Future Science Missions

Industry Space Days 2026

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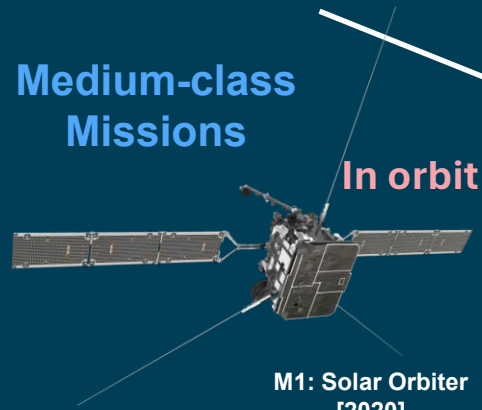
EUROPEAN SPACE AGENCY

Cosmic Vision Plan will be completed with NewAthena implementation

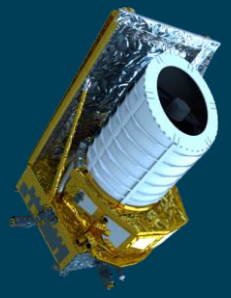
Medium-class Missions

In orbit



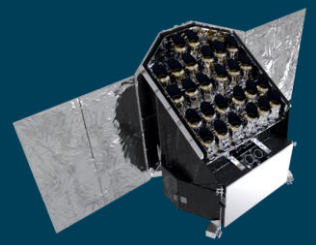
M1: Solar Orbiter
[2020]

In orbit



M2: Euclid
[2023]

In devpt

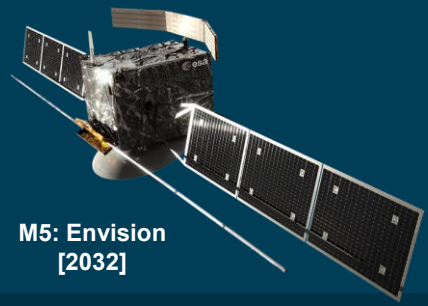


M3: PLATO
[2027]

In devpt

M4: Ariel
[2031]

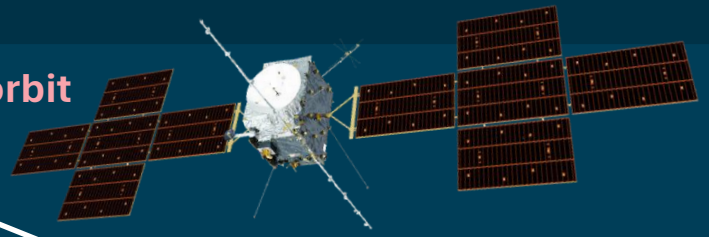
In devpt



M5: Envision
[2032]

Large-class Missions

In orbit



JUICE
[2023]

In devpt

LISA
[2035]

Devpt starting in 2027

NewAthena
[2038]

Small and Fast Missions

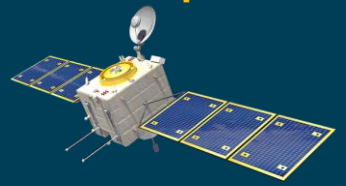
In orbit

S1: CHEOPS
[2019]

In orbit

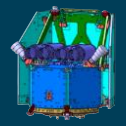
SMILE
[2026]

