

ESA Program Science Highlights

Günther Hasinger

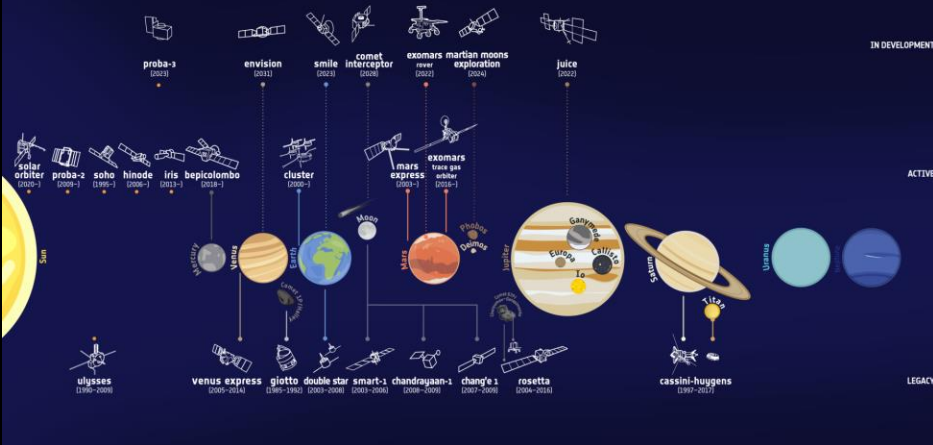
Director of Science

NAS Space Science Week

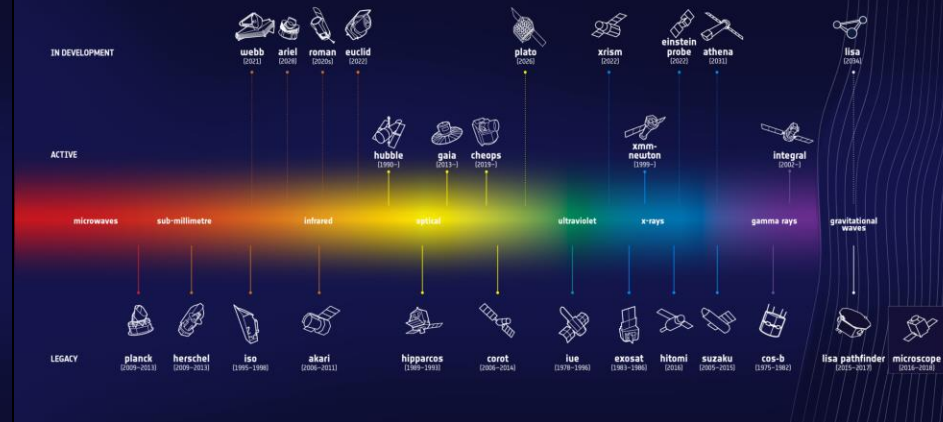
3/22/22 Washington

ESA Scientific Programme Fleet

SOLAR SYSTEM EXPLORERS

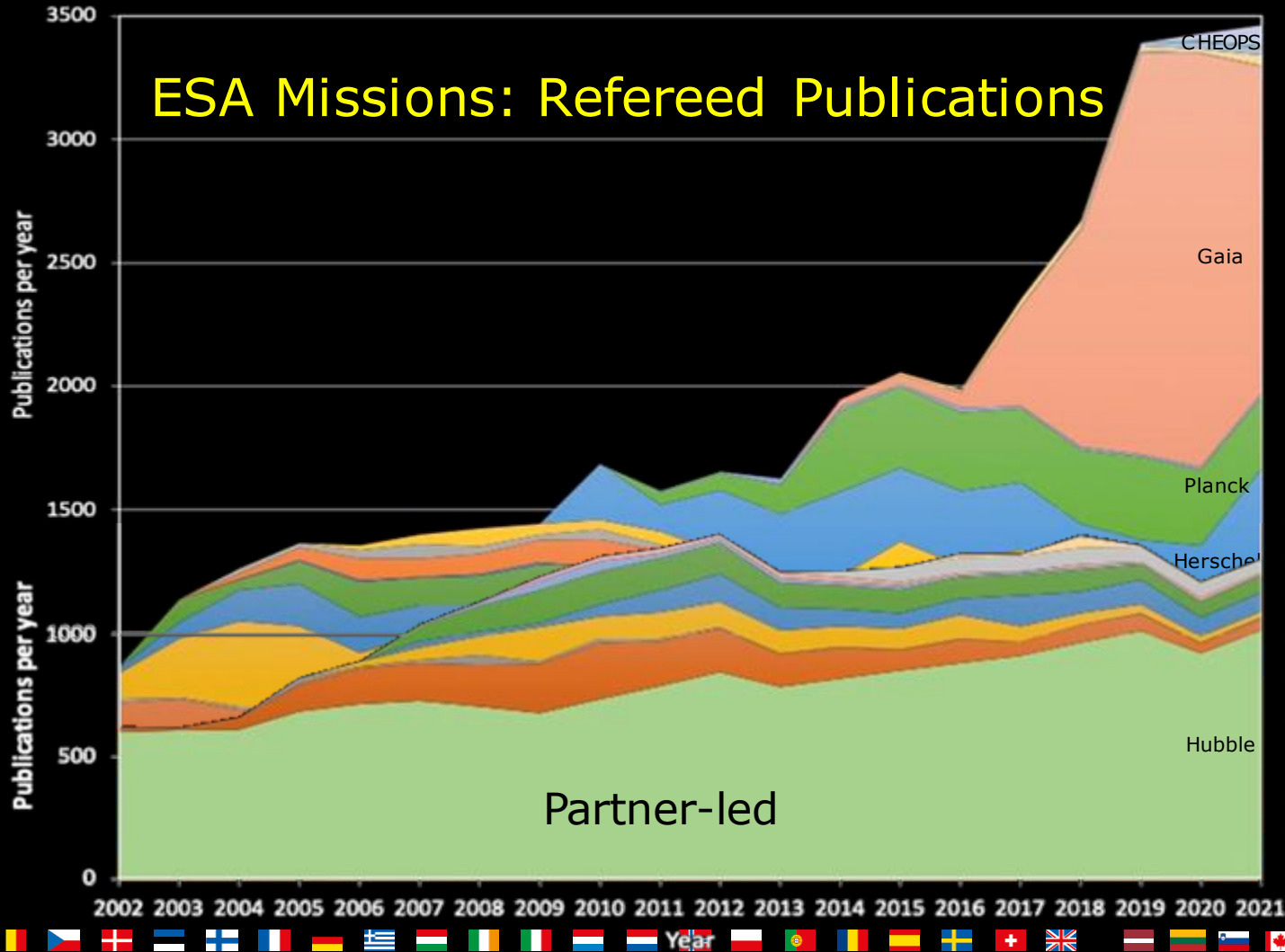


COSMIC OBSERVERS



15 missions in orbit; 15 missions in preparation; 22 in legacy phase
 ... standing on the shoulders of giants! ...
