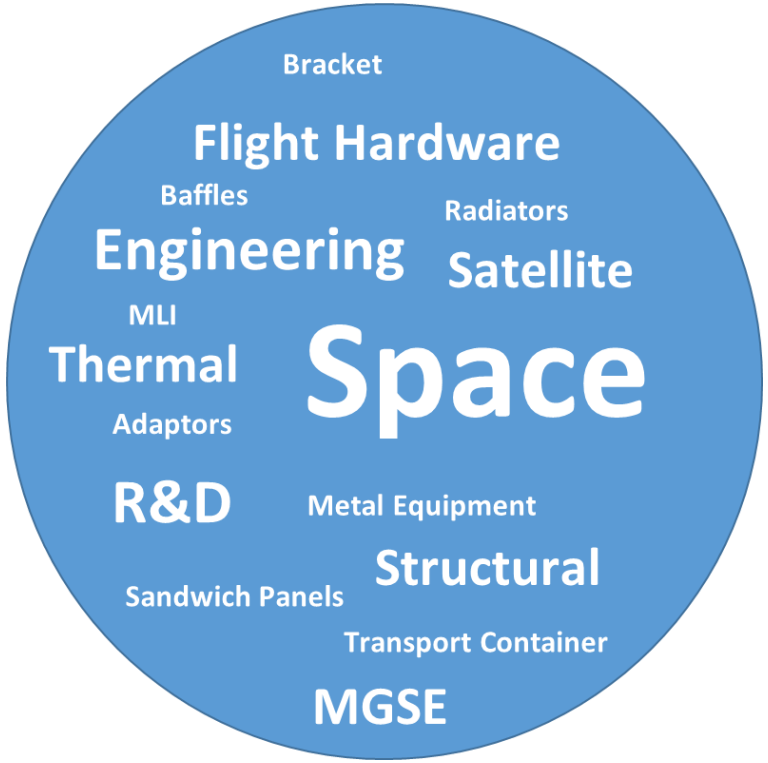
Company introduction

Admatis Ltd.

Bárczy Tamás



General

Foundation: 2000

Owners: Hungarian private persons

Location: Miskolc, Hungary

Size: SME

Position: prime in Hungary

Focus: space, thermal & structural engineering, materials, aging, navigation support, MGSE

Certificates: AS/EN9100, ISO9001, CCR reg, Ncage code, ESA cost audit

Motto

„Whether you believe you can do a thing or not, you're right"
Henry Ford

We believe we can do it.

Customers / Partners

Admatis
Advanced Materials In Space

esa

ThalesAlenia Space
a Thales / Leonardo company

AIRBUS

OHB

gmv
INNOVATING SOLUTIONS

RAL Space

UNIVERSITÄT BERN

avs

clearspace today

NASA

Zenno Astronautics

FERGANI

ADDEV MATERIALS

Centre for Energy Research

REMRED
SPACE TECHNOLOGIES

AXIOM SPACE

Competencies

Admatis
Advanced Materials In Space

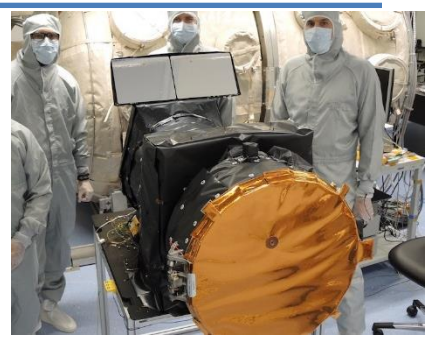
- flight hardware manned missions
- flight hardware unmanned mission
- ground support equipments

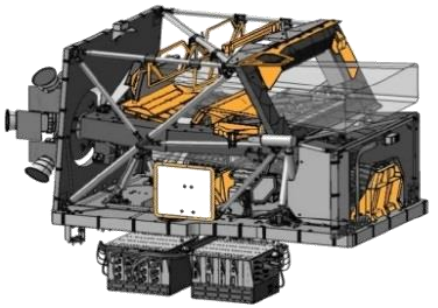
SPACE

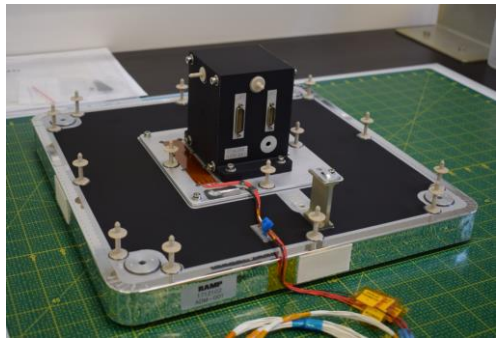
Subprime in Hungary
Mechanical and Thermal engineering
CAD design
FEM analysis
ESA documentation
Project and PA management
Product development

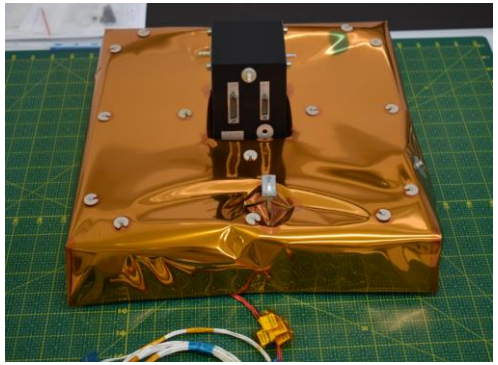
MATERIAL SCIENCE

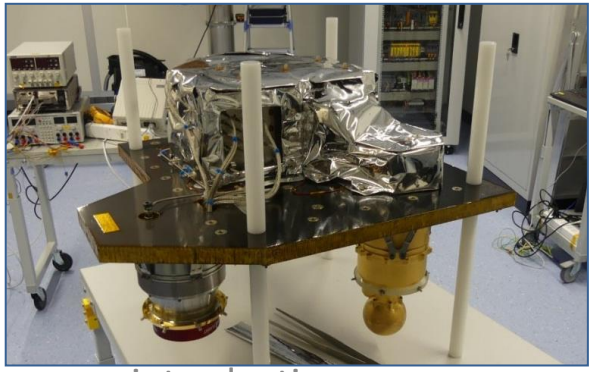
Materials R&D
Aging
Thermo-optical coatings
Conversion coatings
Multi Layer Insulation, MLI

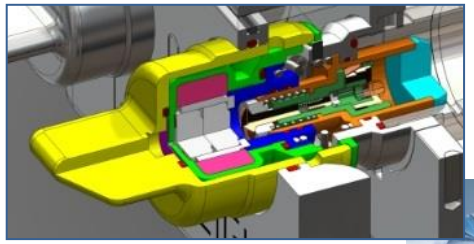




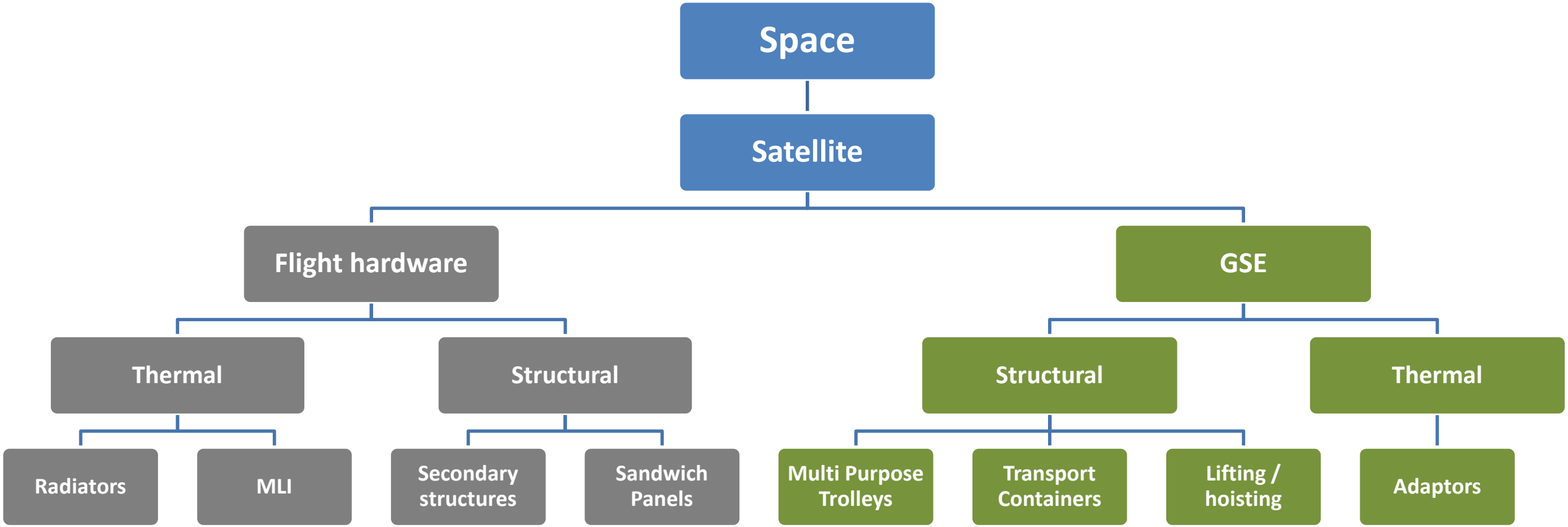








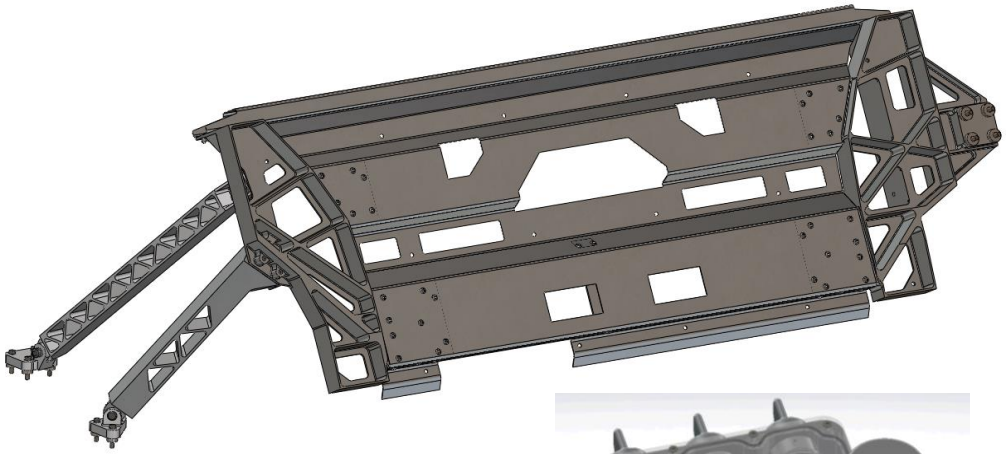
Competencies

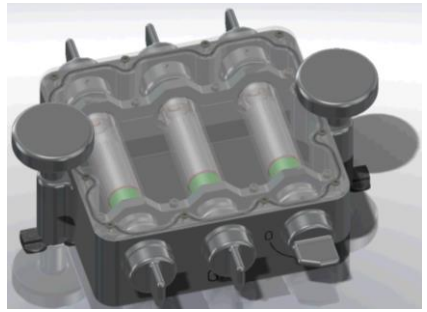


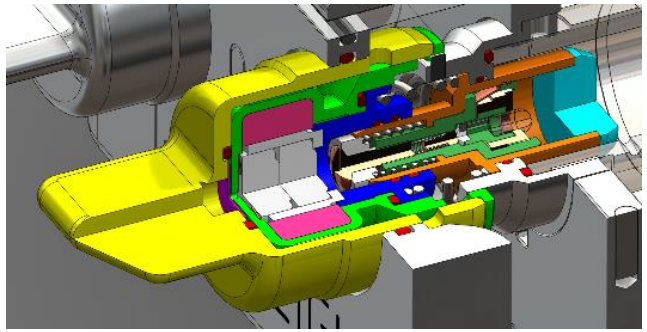
NO IPR constraints.
All IPRs owned by ADMATIS.