In devpt



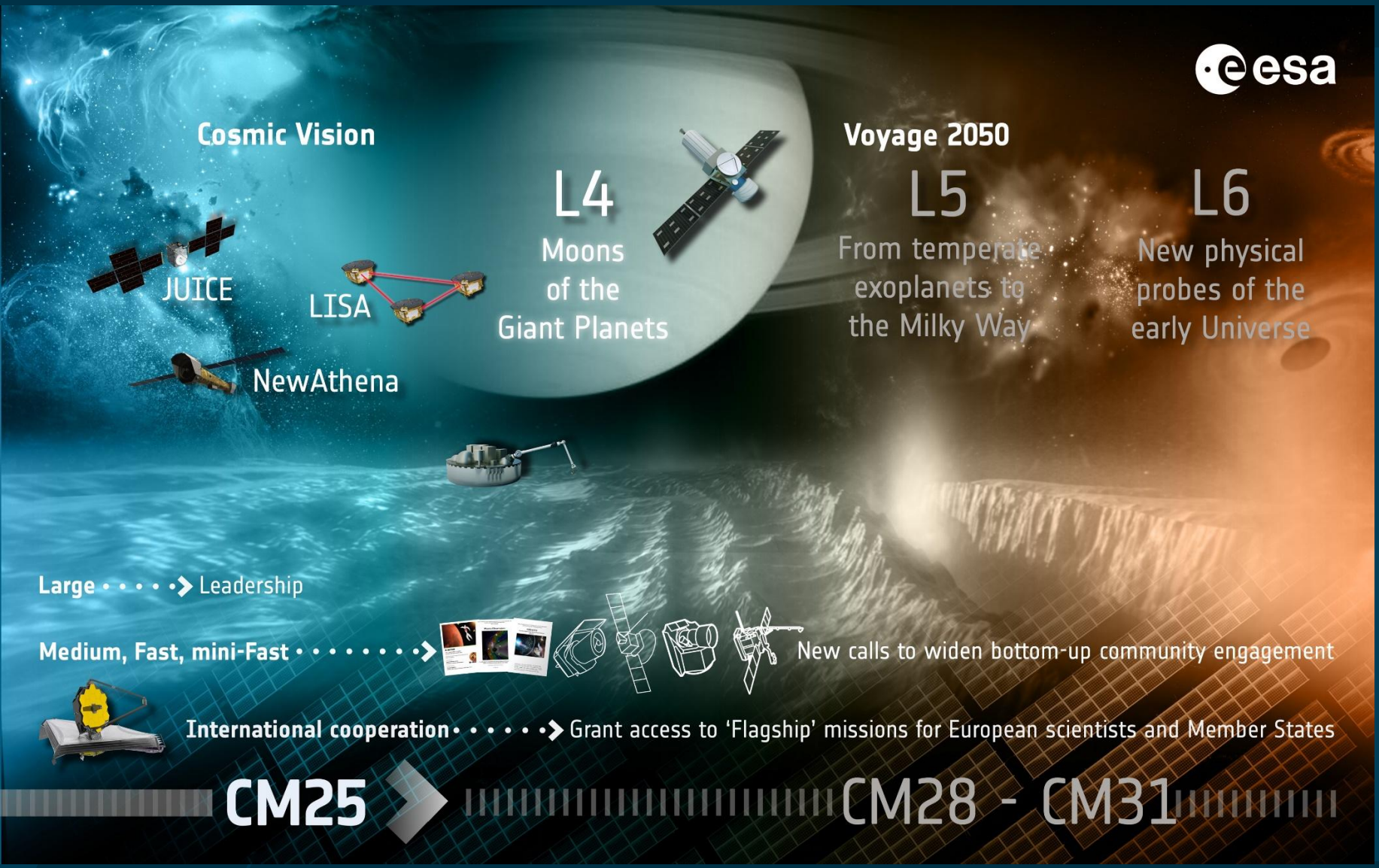
F1: Comet Interceptor
[2029]

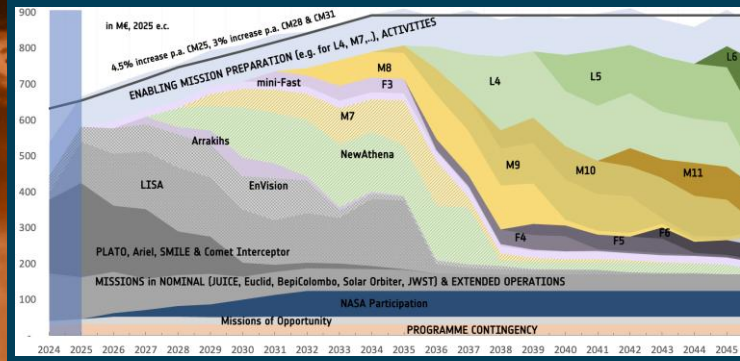
In devpt



F2: ARRAKIHS
[2031]