 Large majority of these missions is done in international cooperation

ESA Missions: Refereed Publications



Most papers ever in 2019-2022 (~3500)

About half of these were from Gaia

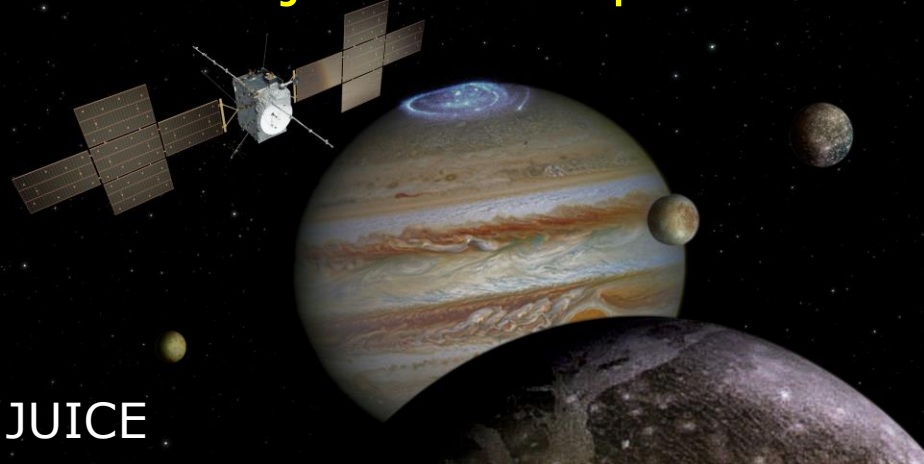
Strong positive trend with doubling time ~8yr

Pandemic caused some slow-down, but still growing trend

~11% of worldwide "market share", including all ground based and theoretical astrophysics (15% including partner missions).