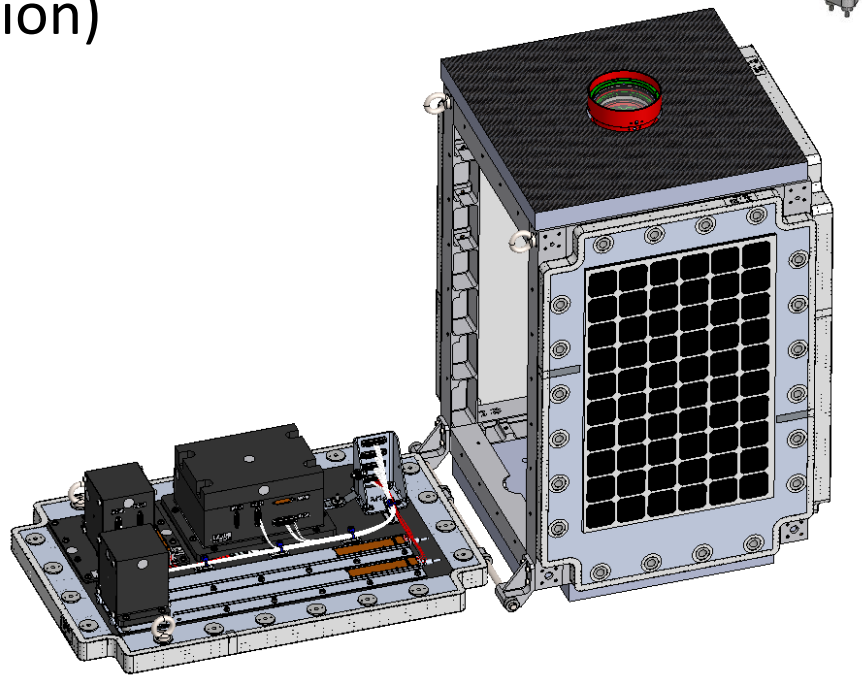
Engineering

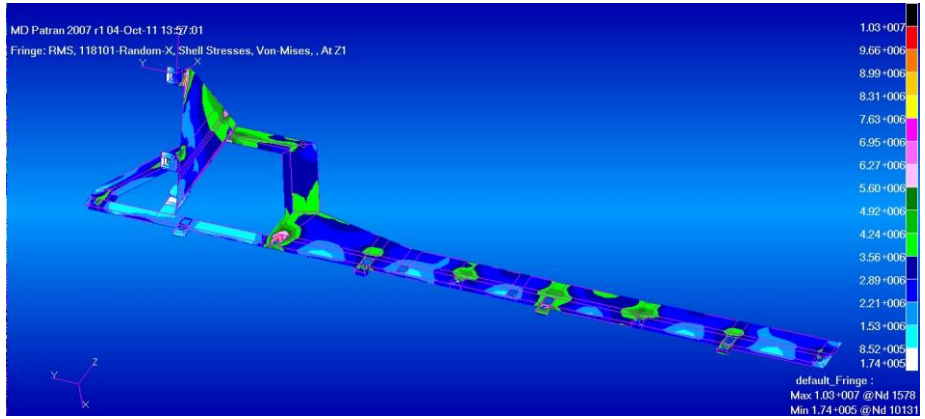
- Building Requirements Specification
- CAD design (SOLIDWORKS)
- Structural and Thermal FE model (GMM and TMM) building
- FEM analysis (NASTRAN, Thermica, SOLIDWORKS Simulation)





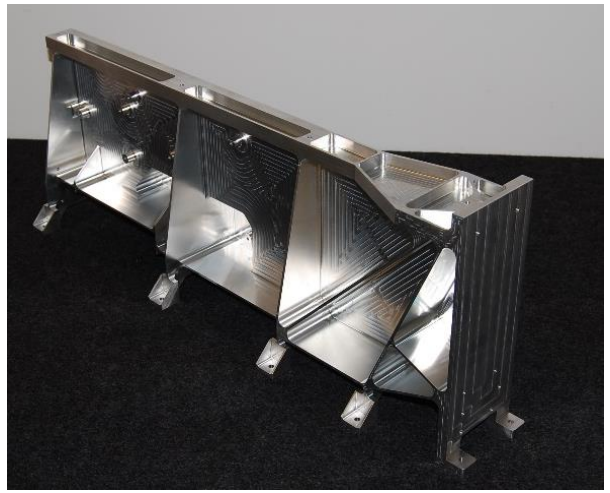


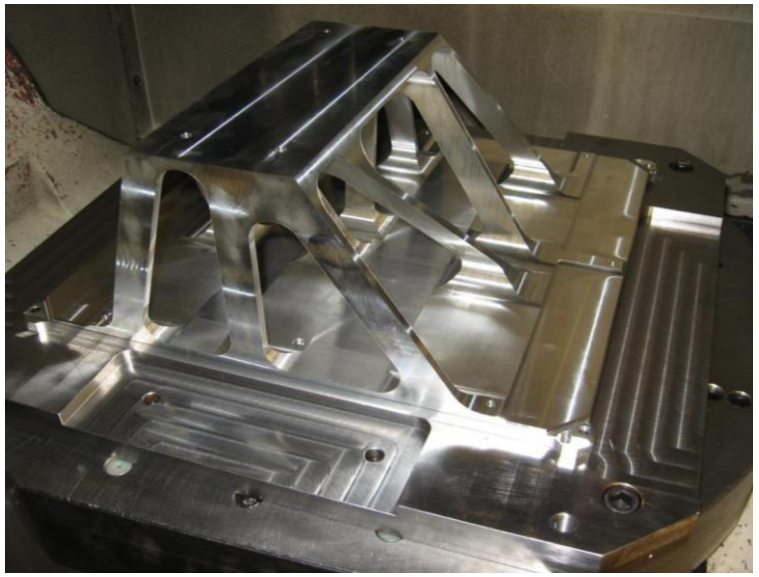


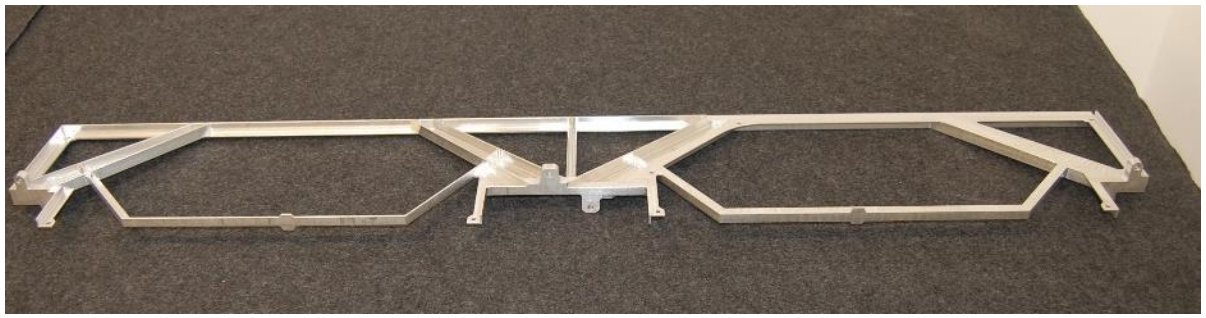


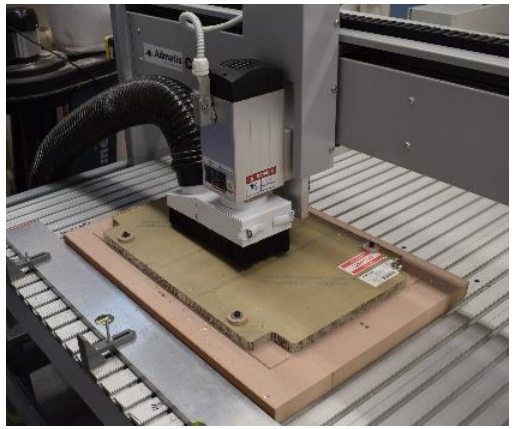
Machining

- Internal or external suppliers
- 3, 4 and 5 axis machines
- TRL9
- Machining dimensions up to 6000x4500x1500 mm
- Tolerance up to 0.005 mm









Surface treatment

Conversion coatings

Types	trivalent chromium coating (SURTEC650) and hexavalent chromium coating (Alodine 1200)
Bath dimensions	950 x 500 x 180 mm
Alloys to be coated	1xxx, 2xxx, 5xxx, 6xxx and 7xxx series of aluminum alloys
Technology	manual, not automatic

Properties

Colour	pale or dark grey
Coating weight	0.1 – 0.5 g/m^2

Qualification

Corrosion	168h / 72h NSS and 240h humidity test
Bake-out	72h, 60°C, 10^{-5} mbar
TVC	100 cycles ±100°C

Compliance

Standard	ECSS-Q-ST-70-14C, prEN4729 and SP-ADST-1000112306 by Airbus
Acceptance	by ESA and Airbus

Reference

Project	Sentinel-2 flight hardware accepted by Airbus and ESA, CHEOPS, JUICE

Painting

Paint systems

Hardware size	max. $2m^2$
Painting booth	ISO Class 8 grade
Masking	yes
Paints	MAP PU1, MAP SG121FD, MAP PUK, Aeroglaze Z306 AQ PUK is under qualification
Primer	yes but not necessary
Technology	manual, not automatic
Overpainting	within few hours of chromating
Curing	in ISO Class 8 clean room or fast curing

Qualification

Corrosion	240h humidity test
Bake-out	72h, 60°C, 10^{-5} mbar
TVC	100 cycles ±100°C
Adhesion	cross-cut and peel test

Compliance

Acceptance	by ESA and Airbus

MLI

Performance: normal & high-efficiency
Appication: internal and external blankets

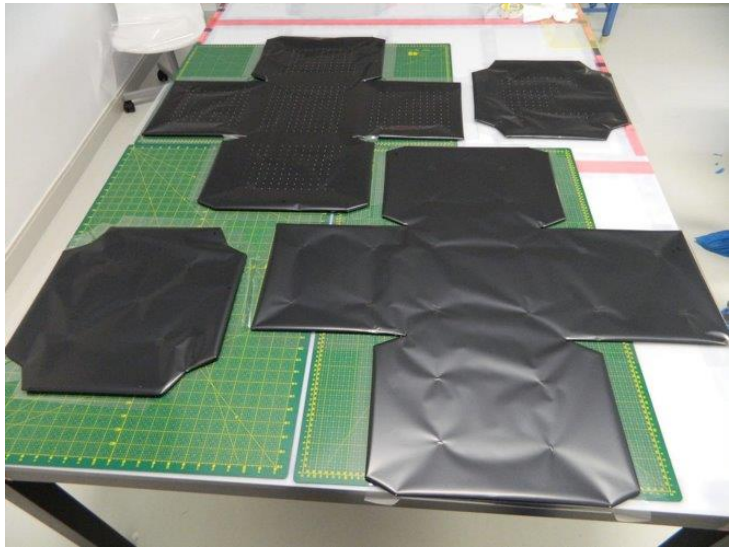
PROCESSES:

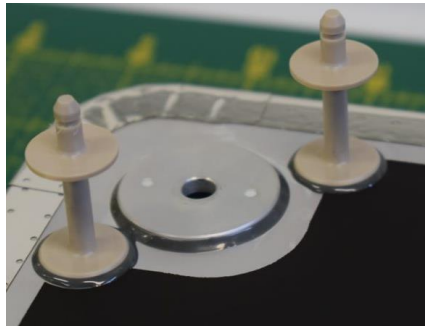
Manufacturing: manual or CNC cutting,
custom perforation

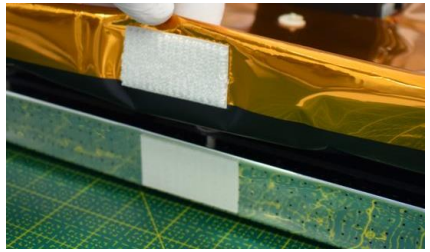
Assembly: blanket pinning,
blanket-to-blanket bonding by PSA,
Velcro application by PSA,
thermo-optical tape application

Grounding: grounding with Al foil and
removable fasteners or fixed rivet

Attachment: standoff or Velcro

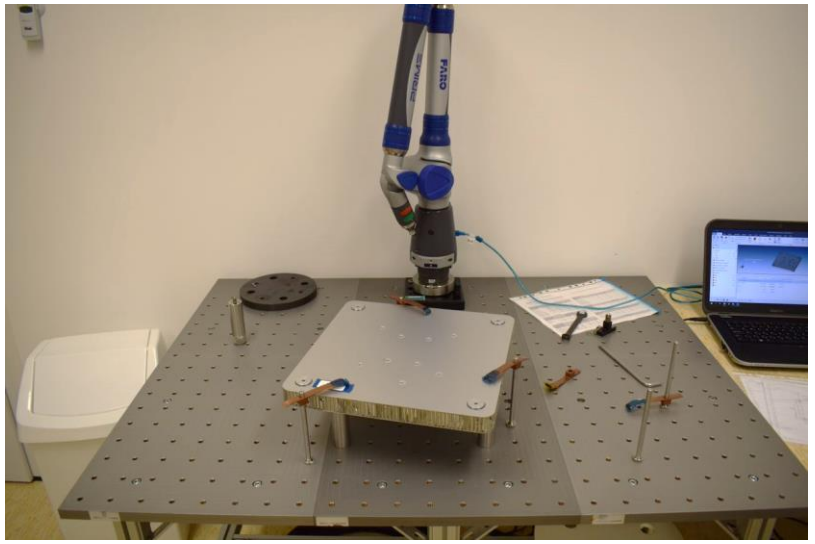


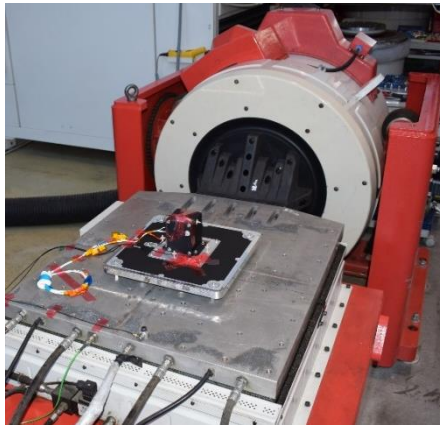


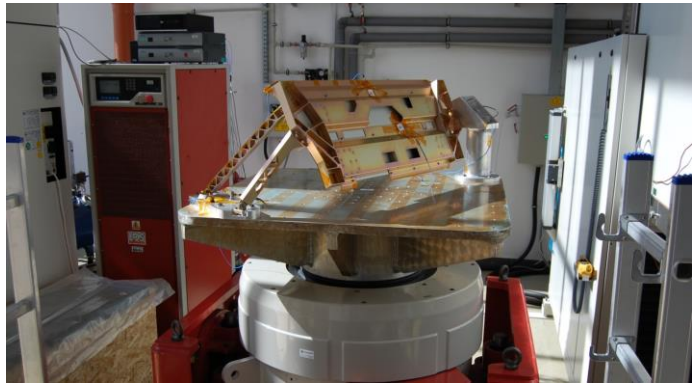


Verification

- CMM with 1800x800mm granite table. Accuracy is ~5micron.
- Portable Measuring Arm with ~1800mm volume. Accuracy is ~27microns.
- LDS shaker 35kN with slip table and head expanders (external)
- Surface Roughness measurement
- Detailed visual inspections by optical microscope
- Cleanliness measurement by portable particle counter
- Bake-out, TVAC and thermal balance
  - internal -70°C - +100 °C
  - external AAC and ESA