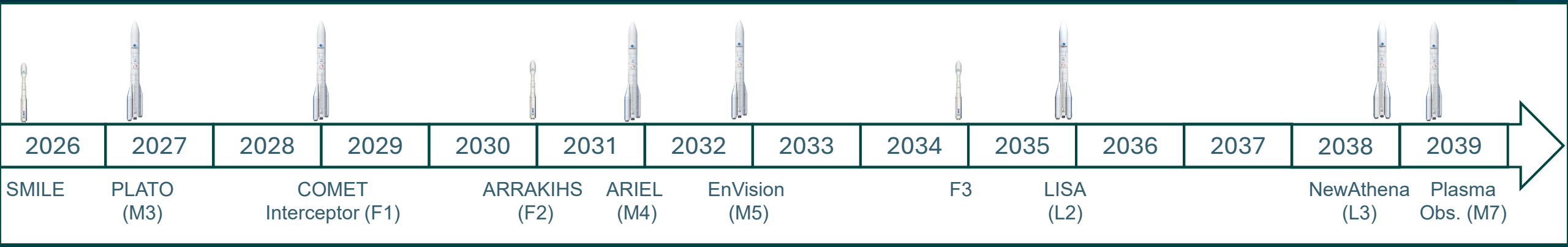
Voyage 2050 is kicked-off with CM25 achievement





Progressive budget ramp-up is needed at CM28-CM31 for enabling the minimum programme requested by the scientific community and supported by the Science Programme Committee

Science programme timeline



- Missions are selected through competitive open Calls and peer-review ranking, aiming at scientific excellence.
- National provisions to science payload and ground segment, via PRODEX or directly.
- Some ESA-led missions involve international partners.
- Missions of Opportunity not shown on the timeline e.g. ESA junior contributions to Einstein Probe (CAS-led), RST (NASA-led), MMX (JAXA-led)
- Launch cadence is ~ 1.5 years (on average, excluding MoO)

Mission classes and industrial contributions

Mission	CaC (M€)	Typical timeline (years)	Comments
F-class	210	A/B (1–3) · C/D/E1 (4–8) · E2 (9–10) · Mission extension (11–12)	Fast-schedule missions. Existing technologies, pre-developments needed in Phase A/B to enable the schedule
M-class	750	A/B1 (1–6) · B2/C/D/E1 (7–15) · E2 (16–18) · Mission extension (19–20)	Medium-size missions. Some new technology developments or improvements possible in Phase A/B1.
L-class	1650	A/B1 (1–9) · B2/C/D/E1 (10–20) · E2 (21–23)	Flagship transformational missions. New technologies are often needed to enable the mission.

Preparation — *SPC adoption & Prime competition* — *Development* — *Science operations*

- Design-to-cost approach enforced for all missions, ensuring programme's stability
- Development of new industrial capabilities during the mission preparation phase for enabling the geo-return, mainly for M & L missions.
- TRL > 5/6 targeted at the mission adoption for risk management, including early investments on the payload
- Geo-return requirements dynamically adjusted for each mission, enabling long-term programme balance.
- Industry selection through maximum competition using ESA Best Practices, for Prime and subcos. Pre-selection of subset of subcos in Prime bid for critical under-returned countries.
- Technology predevelopments typ. 3% to 10% of CaC, CTP budget. All activities are mission-driven.

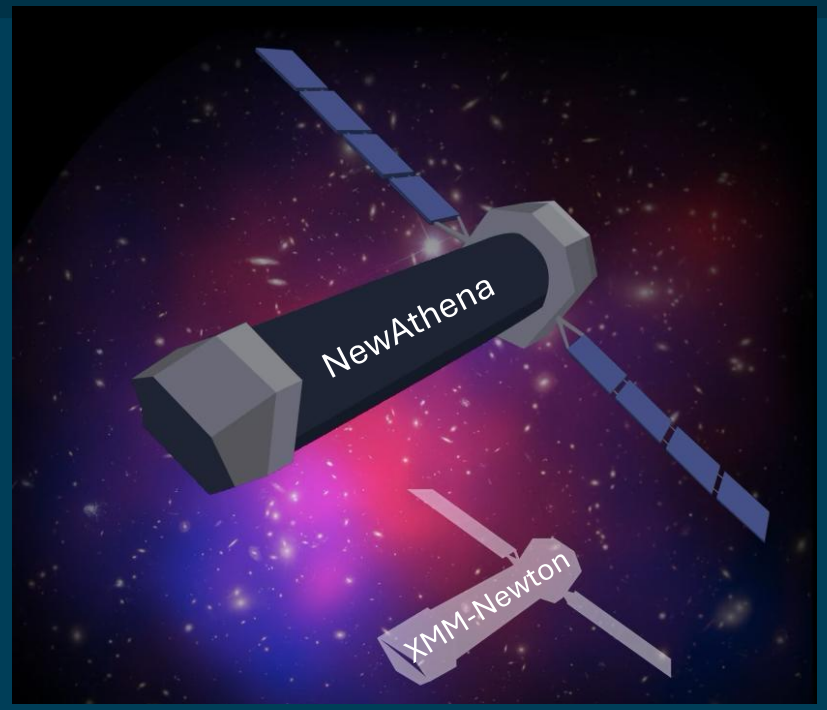
Future missions and industrial opportunities