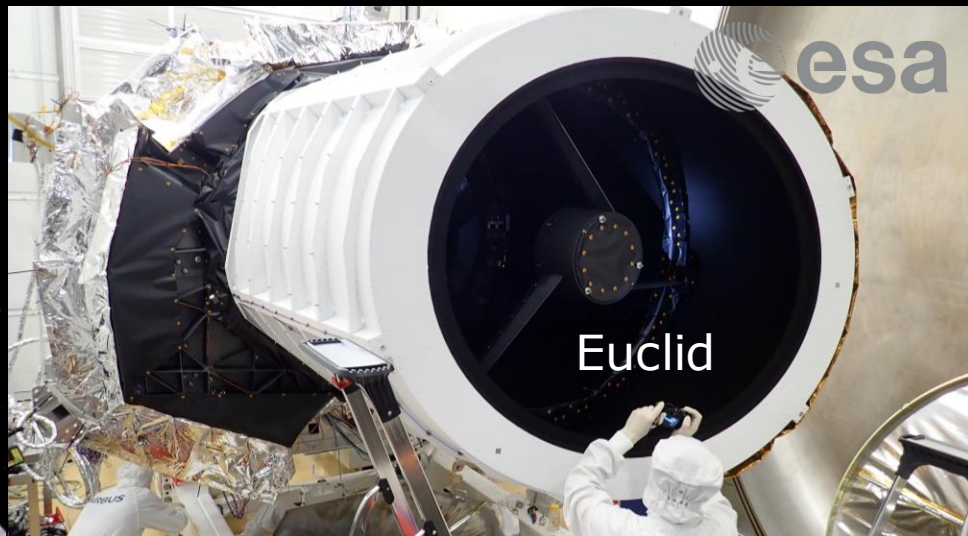
Citation impact strongly increasing.

Projects in Preparation



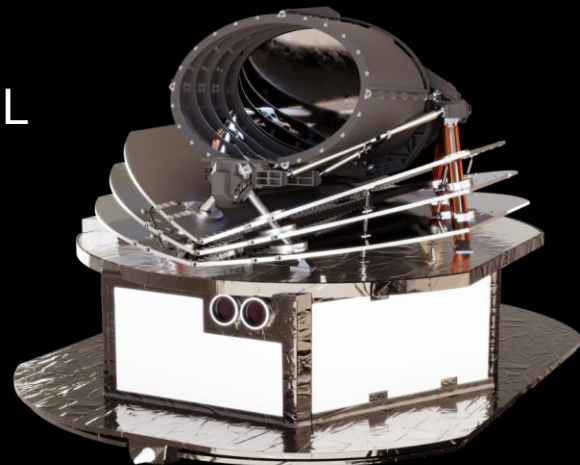
JUICE

PLATO

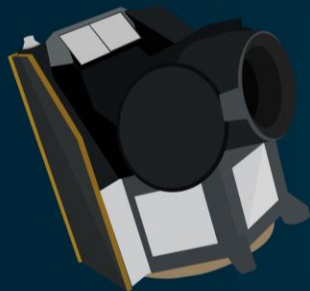


Euclid

ARIEL

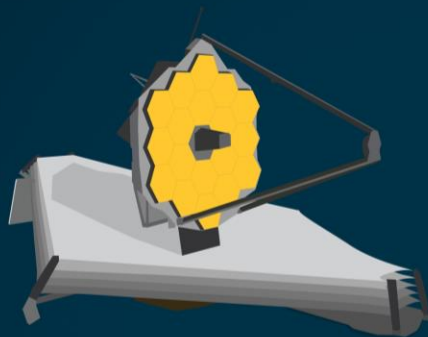


ESA'S NEW AND FUTURE EXOPLANET MISSIONS



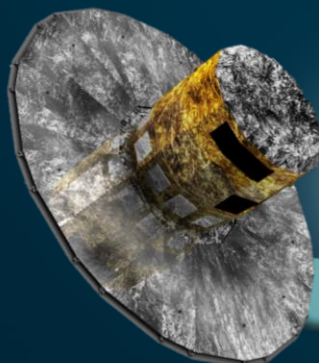
Cheops

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

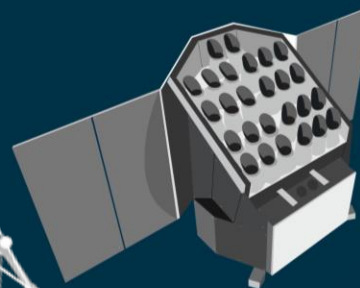


Webb

Detailed characterisation of exoplanet atmospheres through transit studies and direct imaging