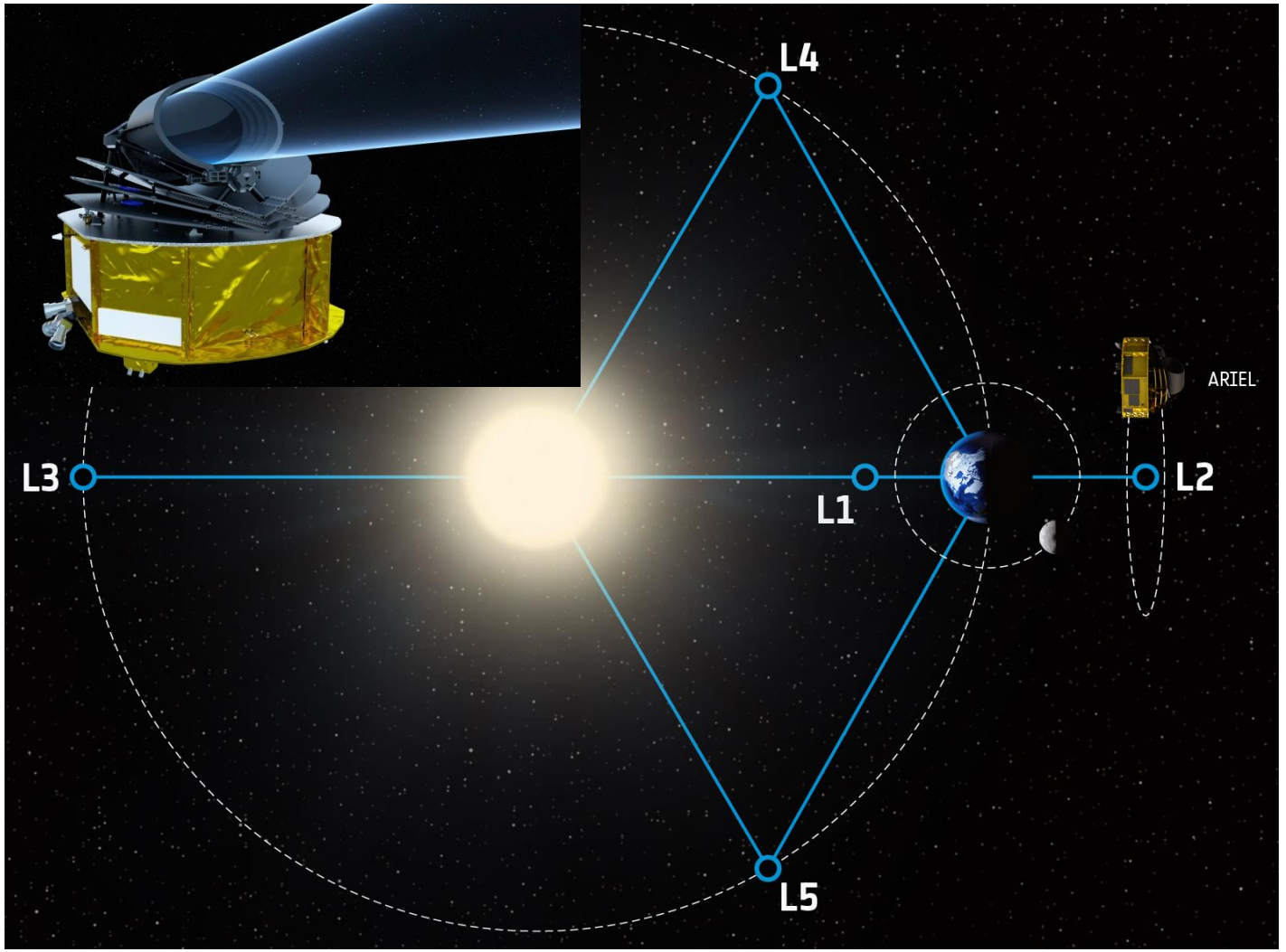




ARIEL - Overview

The mission:

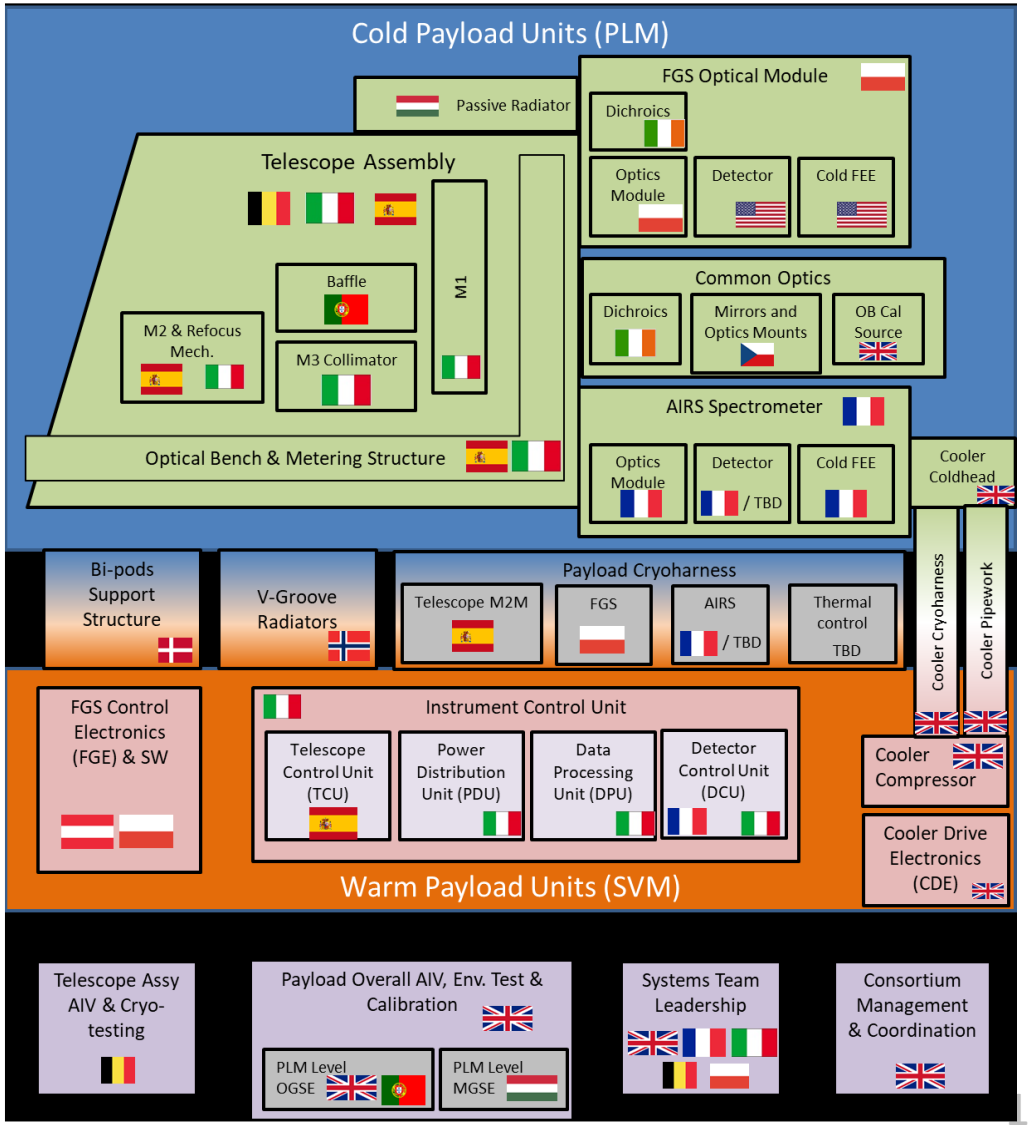
- **Elliptical primary mirror:** 1.1 x 0.7 metres
- **Mission lifetime:** at least 4 years in orbit
- **Payload mass / launch mass:** ~500 kg / ~ 1500kg
- **Instrumentation:** 3 photometric channels and 3 spectrometers covering continuously from 0.5 to 7.8 microns in wavelength
- **Launch date:** 2029
- **Destination:** Sun – Earth Lagrange Point 2 (L2)
- **Launch vehicle:** Ariane 6-2. Launch shared with Comet Interceptor.



ARIEL - Overview

The Team:

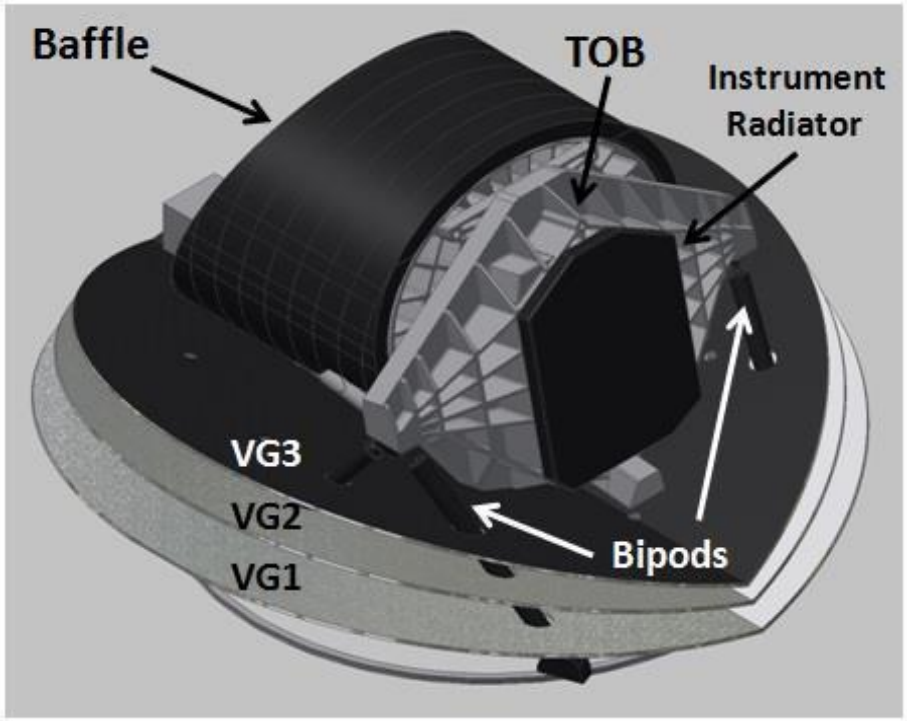
- Ariel mission consortium is led by RAL space UK.
- Prime contractor is ADS
- Contributions from 22 ESA states and NASA and JAXA.

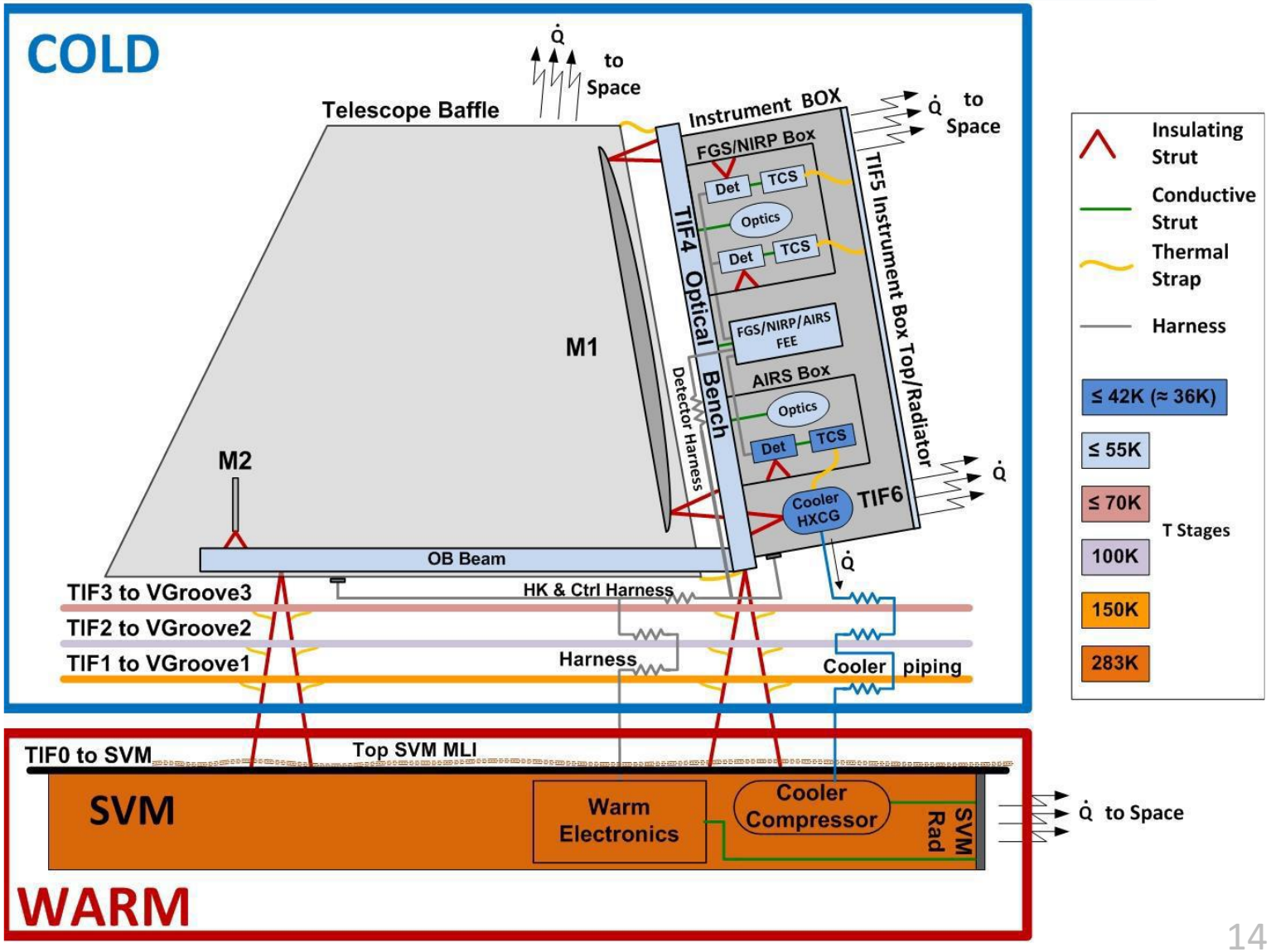


ARIEL - Payload

Purpose of Instrument Radiator:

