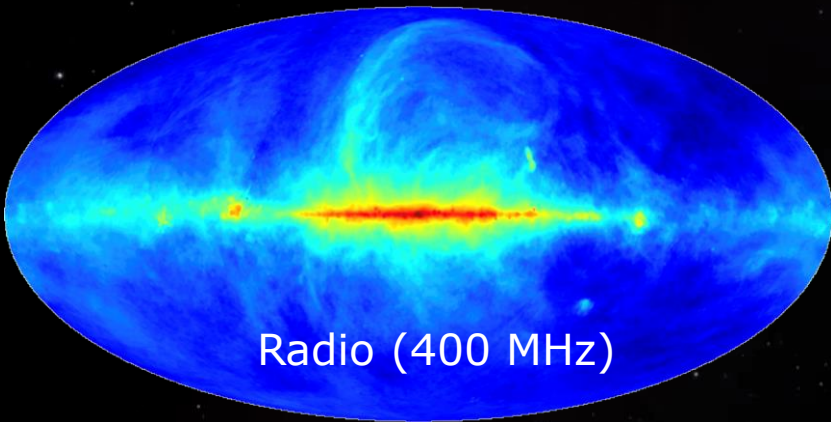
GAIA



#ExploreFarther

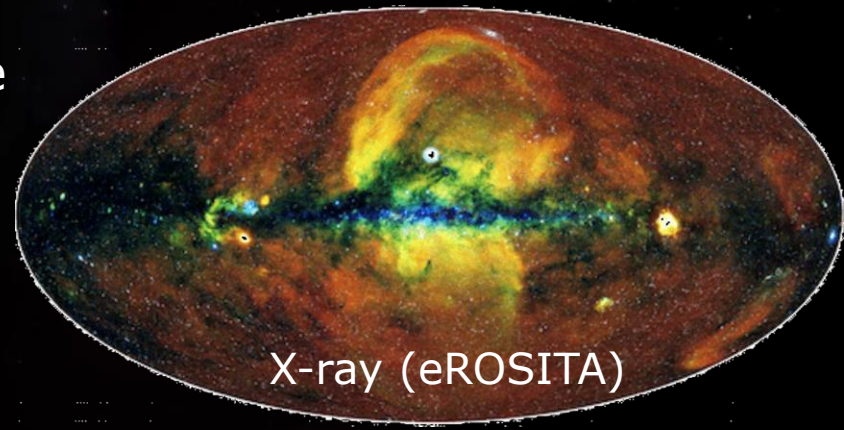


Gaia unravels star formation on the Local Bubble



Local
Bubble

Sun



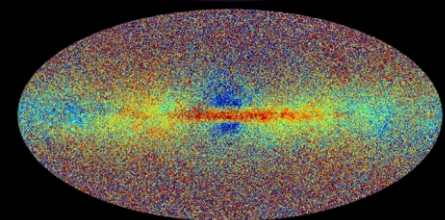
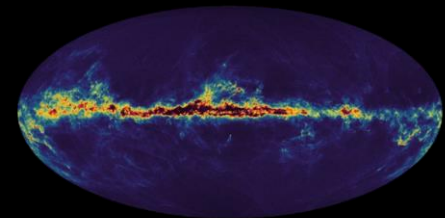
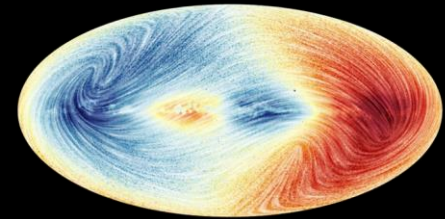
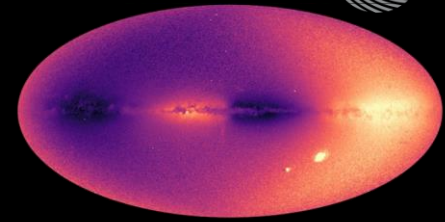
14