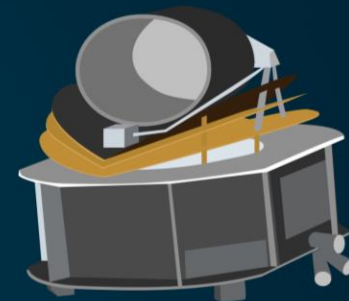


GAIA



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

#ExploreFarther

Gaia unravels star formation on the Local Bubble



Sun

Local
Bubble

14

MILLION YEARS AGO



→ THE EUROPEAN SPACE AGENCY

JWST picture-book launch

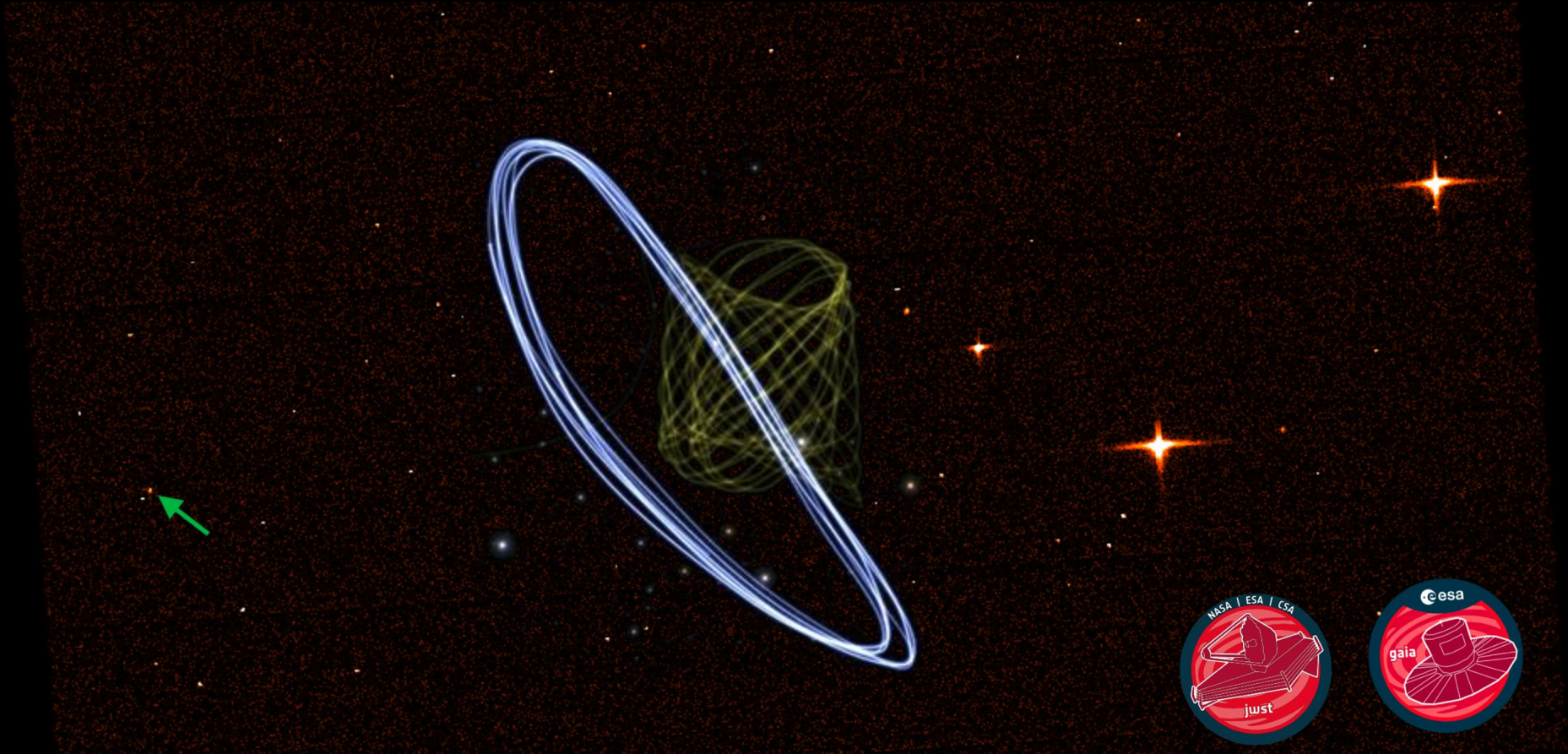


and commissioning



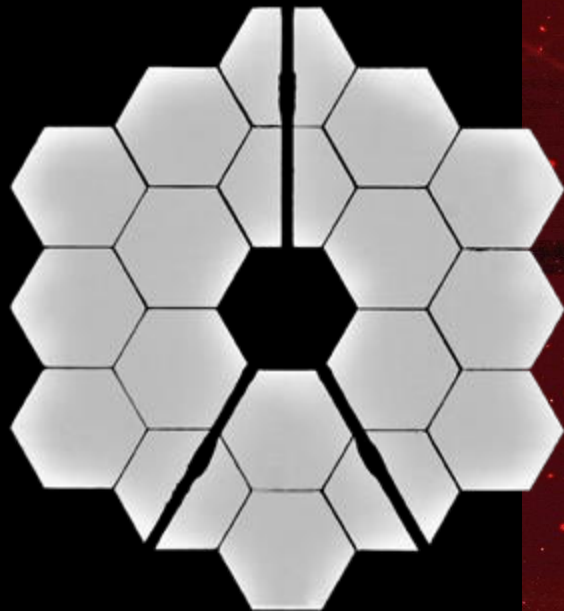
→ THE EUROPEAN SPACE AGENCY

Gaia snaps a picture of Webb



JWST Alignment Image

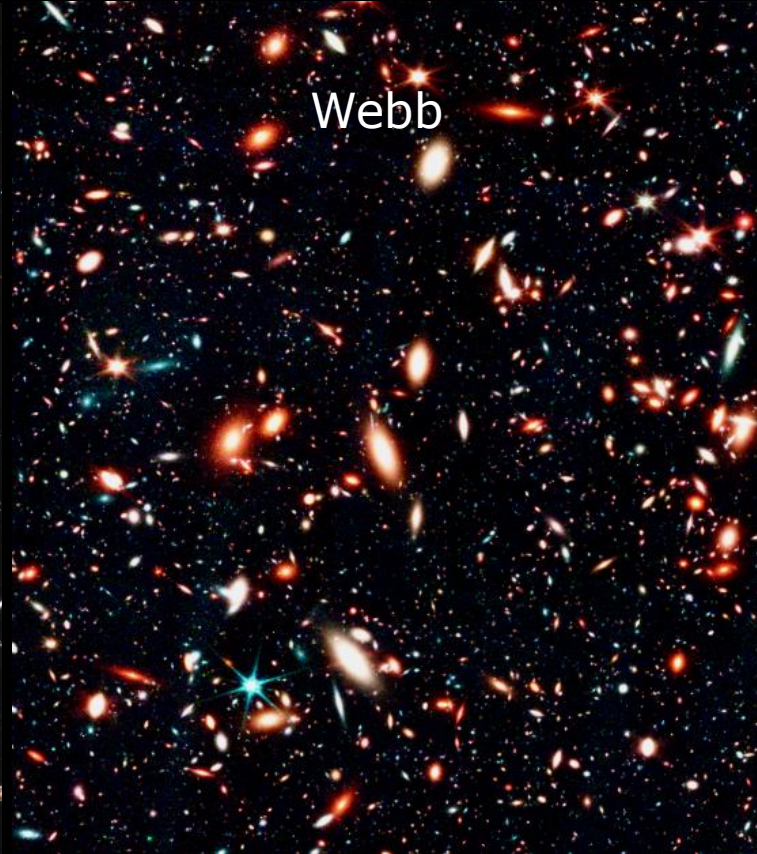
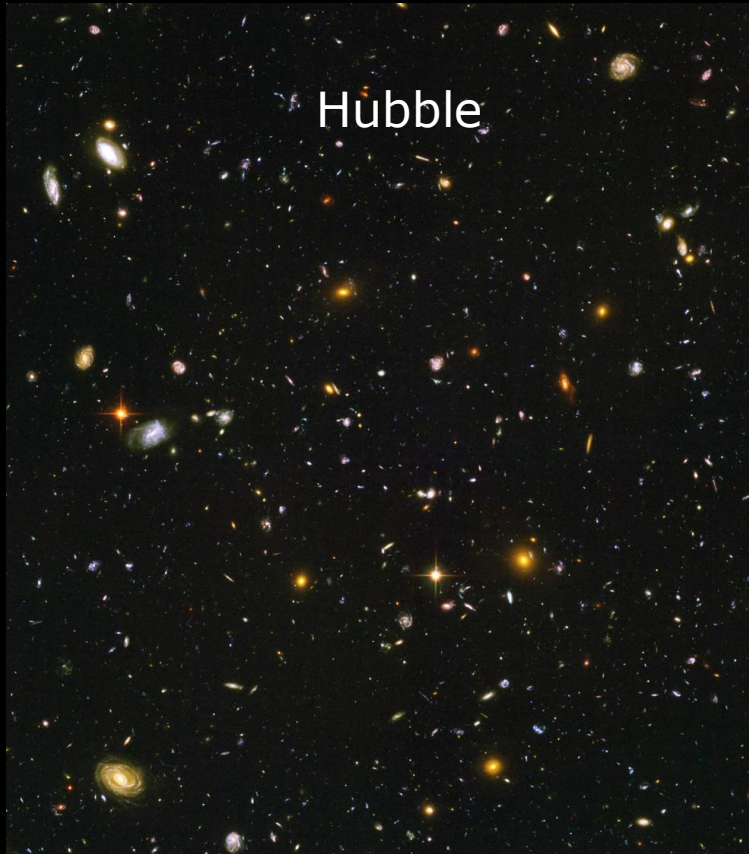
NIRCAM ALIGNMENT SELFIE