- Instrument Cooling
- Radiation Shielding
- (TOB assembly stiffening)





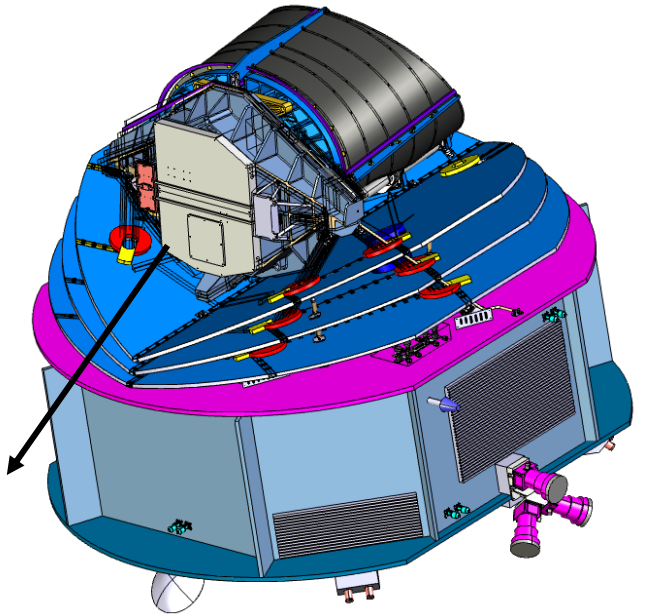
ARIEL – Flight hardware

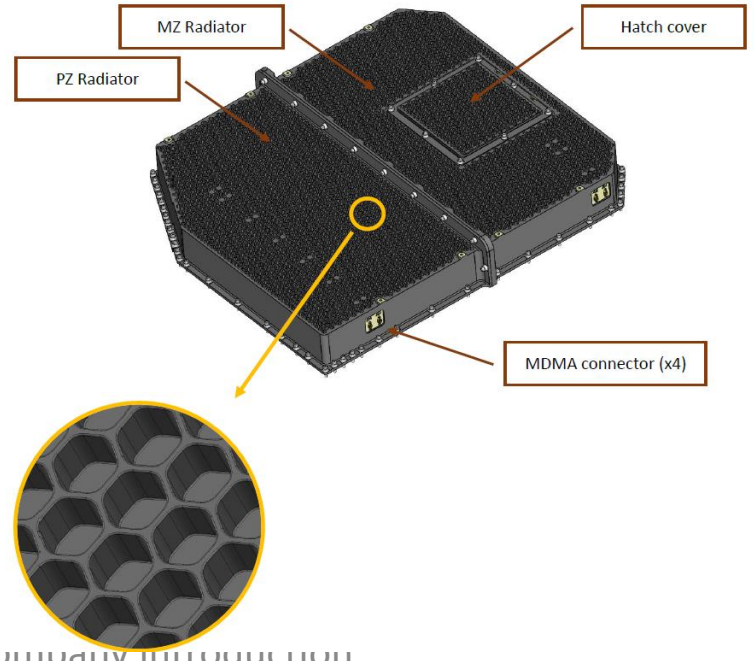
Instrument Radiator Subsystem

- Light tightly seals instrument cavity while ensuring the necessary radiative cooling capacity to dissipate heat produced by instruments into deep space.
- Challenging due to cryogenic (45K) operation temperature.

- Equipped with monitoring thermal sensors.

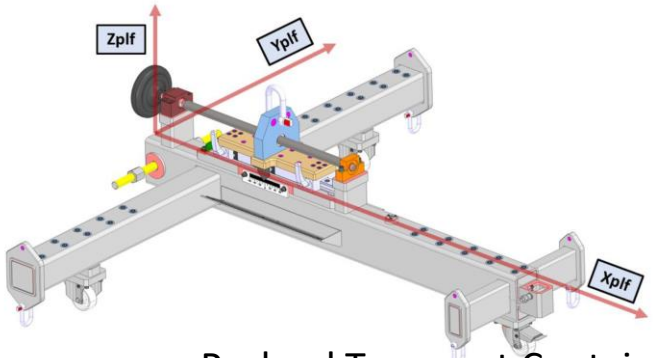
- Features special honeycomb radiative interface to compensate coating's low emittance at cryo.
- Build-to-spec





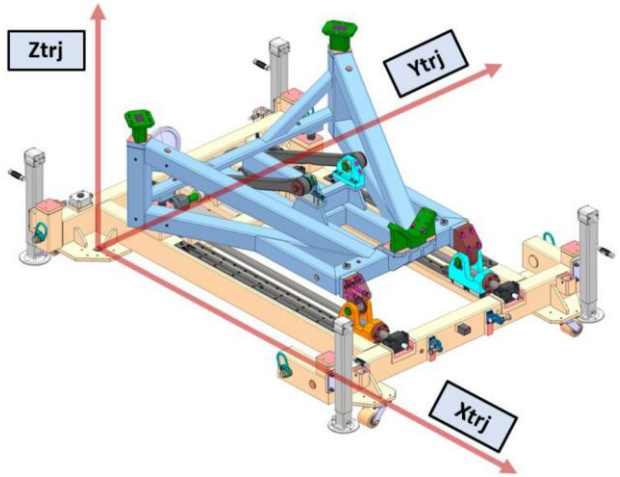
ARIEL – MGSE

Payload Lifting Frame (PLF)

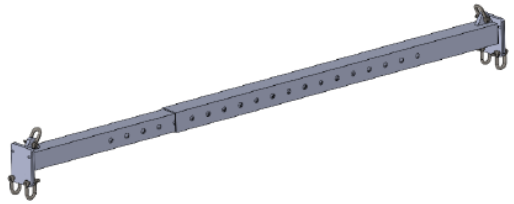


Telescope Lifting Adaptor (TLA)

Telescope Rotation Jig (TRJ)

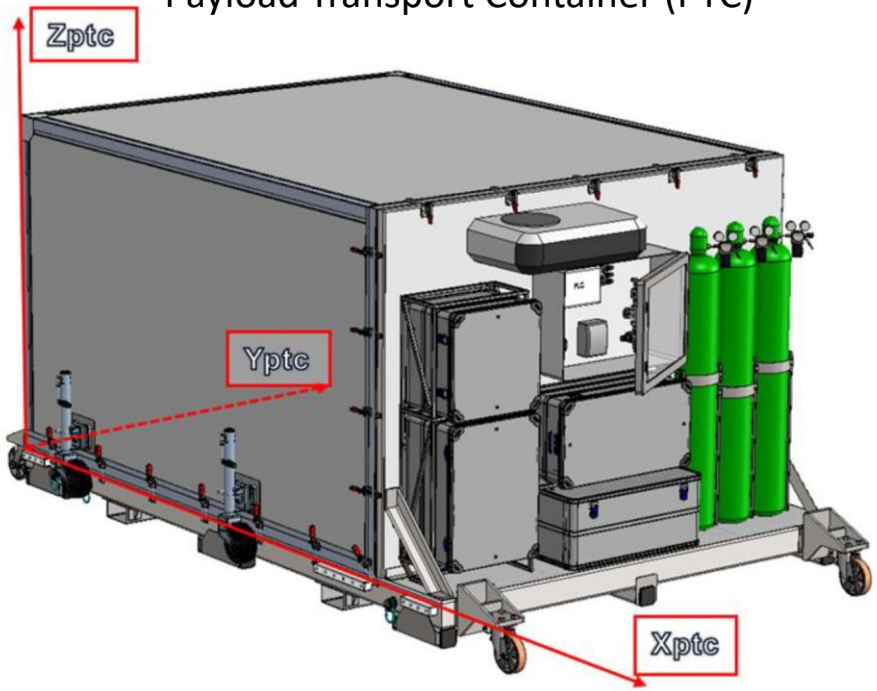


Universal Lifting Beam (ULB)
Container Lifting Beam (CLB)

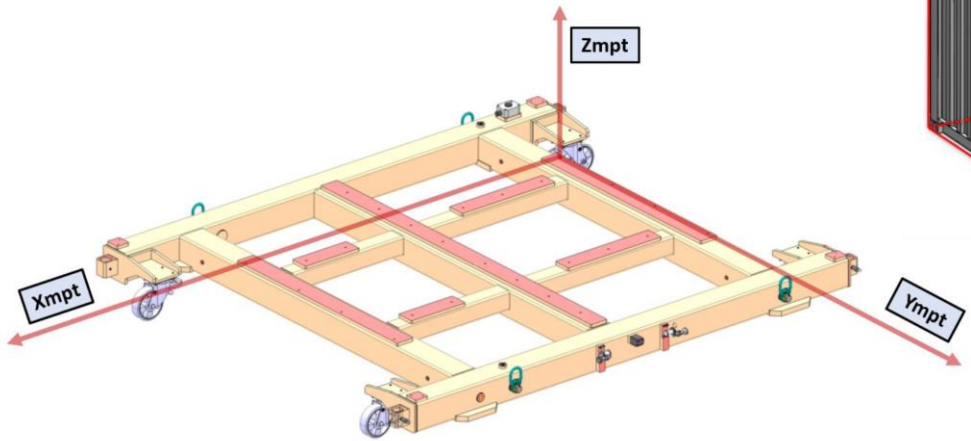


GSE Transport Container (GTC)

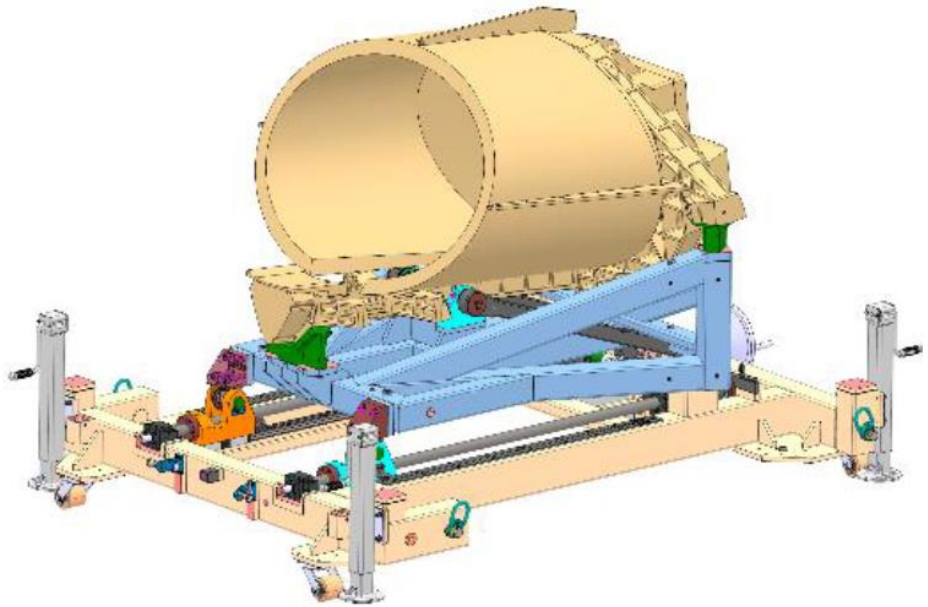
Payload Transport Container (PTC)



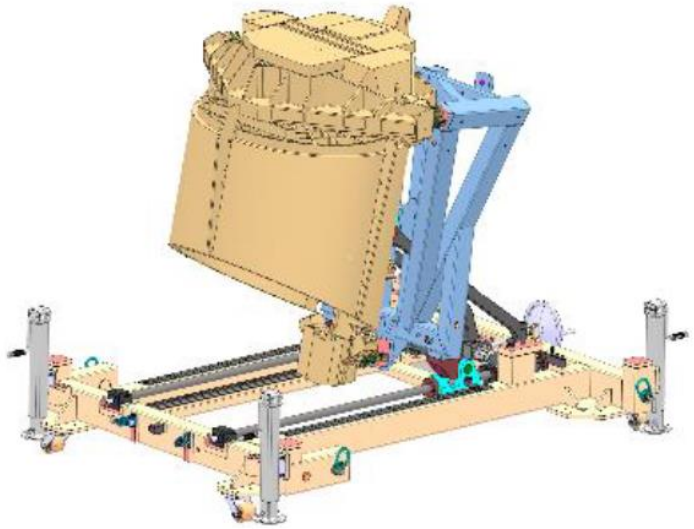
Multi-Purpose Trolley (MPT)