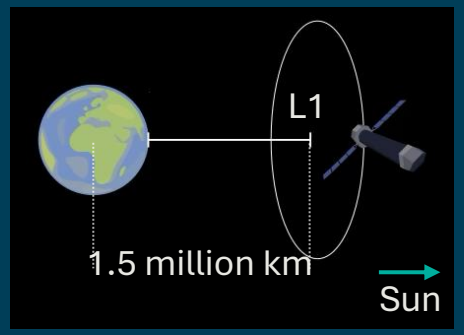
Mission	Planned selection	Planned adoption	Preparation activities (*)	Flight Model opportunities(**)	Approx. launch date
NewAthena	-	Jun-2027	Nearing completion	2027-2030	2038
Plasma Observatory (M7)	Nov-2026	Mar-2030	2027-2029	2030-2034	2039
F3 (Call running)	Nov-2027	Jun-2030	2028-2029	2028-2030	2034
M8 (Call running)	Jun-2030	Nov-2032	2027-2032	2032-2035	2041
L4 (Saturn/Enceladus)	2027	2034	2026-2034	2034-2038	2044

(*) Approximate period over which technology predevelopments are placed

(**) Approximate period over which most of the industrial team will be defined for the flight segment

NewAthena X-Ray Observatory





~ 7.5 ton SC at L1 Lagrange point

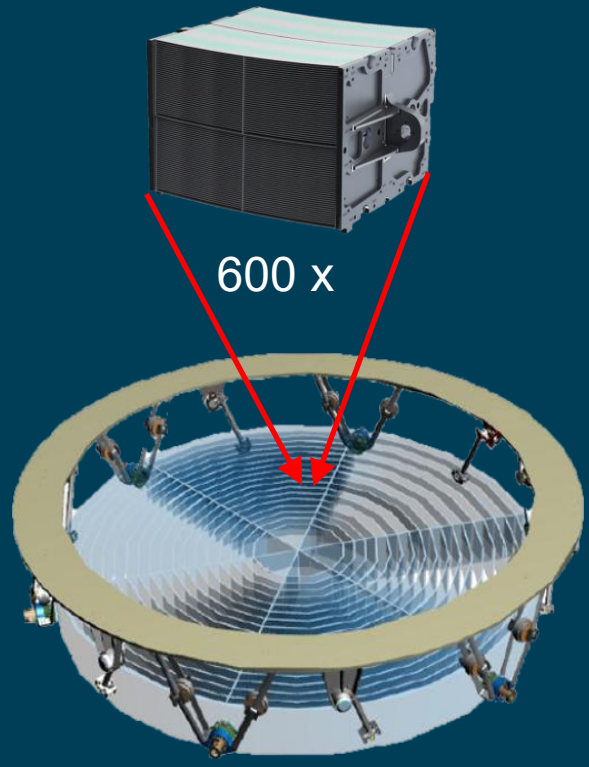
Largest X-ray observatory ever

- Effective area > 1 m^2 at 1 keV;
- Angular resolution < 9 arsec
- Energy resolution < 4 eV

Two cutting-edge instruments

- **Wide Field Imager (WFI)** , 0.2-12 keV, FoV 40 x 40 arcmin2, Si-based APS 4x(512x512) pixels.
- **X-Ray Integral Field Unit (X-IFU)** , FoV 4 arcmin, 1504 TES detectors @ 0.1 K, spectro-imager with energy resolution < 4 eV

- Dialogue phase with the two Primes started
- ITT for Prime selection in July 2027
- Best Practices expected over 2028-2030