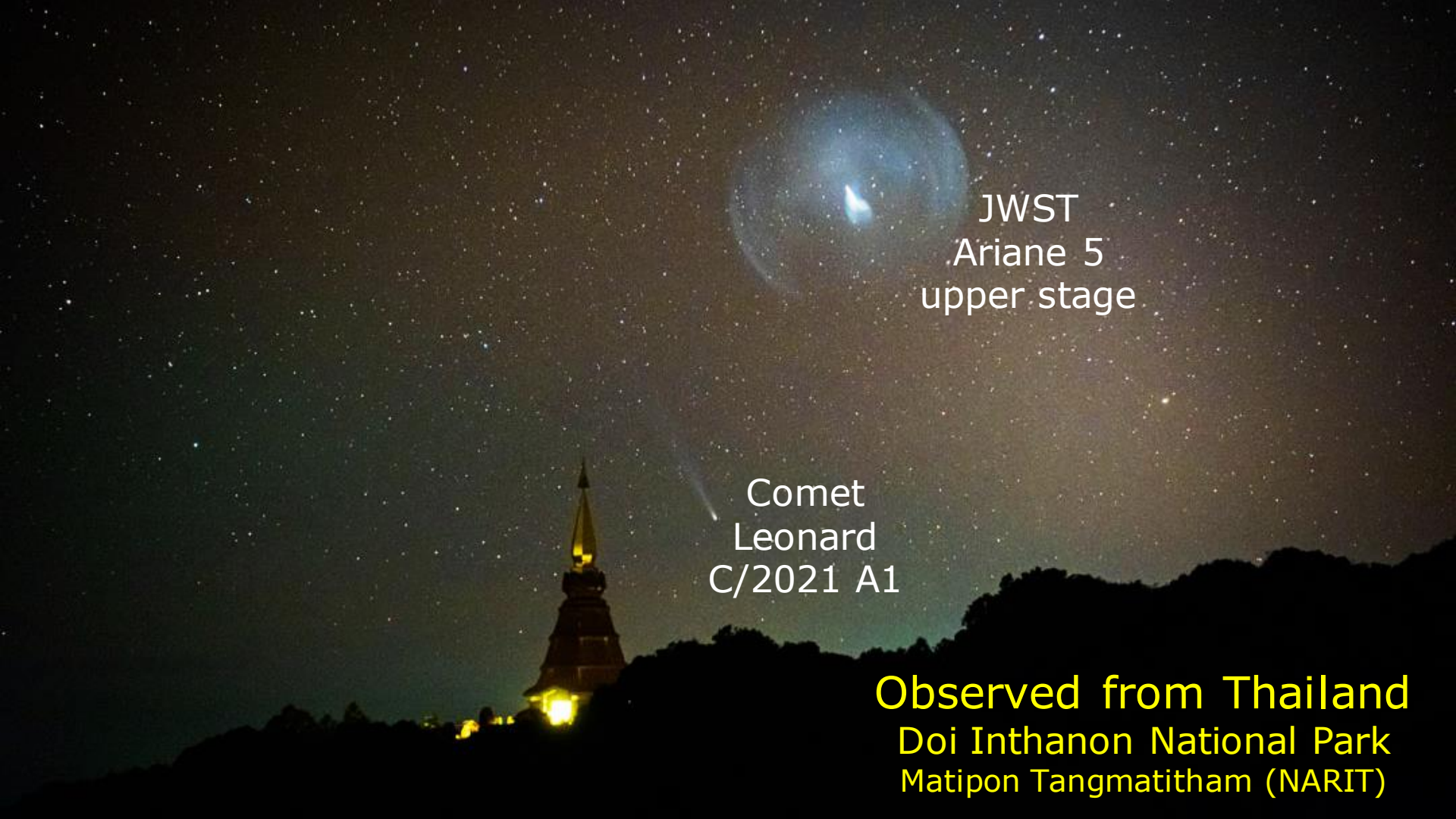


TELESCOPE ALIGNMENT EVALUATION IMAGE



Diving into the early Universe – Hubble / Webb



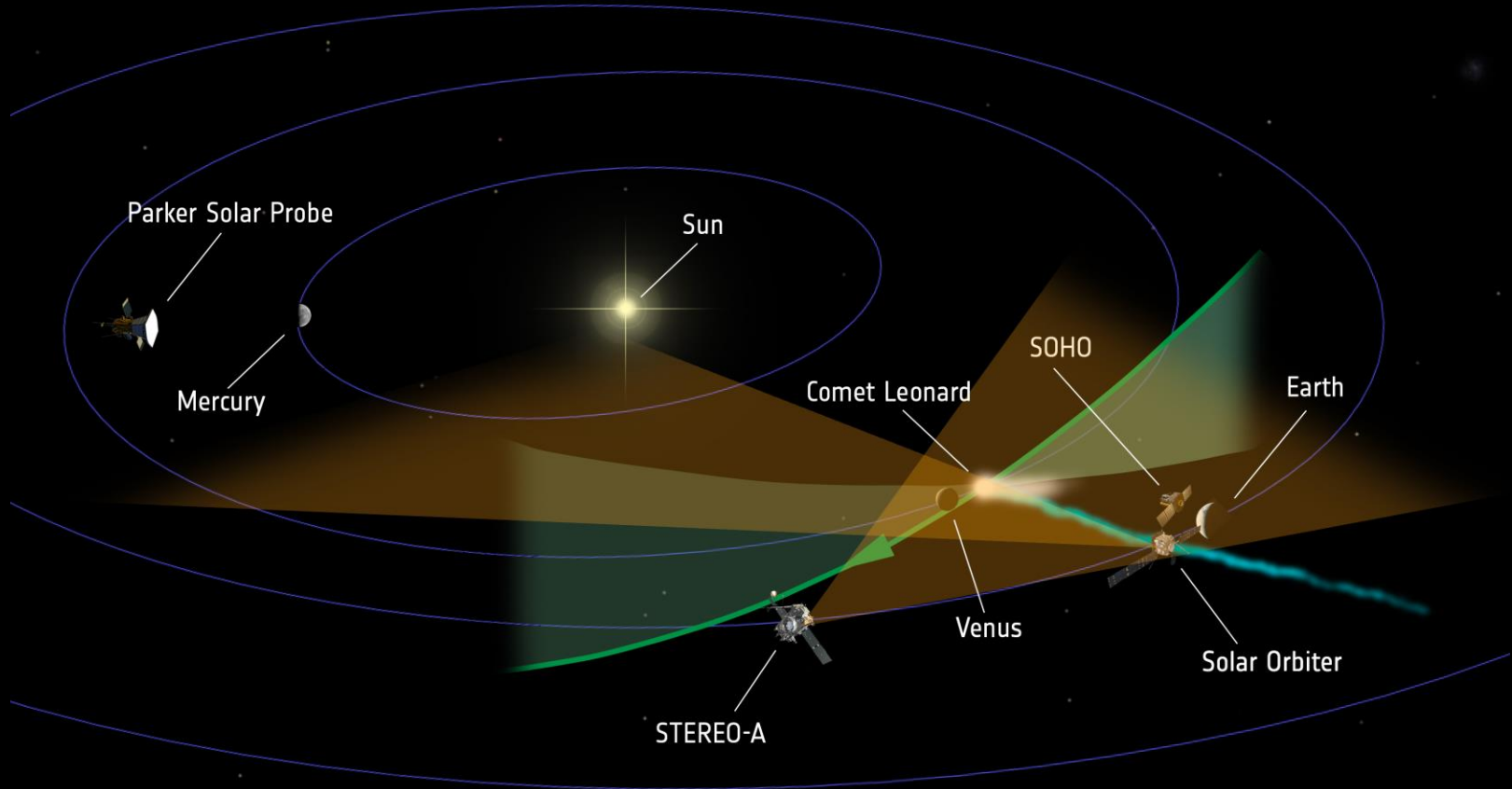


JWST
Ariane 5
upper stage

Comet
Leonard
C/2021 A1

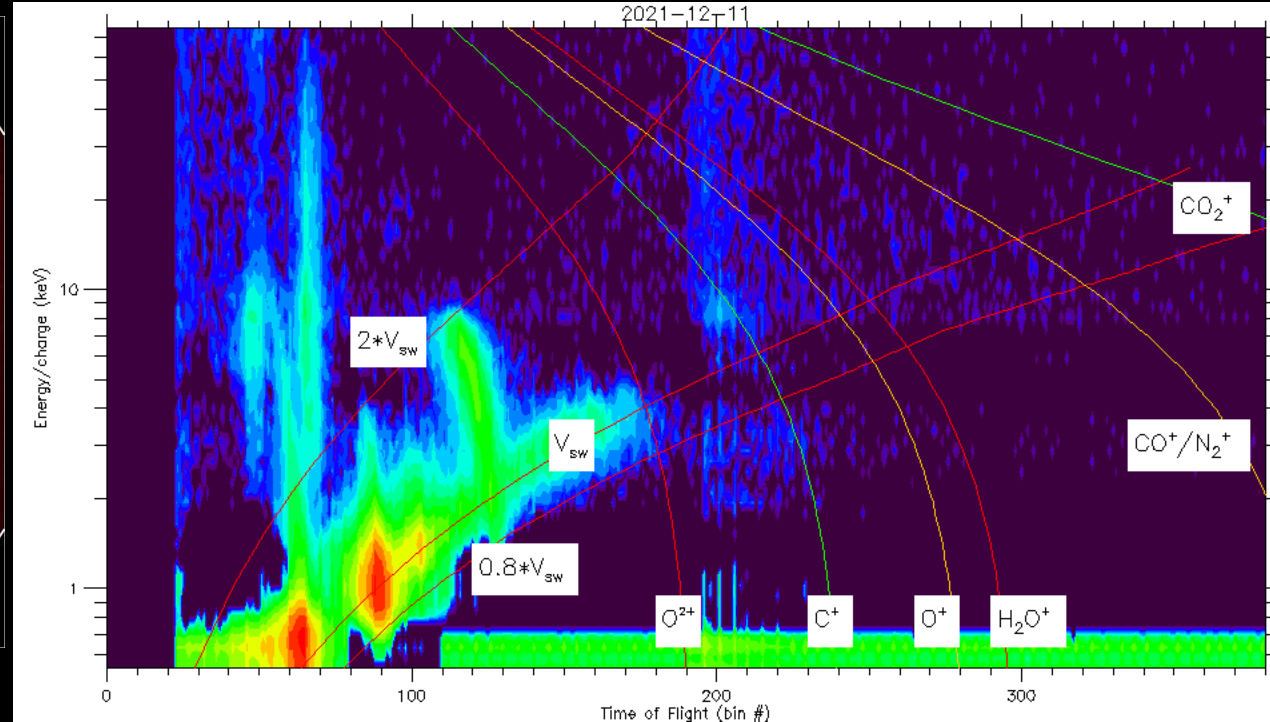
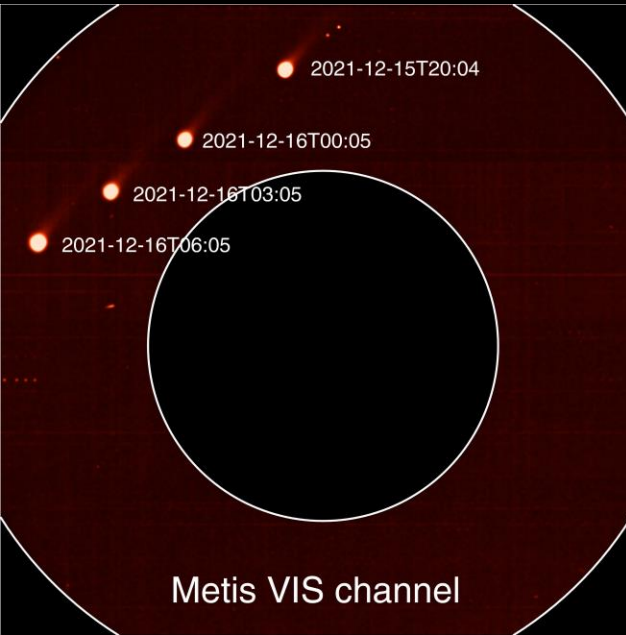
Observed from Thailand
Doi Inthanon National Park
Matipon Tangmatitham (NARIT)