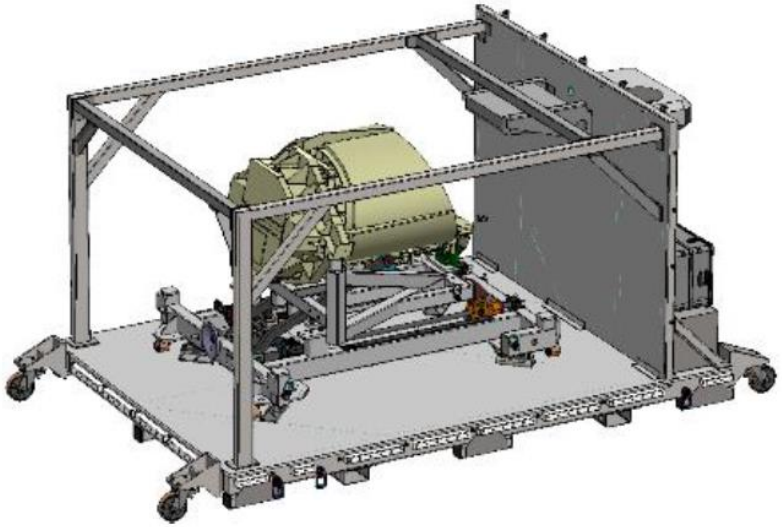
ARIEL – MGSE



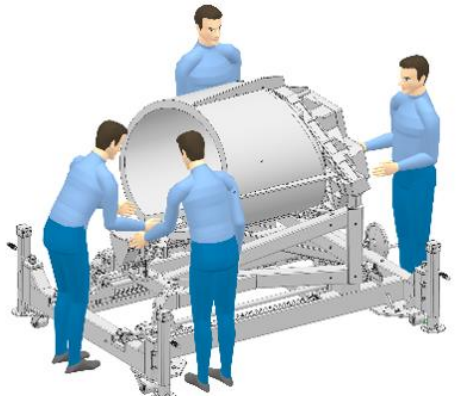
54. Figure – TRJ with TA



55. Figure – TRJ in integration position



TRJ and TA in the PTC

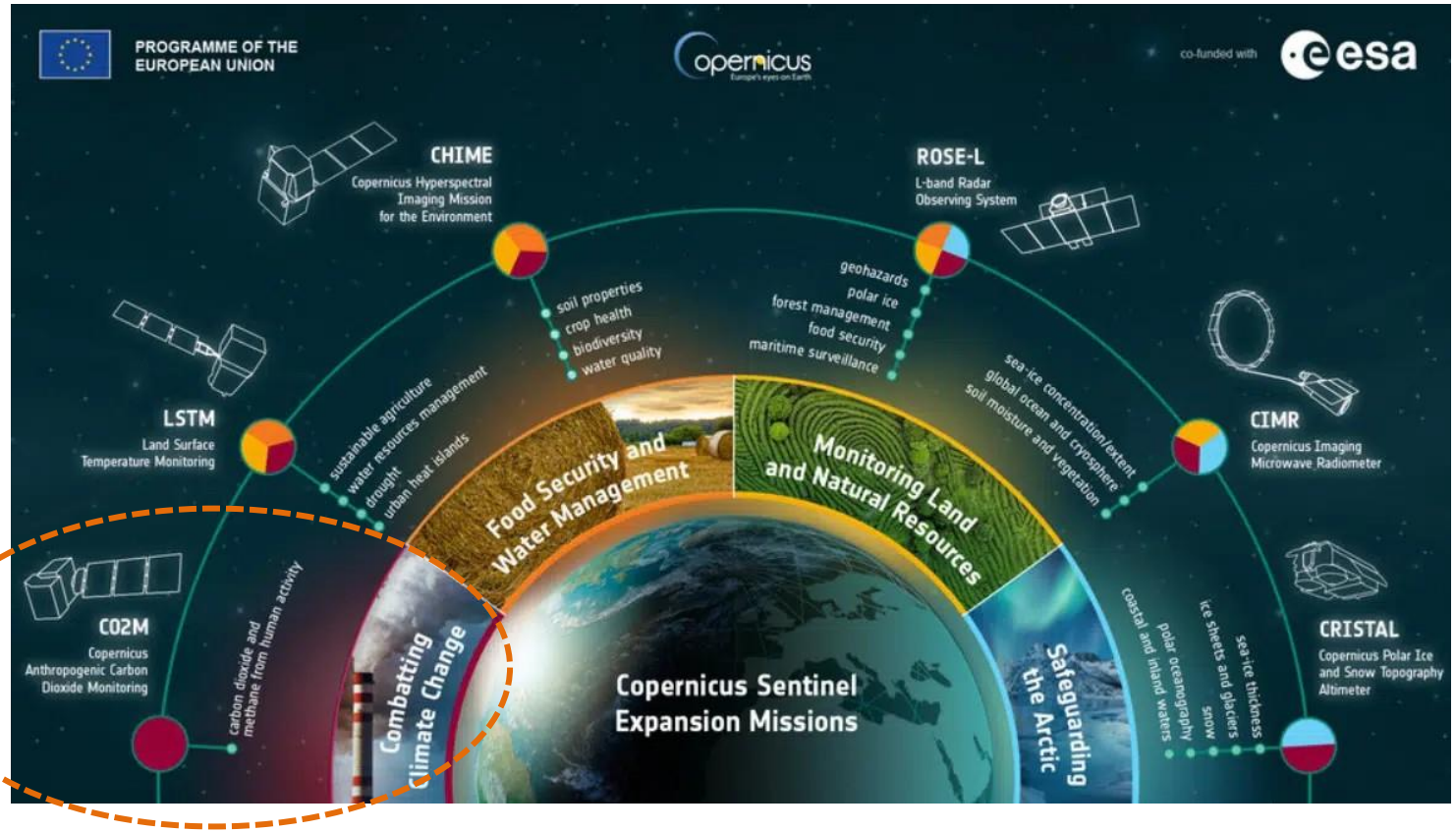


CO2M – Thermal Guard Assembly

Admatis
Advanced Materials In Space

Copernicus is one of the largest European space program for Earth Orbservation.

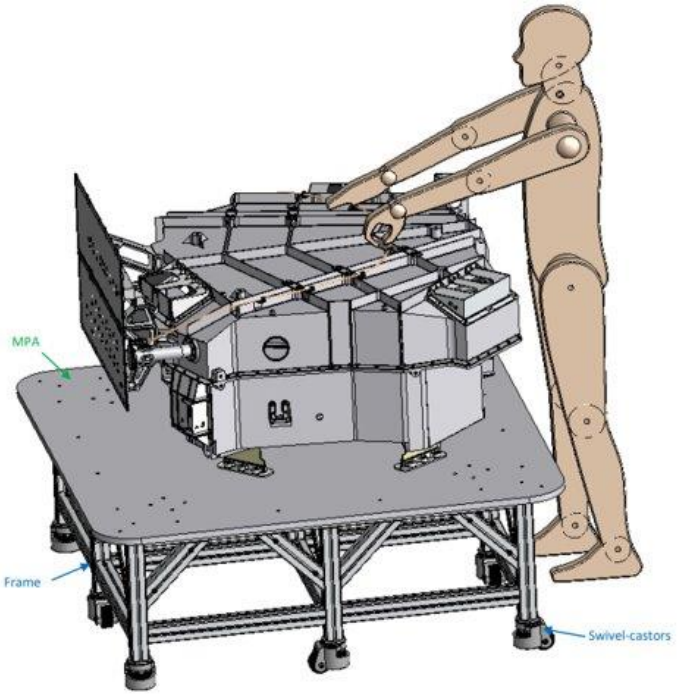
CO2M is part of ESA HPCM (High Priority Candidate Missions) / Copernicus Expansion Mission.



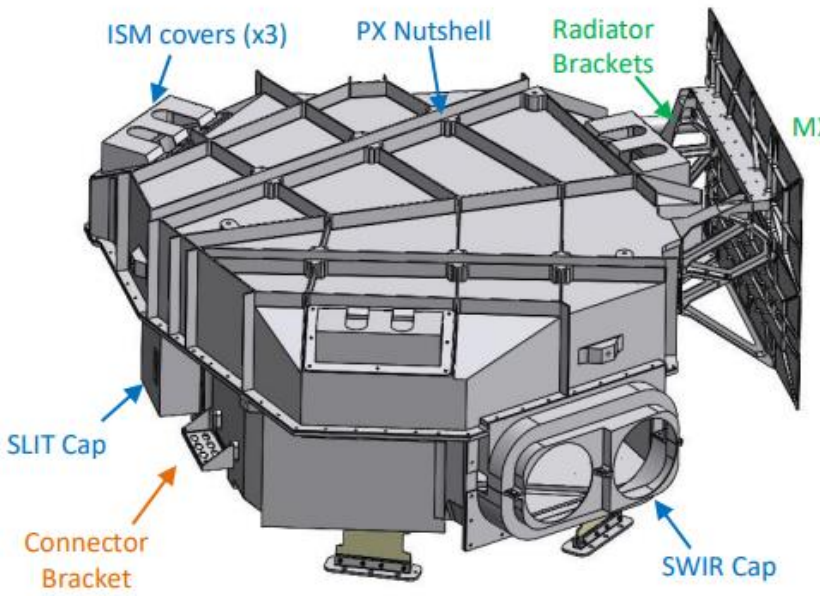
Mission is the climate change monitoring.
The aim of the CO2M mission is the detection and measurement of climate damaging gas focusing on carbon-dioxide and nitrogen-dioxide.

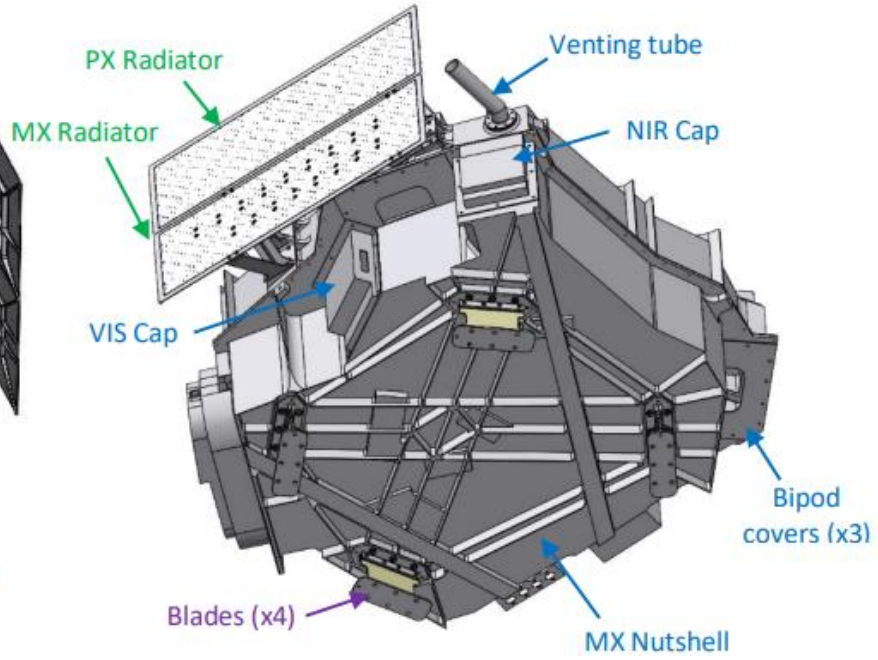
CO2M – Flight hardware

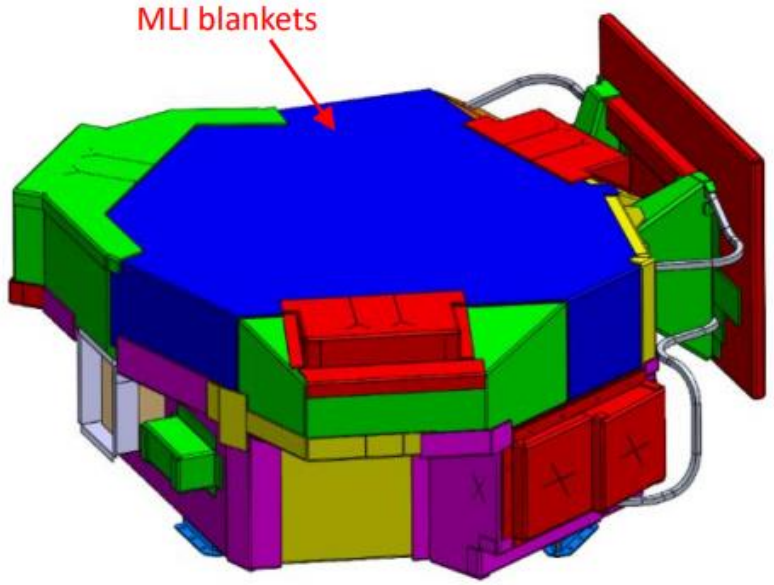
- Selection in open competition
- Encapsulation and thermal insulation of CO2 spectrometer.
- Design, analysis, manufacturing and testing of PFM, FM2 and FM3 (TBC)
- Platform provider: Thales Alenia Space France / Prime: OHB
- Build-to-spec