MILLION YEARS AGO

C. Zucker et al. 2022, Nature



GAIA Data Release 3



JWST picture-book launch

PRIMARY MIRROR SELFIE

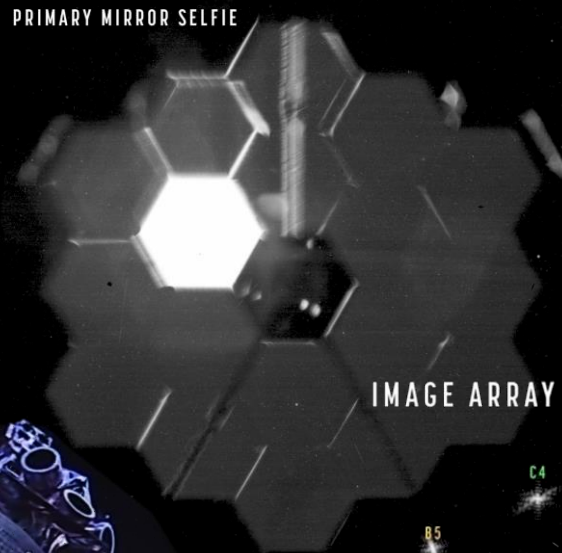
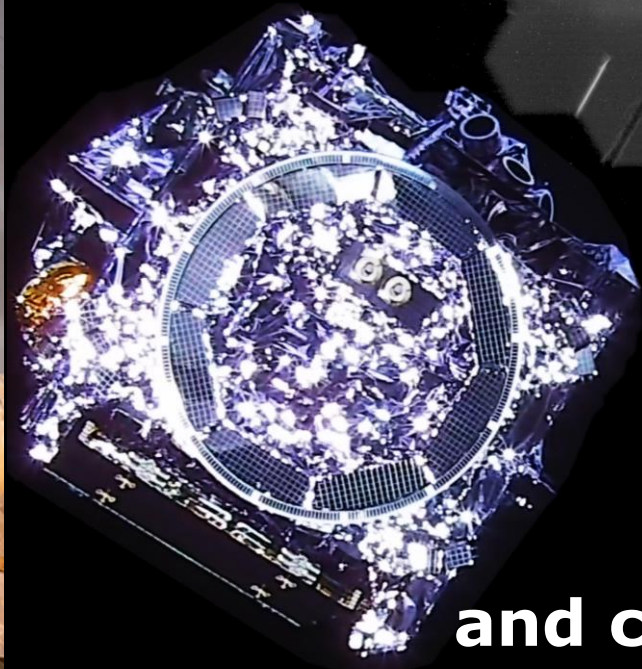
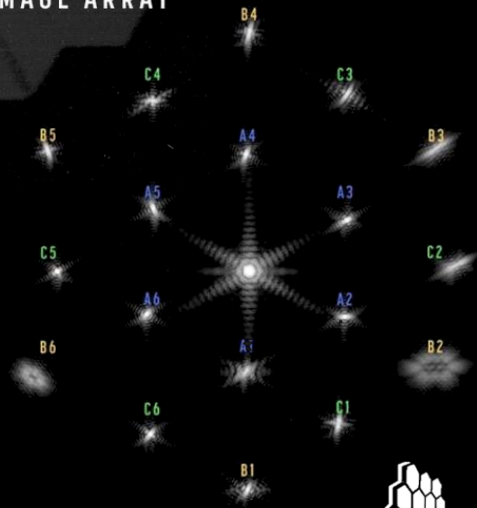