Solar Orbiter flies through tail of Comet Leonard



Solar Orbiter samples cometary tail material

Solar Wind Analyzer Heavy Ion Sensor



Carbon, Oxygen, Nitrogen etc. discovered!

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

New physical probes of the early Universe

L6

NAS Astro 2020

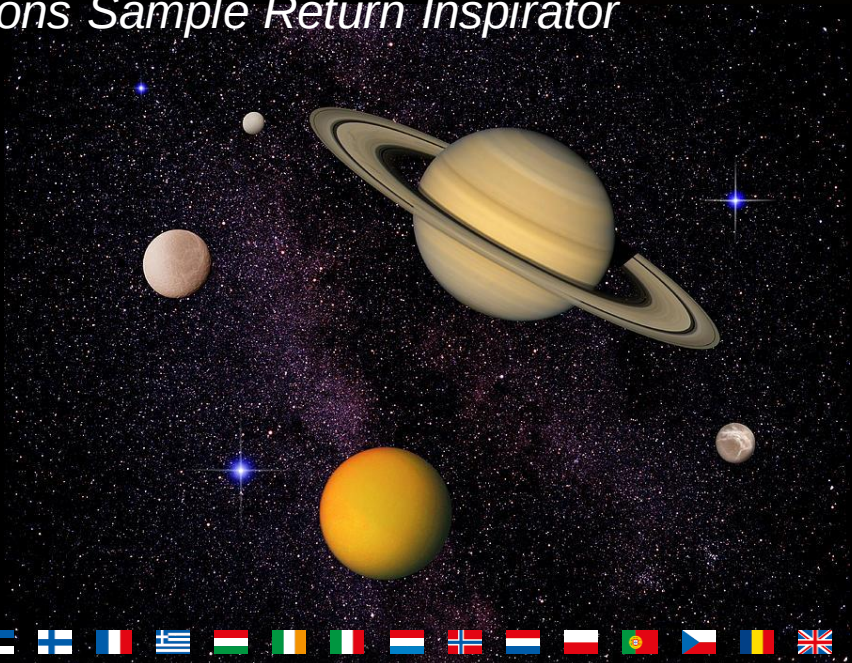
Member State provision of payloads is a key enabler and will use a new paradigm developed with the Member States in preparation for CM22

A mission to the moons of Jupiter or Saturn

The ambitious next destination for the Science Programme

A competitively selected team of European scientists has started to define the first “Large” mission of Voyage 2050...

... also look into much more ambitious mission profiles, paving the way for the *Icy Moons Sample Return Inspirator*



Thank you very much!