CO2M – Flight hardware



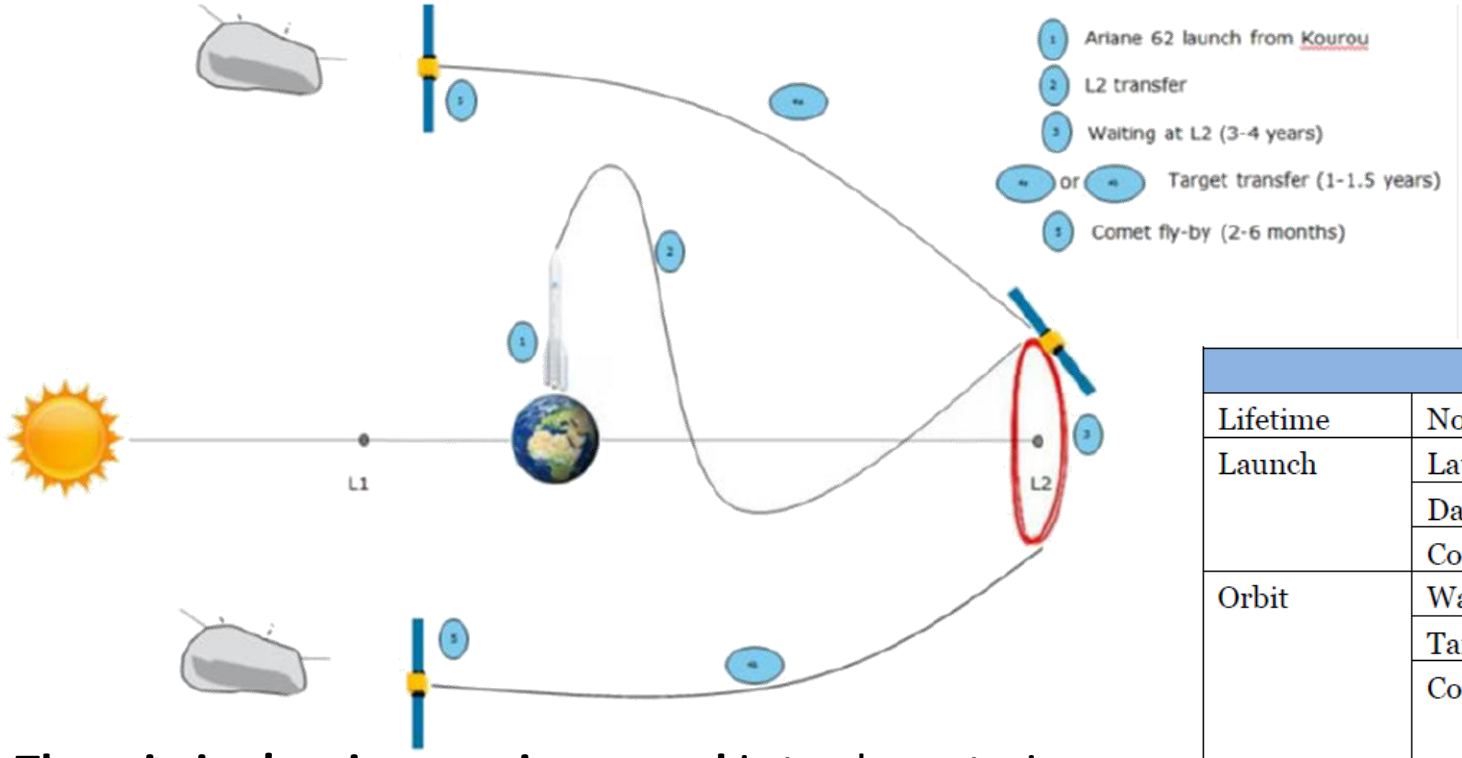




Comet Interceptor – Flight hardware

Admatis
Advanced Materials In Space

MISSION PROFILE



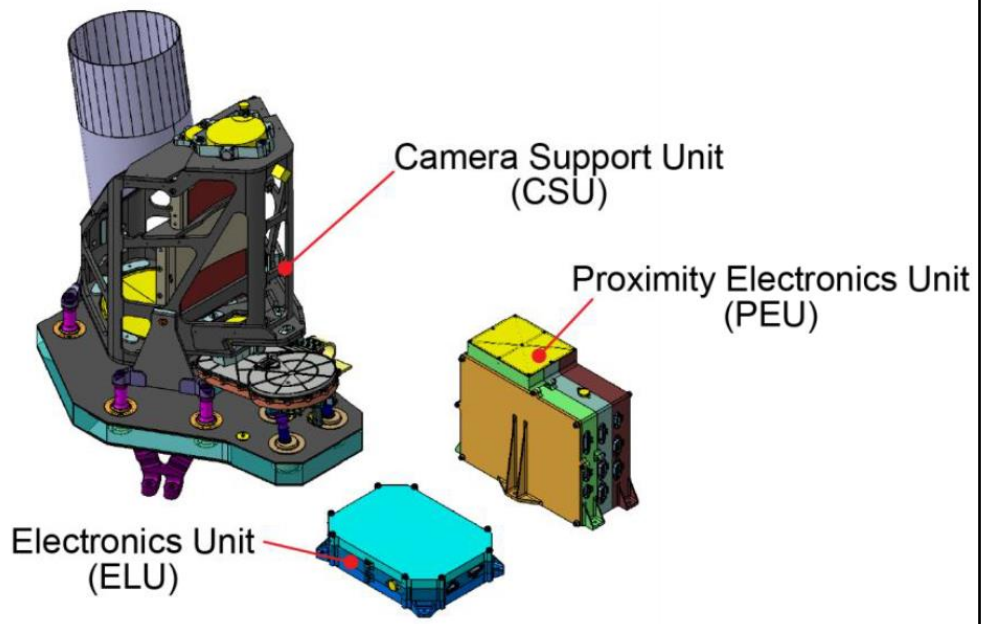
The mission's primary science goal is to characterize, for the first time, a dynamically-new comet or interstellar object, including its surface composition, shape, and structure, the composition of its gas coma.
Prime: OHB Italy
CoCa leader: University of Bern

Comet Interceptor – Mission summary		
Lifetime	Nominal 5 years with maximum 6 months of Science Operations	
Launch	Launcher	Ariane 6.2
	Date	2028
	Configuration	Shared, dual launch with ARIEL mission
Orbit	Waiting phase	Halo orbit around SEL2 point
	Target transfer phase	Heliocentric trajectory close to Earth orbit
	Conditions at encounter	Heliocentric distances between 0.9 and 1.25 AU Solar phase angle range at encounter +/-45 deg Fly-by relative velocity at encounter ≤70 km/s
Overall system characteristics		
Mass	Dry mass	655 kg
	Wet mass	796 kg (incl. probes B1 and B2)
Dimensions	Stowed	1,974 mm x 2,073 mm x 1,976 mm
	Deployed	9,768 mm x 2,999 mm x 2,484 mm
Delta-V	Chemical propulsion	110 m/s
	Electric propulsion	1522.5 m/s

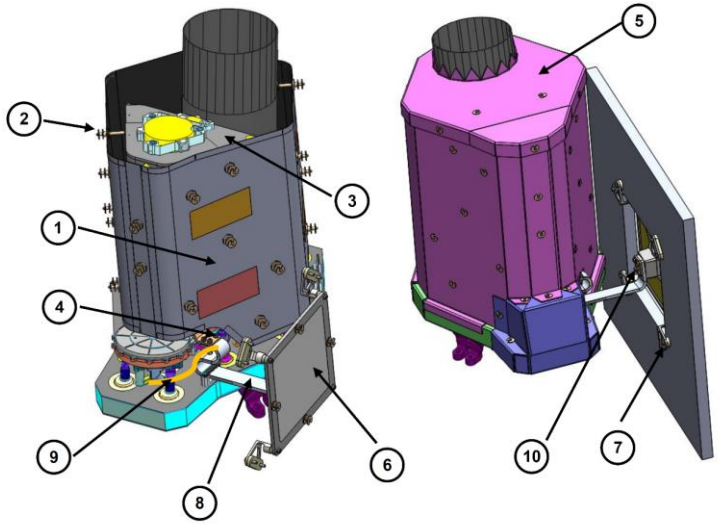
Comet Interceptor – Flight hardware

- ESA Project
- Objective is to develop passive and active thermal control hardware for Comet Interceptor's instrument called COmet Camera (CoCa).
- Active and Passive Thermal Control packages are under ADMATIS responsibilities.
- Build-to-spec

COCA OVERVIEW

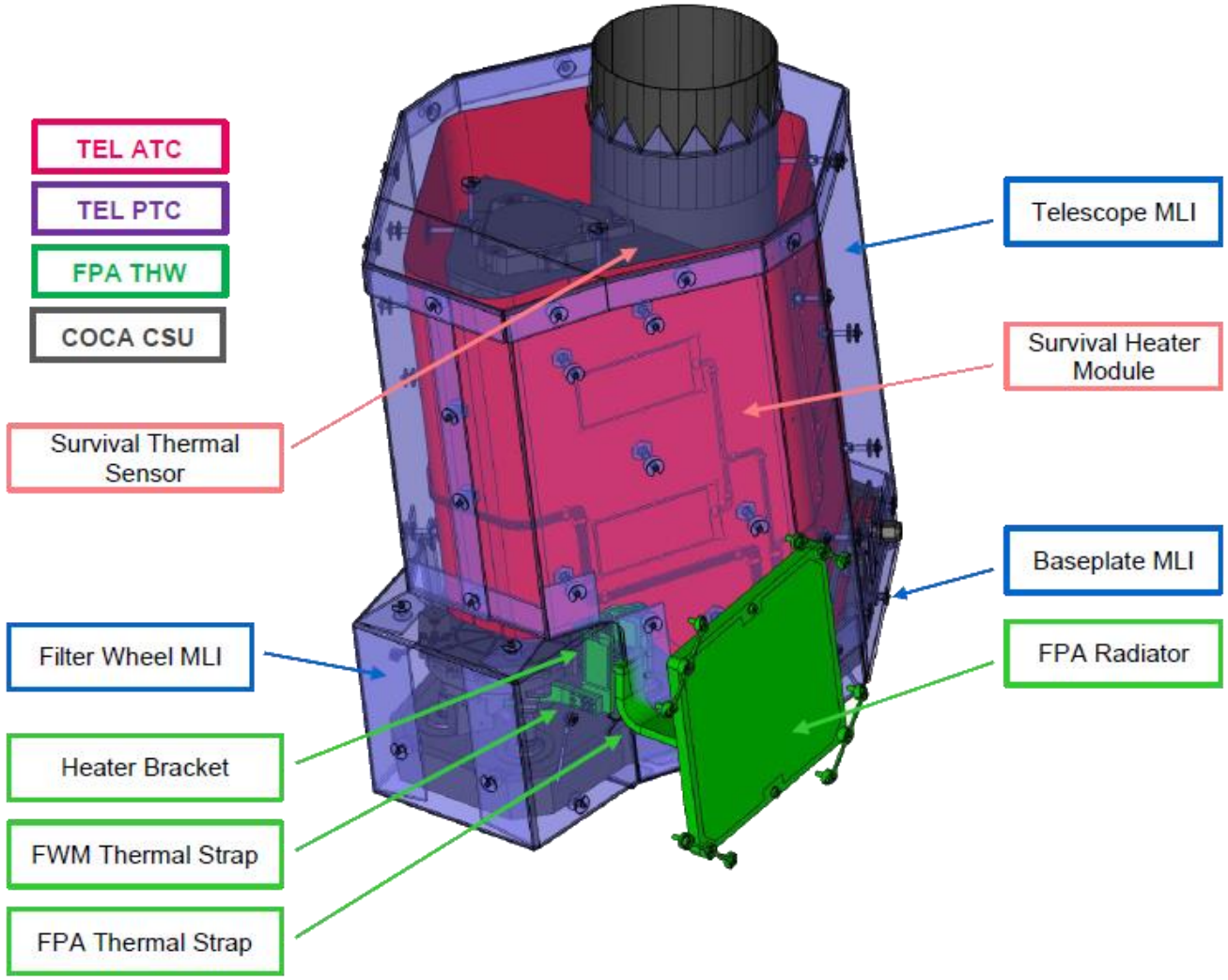


ADMATIS HARDWARE



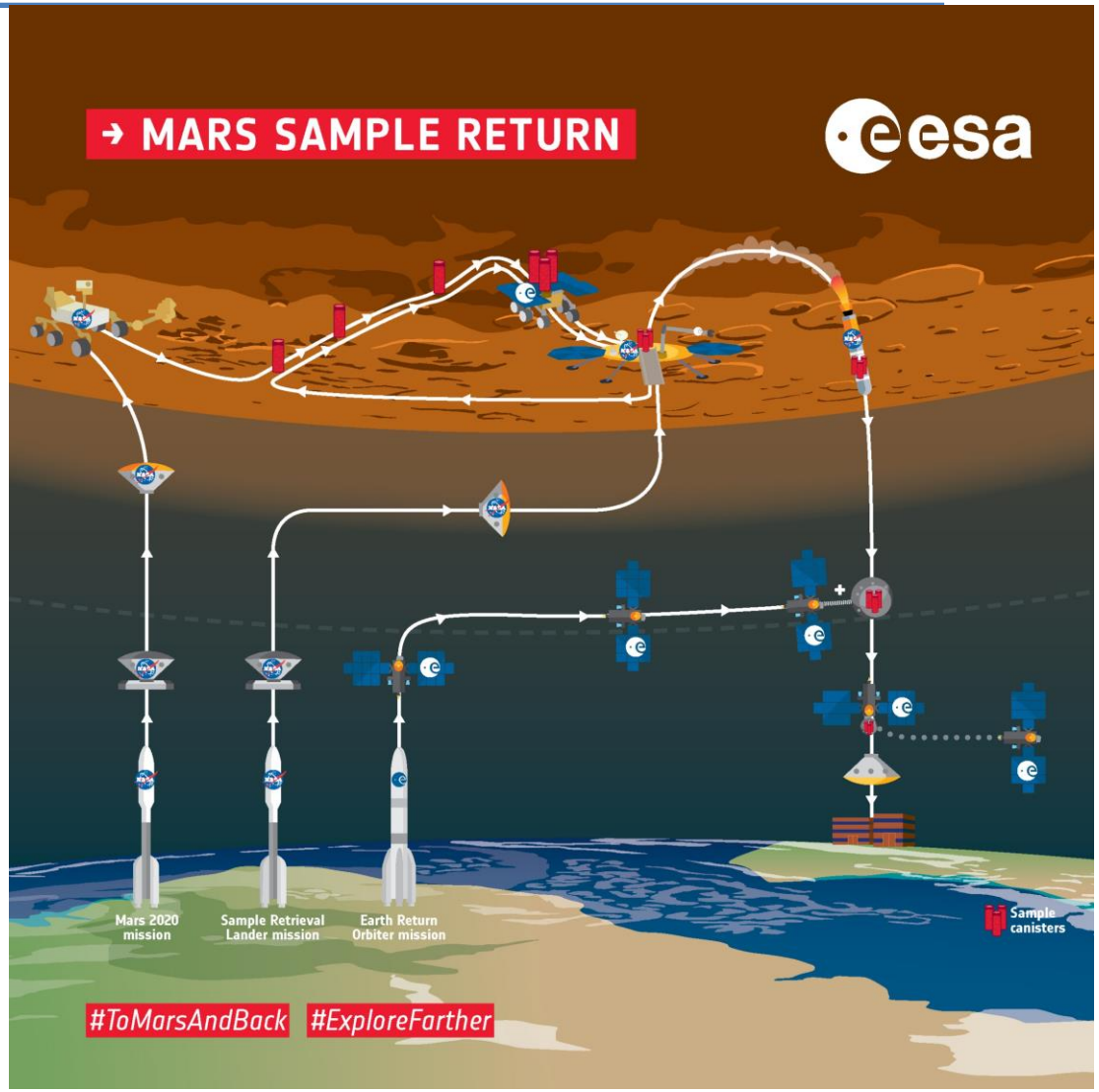
ID	Description	ID	Description
1	Survival Heater Module (SHM)	6	FPA radiator
2	SHM and MLI fixations	7	FPA radiator fixations
3	Telescope survival sensors	8	FPA Thermal strap
4	FPA survival heater and sensors	9	FWM thermal strap
5	CSU Multi-layer Insulation	10	Thermal strap fixations