IMAGE ARRAY



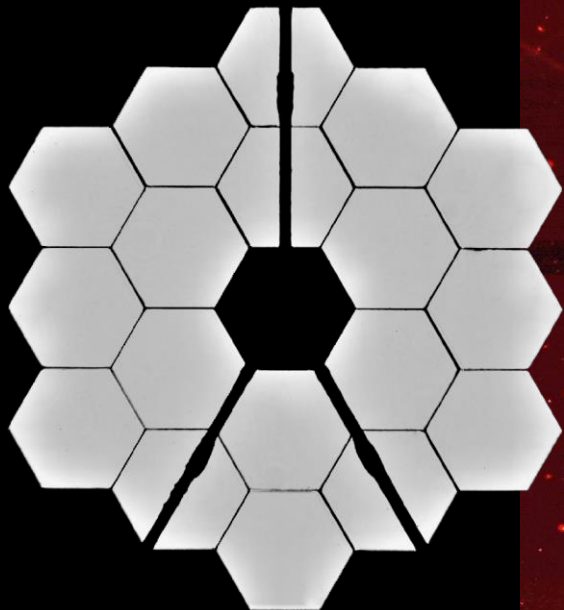
and commissioning



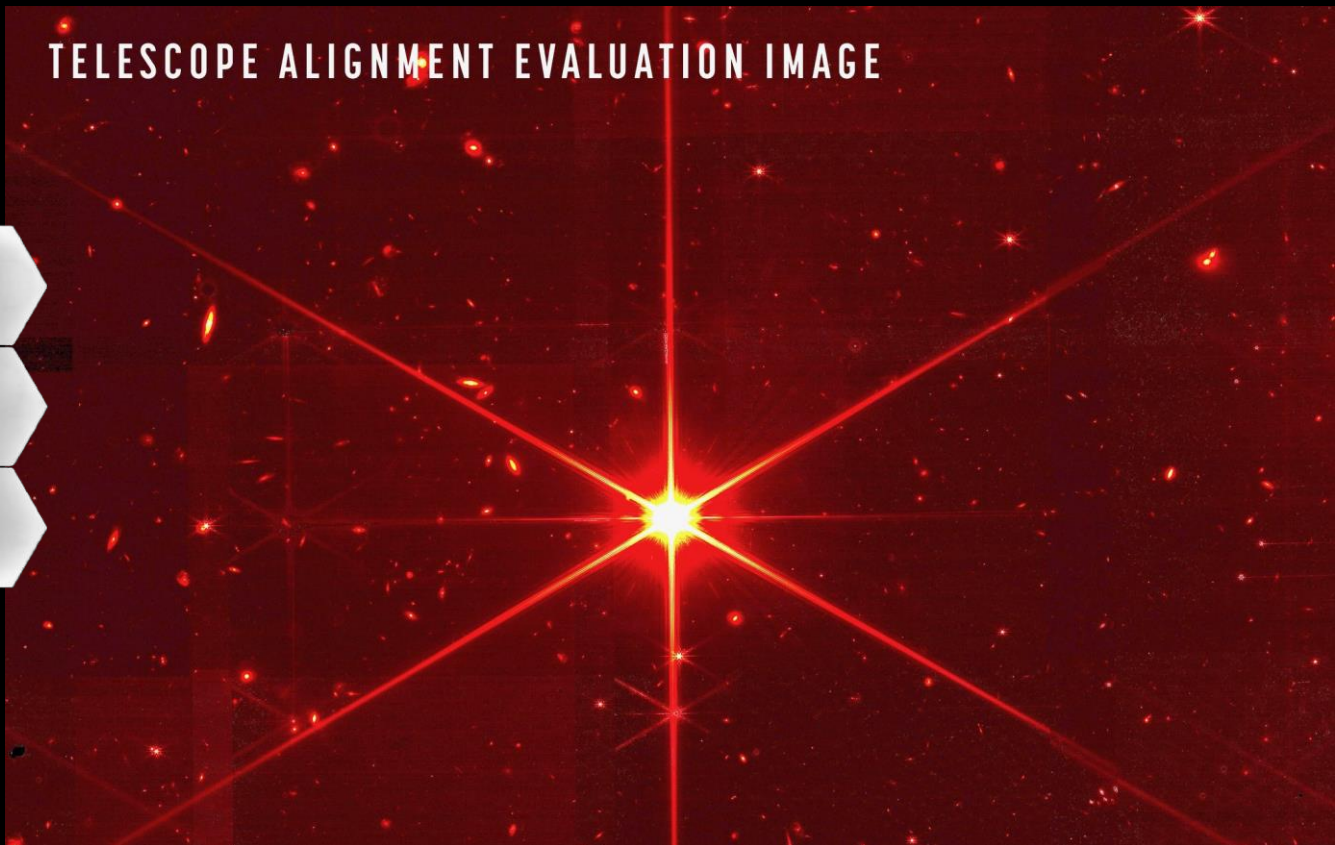
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JWST Alignment Image