Silicon Pore Optics large mirror

4K cooling system development

4K cooling system CTP activity started in May 2026

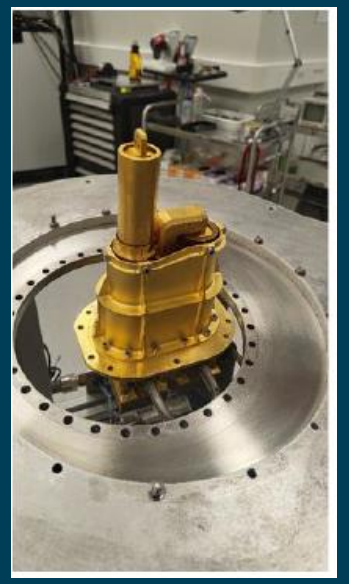
Objective: Develop a 4K cooling system based on existing building blocks in Europe

Industrial consortium led by OHB (DE) with CEA/AirLiquide(FR), STFC-RAL(UK), TCbv (NL)

- Applicable to NewAthena for providing 4K stage to the payload from passive 50K stage.

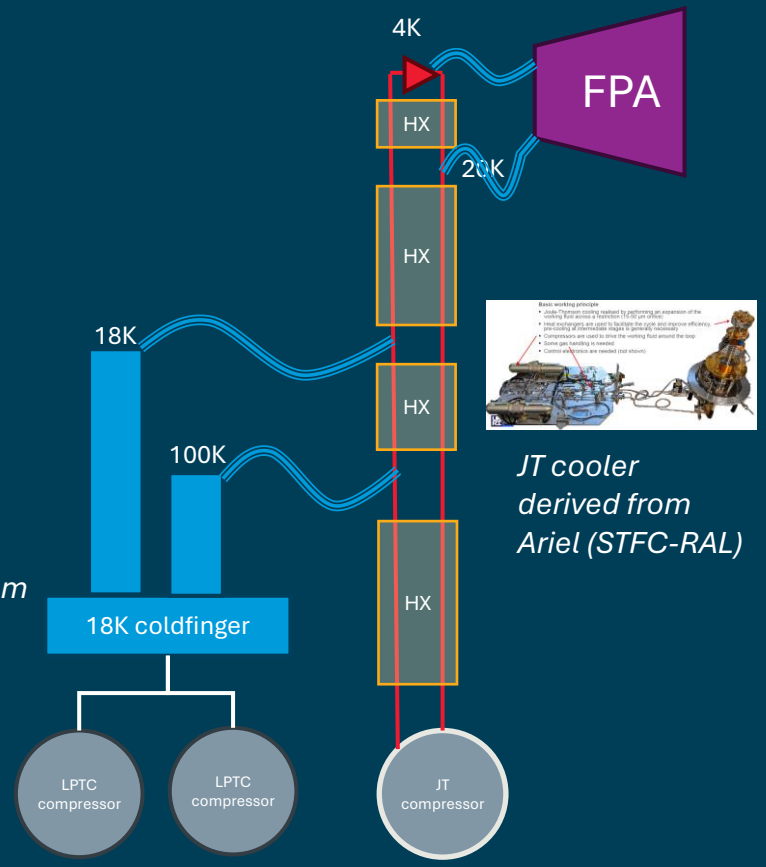
Enabling a variety of future astrophysics M-missions (M8 and beyond) requiring cryogenic instruments:

- Far-Infrared/THz missions (post-Herschel)
- CMB missions (post-Planck)
- Radiotelescope



20K coldfinger derived from HiPTC CTP development Air Liquide/CEA (FR)

LPTC compressor, qualified for MTG (TCbv, NL)