Comet Interceptor – Flight hardware

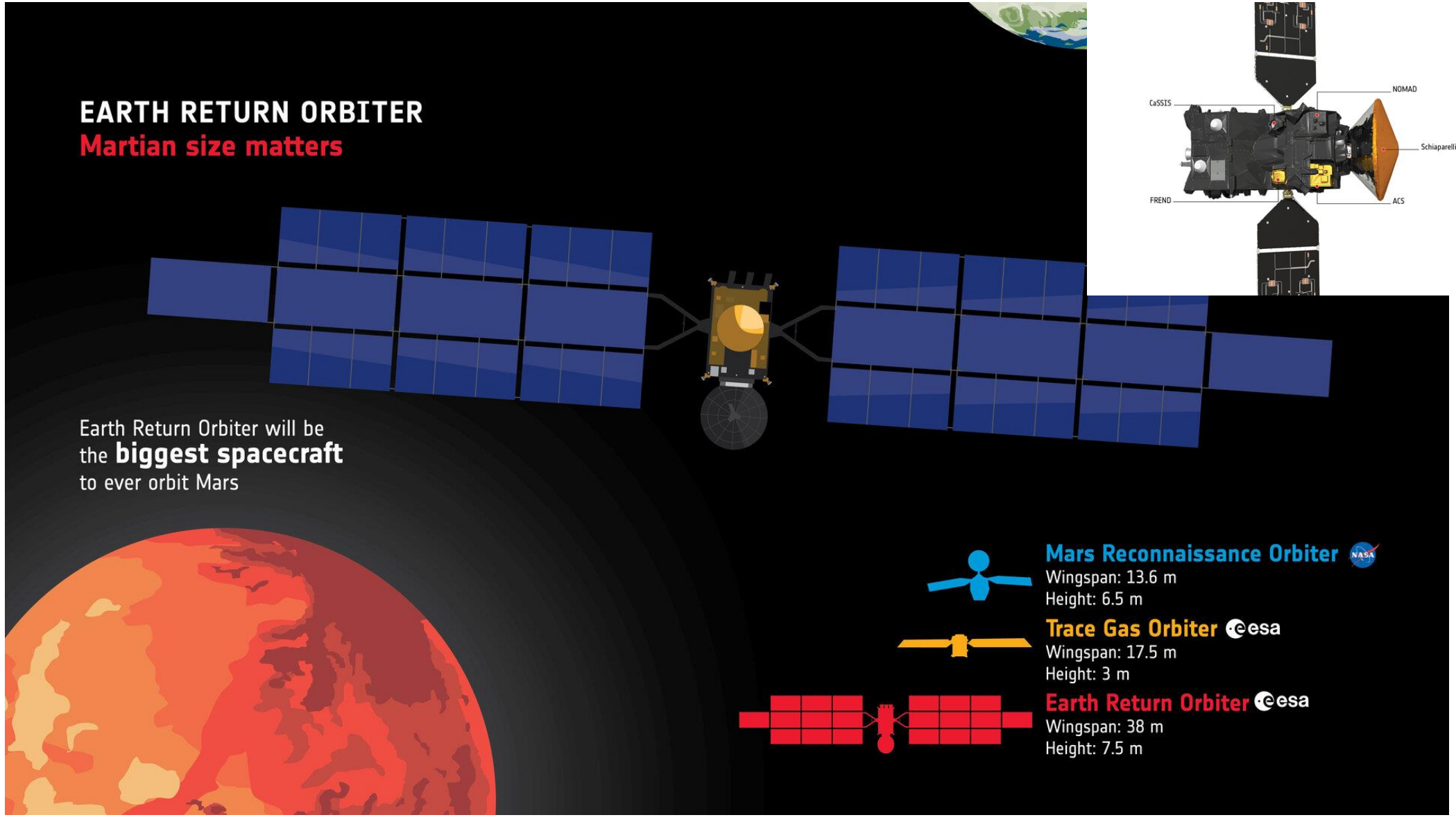


MSR – ERO –SDS – The Mission

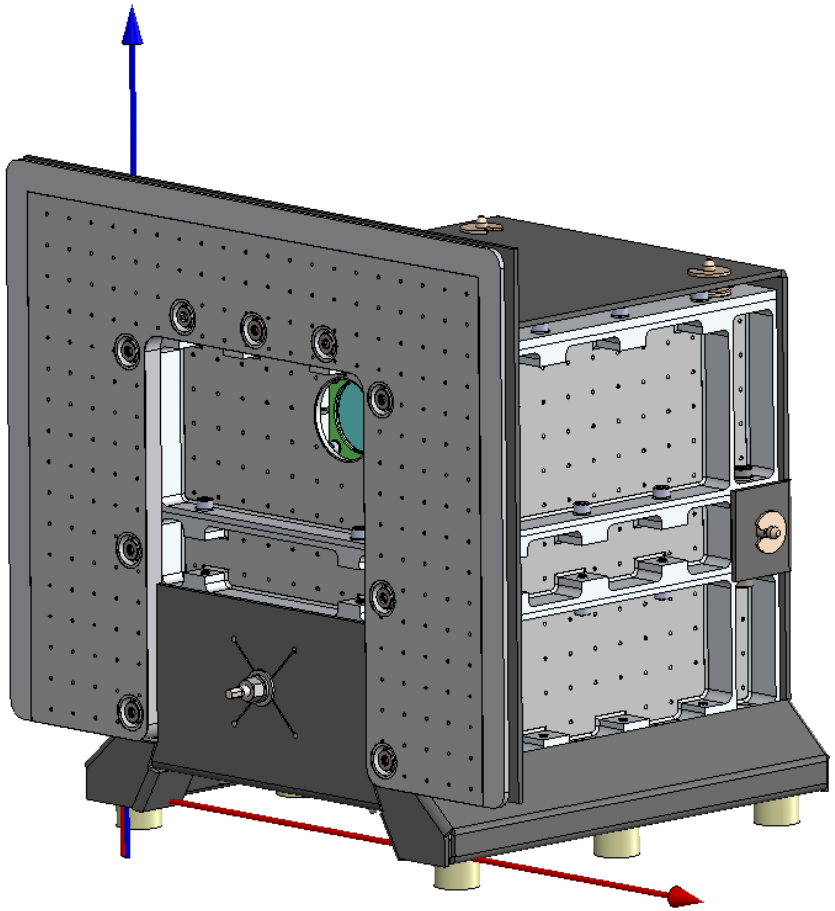
- External scientific instrument for radiation measurement
- Prime: Airbus
- Build-to-spec
- 2022 – 2025
- Hungarian team: EK, ADMATIS, Remred
- ADMATIS is responsible for thermal and structural subsystems

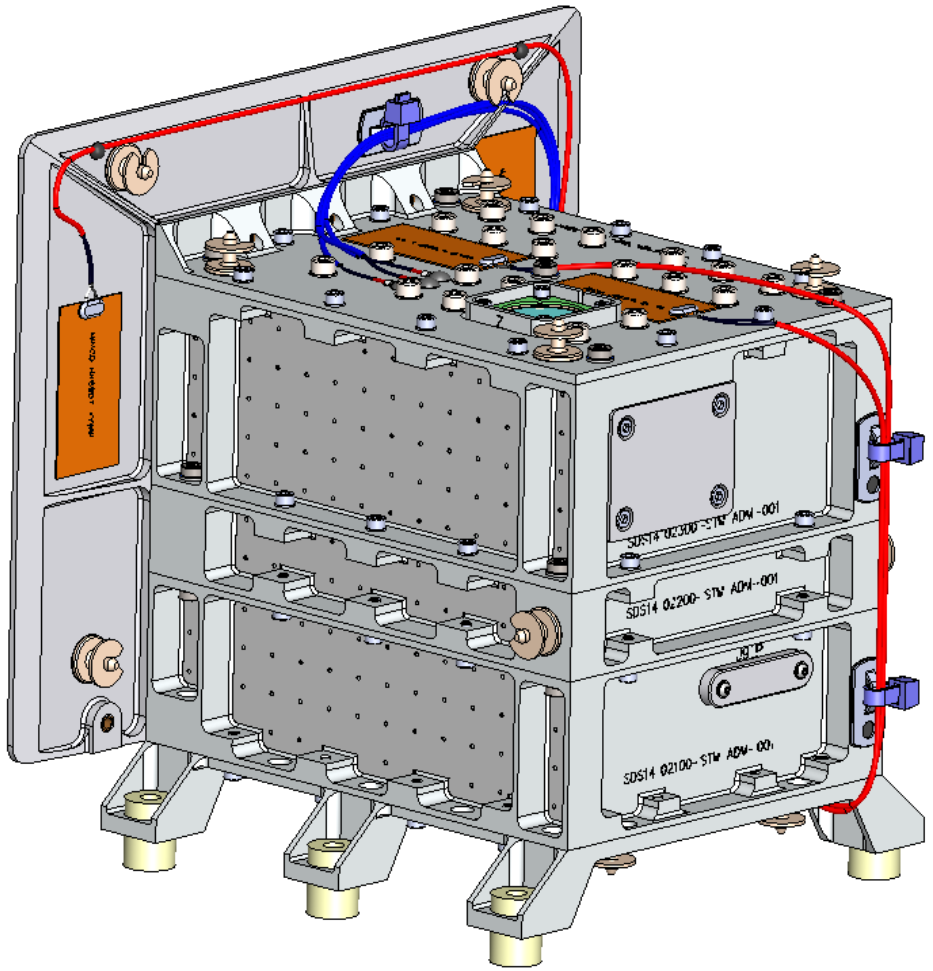


MSR – ERO –SDS – Spacecraft



MSR – ERO –SDS – Flight hardware





Version 2023

Mission Overview - MSN

ESA CLEANSPACE

CLEAN SPACE IS THE EUROPEAN SPACE AGENCY'S INITIATIVE, STARTED IN 2009 WITH THE ECOSAT STUDY, TO SAFEGUARD THE TERRESTRIAL AND ORBITAL ENVIRONMENTS, WHILE BOOSTING THE INNOVATION AND COMPETITIVENESS OF EUROPE'S SPACE SECTOR.

CLEAN SPACE HAS THREE BRANCHES:

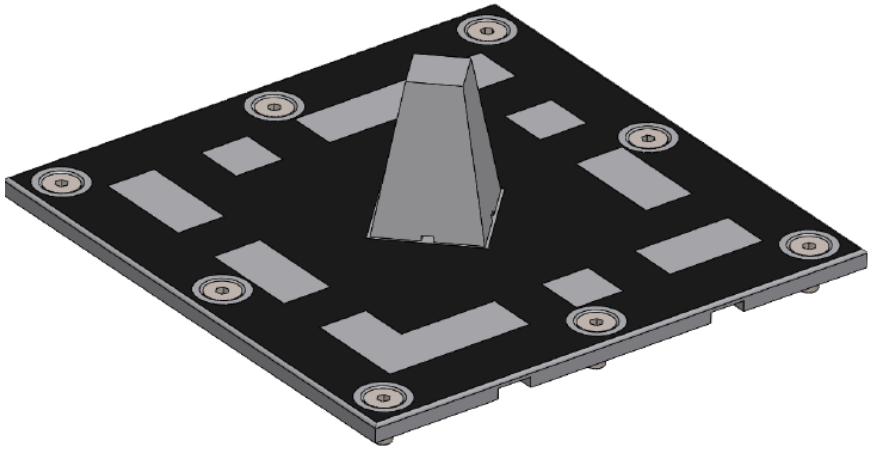
They reflect its mission to assess the environmental impacts of Agency programmes designed to find ways to address these challenges and contribute to a more sustainable and competitive European space industry.