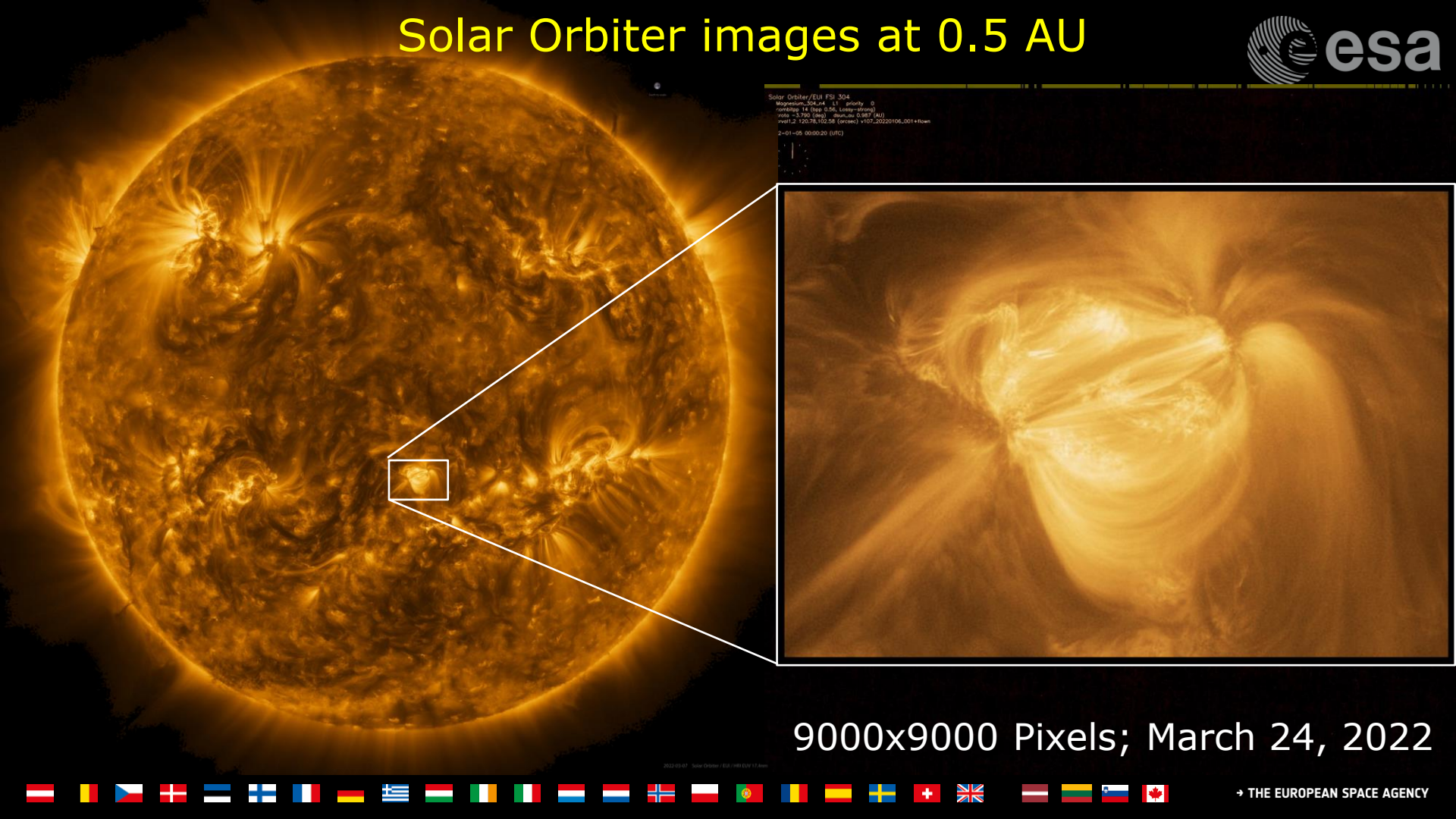
NIRCAM ALIGNMENT SELFIE



TELESCOPE ALIGNMENT EVALUATION IMAGE



Solar Orbiter images at 0.5 AU



Solar Orbiter/EUI FSI 304
Magnetism_204_04_L1_priority_0
Resolution: 1.4 (deg) 0.56 (Carrington)
Date: 2022-03-24 09:07 (AU)
Event: 2 12078,10258 (arcsec) v107_20220106_001 #f16m
2-01-08 0000:20 (UTC)

9000x9000 Pixels; March 24, 2022

Comet Interceptor

Mission to a dynamically young solar system object or to an interstellar visitor.