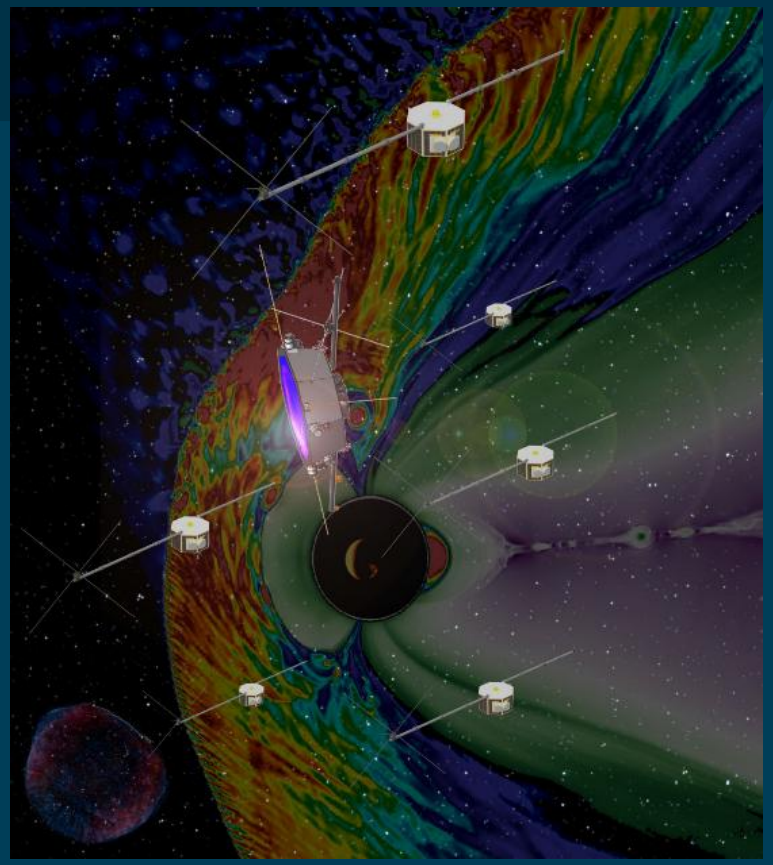


JT cooler derived from Ariel (STFC-RAL)

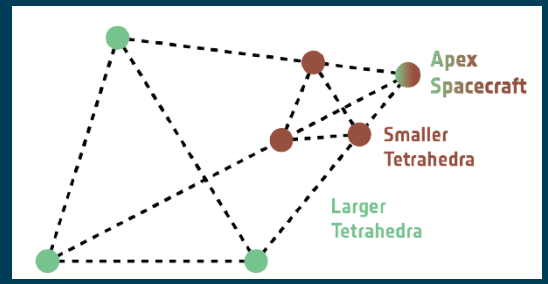
Electronics derived from Ariel (OHB)

Plasma Observatory (M7)

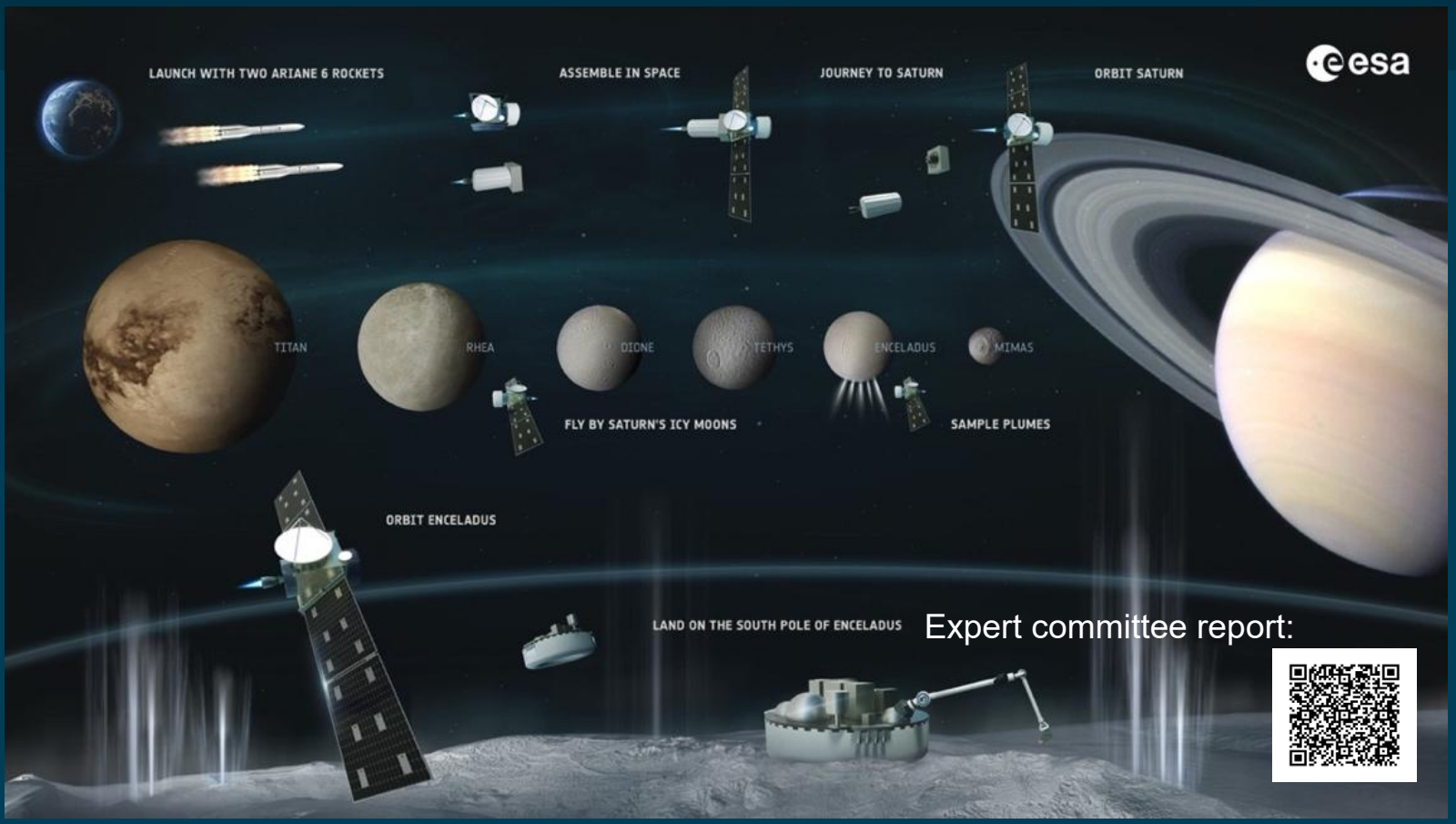
- Constellation of 7 spacecraft, for multi-scale characterisation of Earth's magnetosphere.
- Double-tetrahedron configuration, modifiable in-orbit
- SC mass ~250 kg, spinning 15 rpm, identical platforms
- Payload suite provided by the Member States and Int'l partners
- Ariane 6 launch to HEO 39,500 x 102,000 km, 15 deg inclination