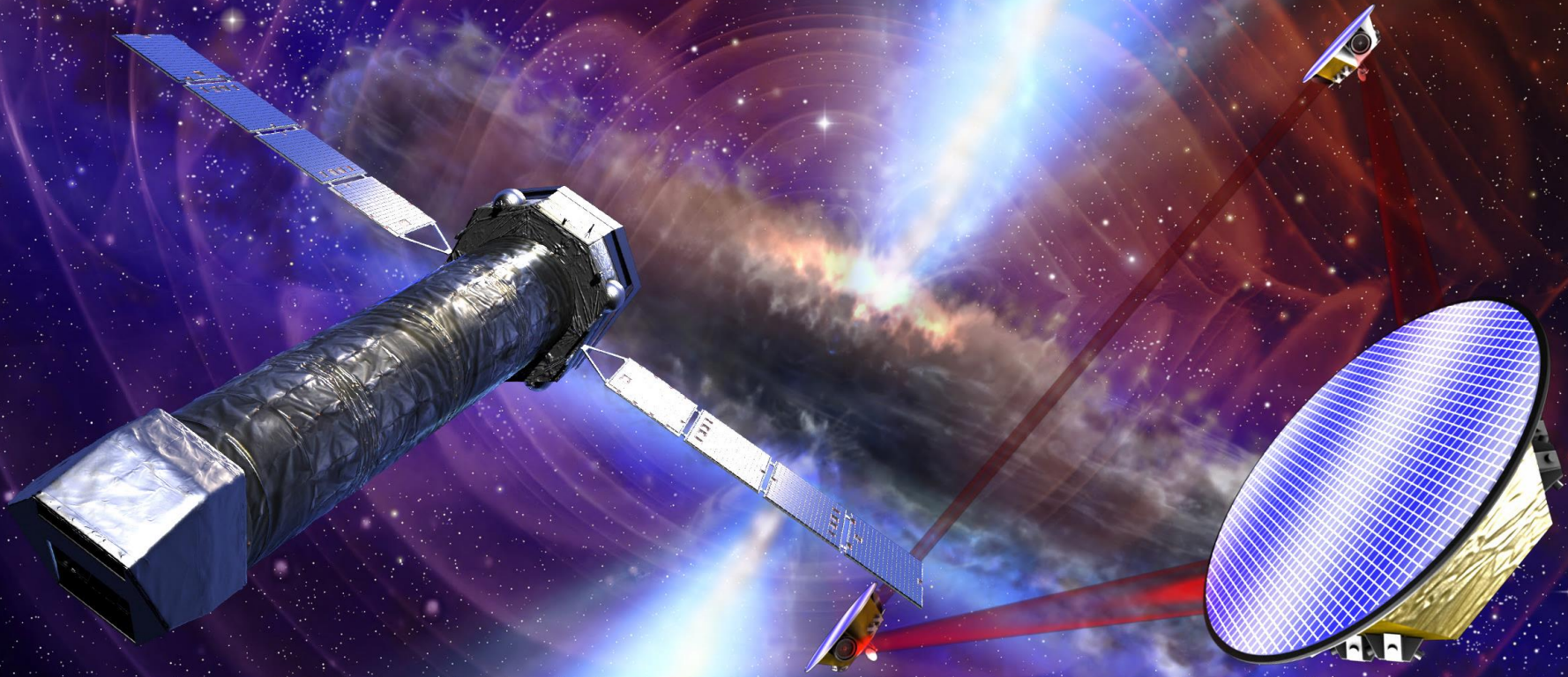


First ESA Fast/Flexi-Mission!
Perfect and rapid response to a new scientific challenge!



→ THE EUROPEAN SPACE AGENCY

ATHENA and LISA: Sound to Cosmic Movies



Strategic Objectives: Voyage 2050 sets sail



Moons of the
giant planets

L4

From temperate
exoplanets to the
Milky Way

L5

New physical probes
of the early Universe

L6

Possible Technology development: cold atom interferometry, X-ray interferometry, new power and heat sources, cryogenic sample return, solar sails

Member State provision of payloads is a key enabler and will use a new paradigm developed with the Member States in preparation for CM22



Synergies between ESA and US Strategic Plans



ESA Voyage 2050

- Moons of Giant Planets
- Temperate Exoplanets/Milky Way
- New Physical Probes of the Early Universe

NAS Astro 2020

- Temperate Exoplanet Flagship
- FIR Probe
- X-ray Probe

NAS Planetary 2023

- Uranus Orbiter/Atmospheric Probe
- Enceladus Orbi-Lander

NAS Heliophysics 2025

- Interstellar Probe ???

- L4 could be ESA-led Enceladus mission with NASA participation
- L5 could be ESA-only GAIA-NIR
- ESA contribution to Uranus mission (e.g. atmospheric probe like Cassini/Huygens)
- ESA Contributions to Astrophysics and Heliophysics flagship missions



Thank you very much!