- Phase B1 ITT in Q4-2026 (parallel contracts)
- Competition for Prime selection in 2030



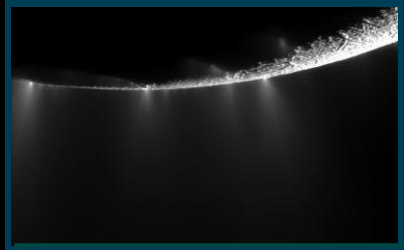
L4 mission to the Saturn system



3-year tour of Saturn moon system and landing on Enceladus south pole.
Solar powered spacecraft.

- Phase A starting 2027
- Technology preparation over 2026-2034
- Arrival at Saturn in the 2050s

Enceladus, Saturn's active moon



South pole plumes (from NASA's Cassini mission)

Battery-powered lander

- Surface operations > 4 weeks
- Average temperature 85 K

Critical technologies for L4 are being initiated

Electric propulsion

Key to reach Saturn with feasible mass

Mission needs:

- ISP > 2500 s
- Power 9-20 kW
- Total impulse: > 4 MN.s/kW
- Long duration cruise ~10 years

- Large solar array is needed for powering the spaceraft at Saturn (~10 au). It is also used to power the Electric Propulsion thrusters during cruise phase
- Parallel contracts will be initiated in 2026, aiming at qualification before the mission adoption

Lander battery

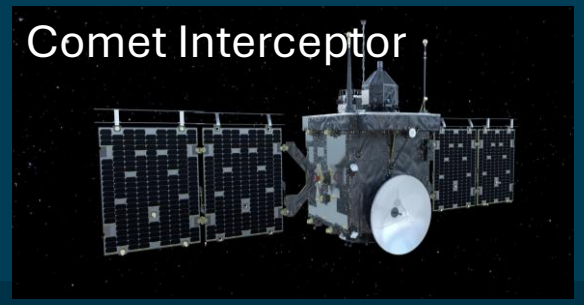
- Primary battery envisaged
- Current European space heritage: 400 W.h/kg (Philae, Comet Interceptor), using $LiSOCl_2$ cells

Mission needs:

- > 700 W.h/kg, driven by lander surface operations
- Battery dissipation will heat the lander

Parallel contracts started for Li/CFx cells , aiming at 750-800 W.h/kg

Rosetta's PHILAE



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THANK YOU!

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