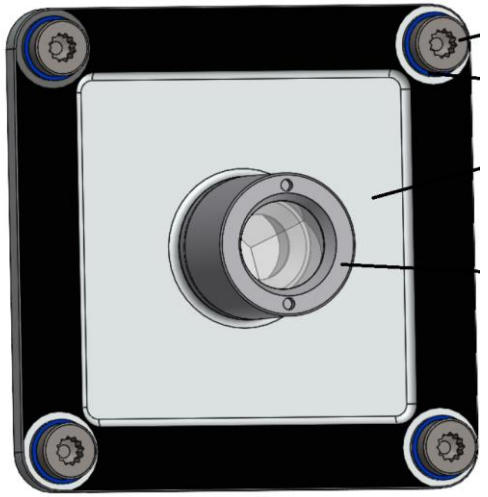
- **ECODESIGN**: Embedding environmental sustainability within space mission design.
- **MANAGEMENT OF END OF LIFE**: Developing technologies to prevent the creation of future debris.
- **IN-ORBIT SERVICING**: Actively removing spacecraft from orbit and demonstrating in-orbit servicing.

Clean Space (esa.int)

Markers Supporting Navigation

ESA R&D project portfolio with 5 projects at ADMATIS.
The first was competitive with other possible solutions.
Objectives:
- develop something than can be detected after 15 years LEO contitions with visible and thermal infrared cameras
- BOL and EOL properties are almost the same
- support navigation with range 40 – 0 meter
- detectable from Earth by laser technology



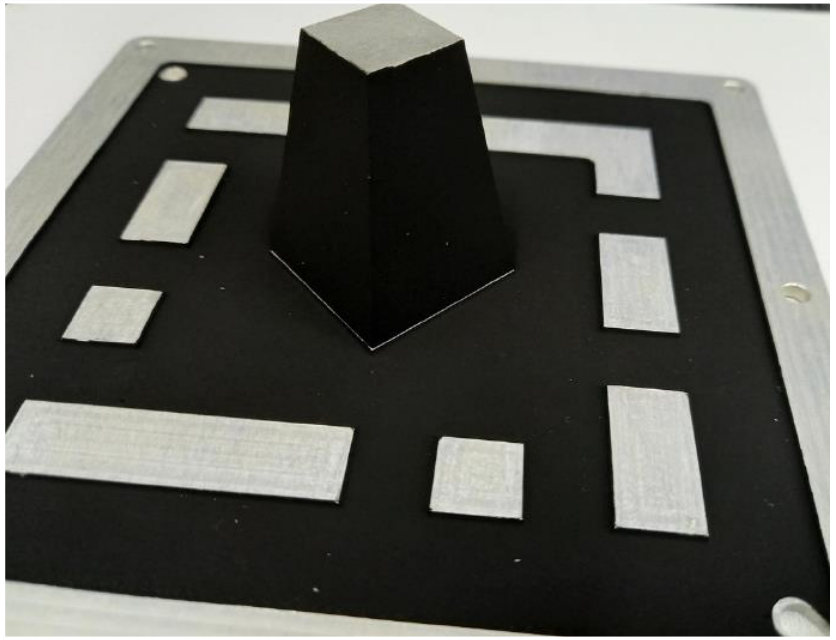


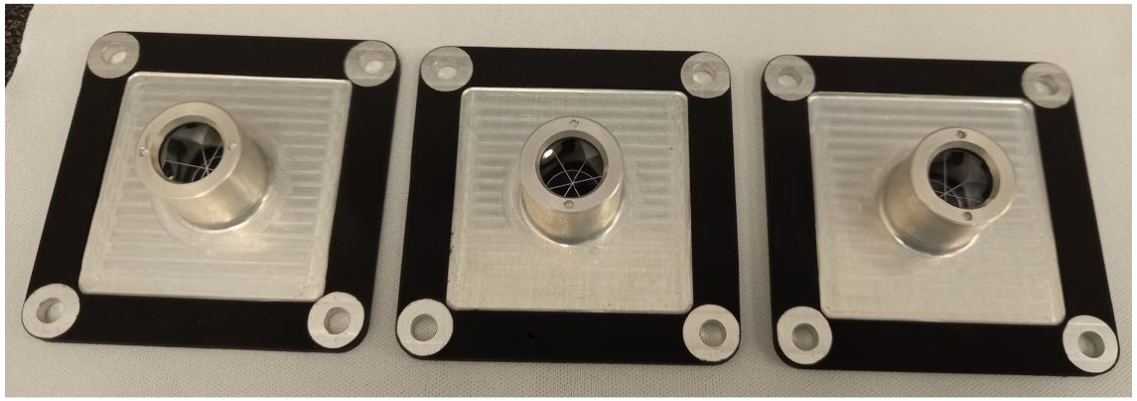
Markers Supporting Navigation

ESA – ADMATIS exclusive supplier contract signed in 2023.

The first industrial orders received:
- ESA AVS (AVS)
- ESA HPCM CRISTAL (Airbus)
- ESA HPCM LSTM (Airbus)

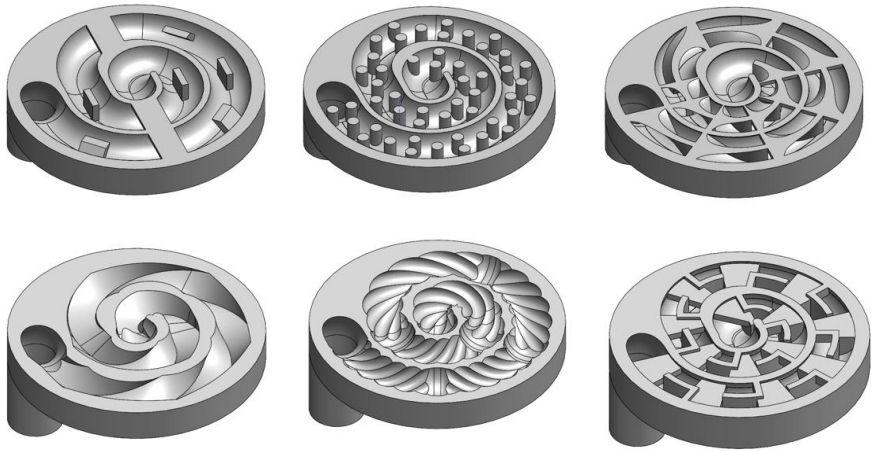
New developments running:
- phosphorescent painted Markers
- GNC test facility
- Markers for constellations
- System level leader of international team



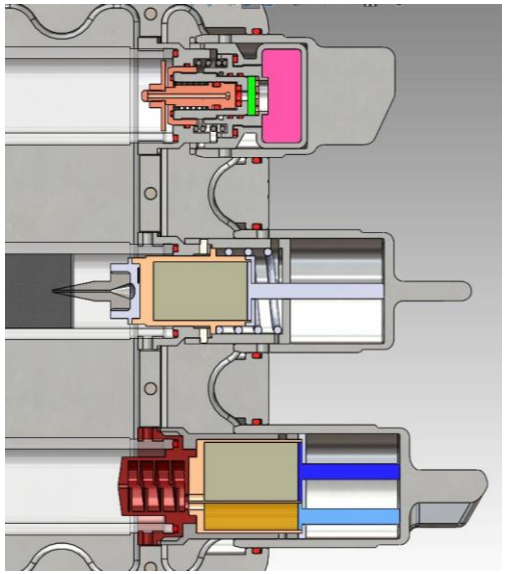


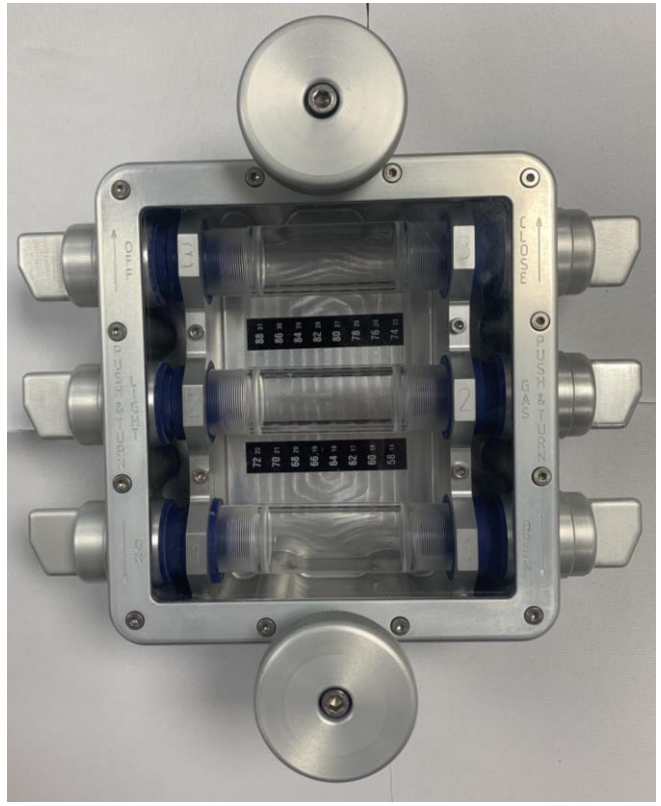
POSITIVE – Flight hardware

- Porous Lightweight Material Development
- Part of Hungarian in Orbit (HUNOR)
- Objective is to develop technologies for building structural porous material from Moon dust in order to support colonisation. Two types of foam are under development:
  - High porosity insulation material
  - Low porosity structural material like a brick
- Experiments on ISS
- 2022 - 2025



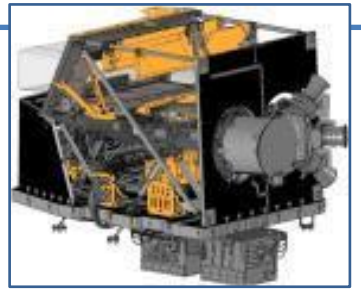
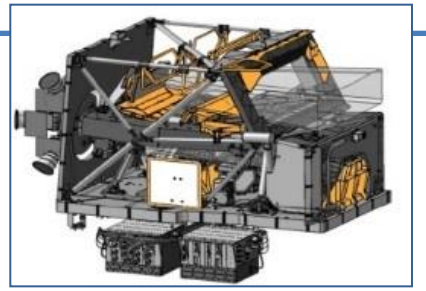
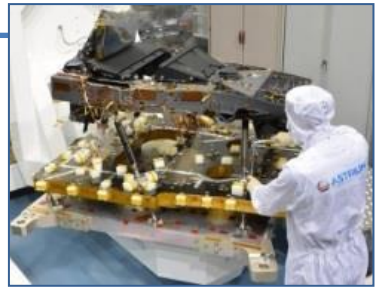
Static mixer concepts



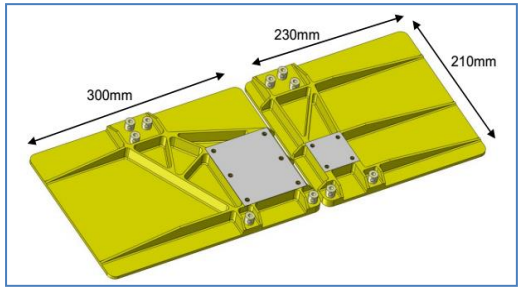


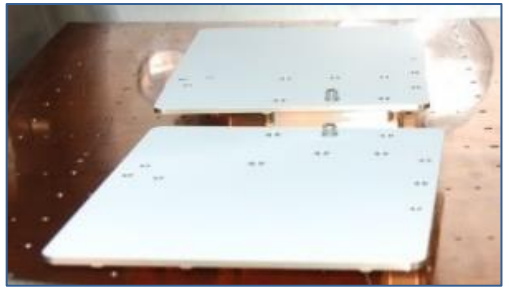
References

SENTINEL-2 A/B/C/D
Metallic Mechanical and Thermal Hardware are designed, manufactured, tested and delivered by ADMATIS.
Partner: Airbus
Implementation: 2009-2018

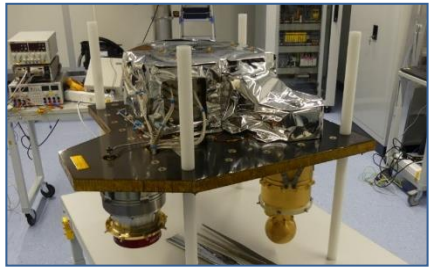
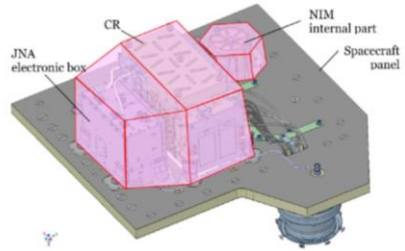




CHEOPS
FPA and FEE radiator development to CHEOPS satellite.
Partner: ESA , University of Bern
Implementation: 2013-2017

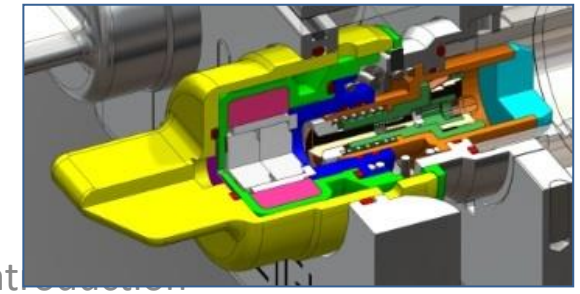





JUICE
STM and FH MLI for PEP and Thermal dummies for SWI instrument
Partner: ESA, Airbus, University of Bern
Implementation: 2020

FOCUS
Foaming experiments on board of ISS in February 2010.
Scientific background and hardware development.
Partner: European Space Agency (ESA)
Implementation: 2007-2010



Facilities

Software

1. servers with Linux and Windows
2. laptops with Windows, MS Office and ESET
3. SolidWorks Premium 3D CAD
4. SolidWorks Simulation Premium
5. NASTRAN
6. Thermica
7. LabView
8. MS SharePoint
9. Microsoft Project

Premises

1. Clean rooms for manufacturing and assembly (ISO8)
2. Clean room for cleaning and packaging (ISO8)
3. Surface treatment line and chemical laboratory
4. Conference rooms equipped with teleconf
5. Storage rooms with controlled environment

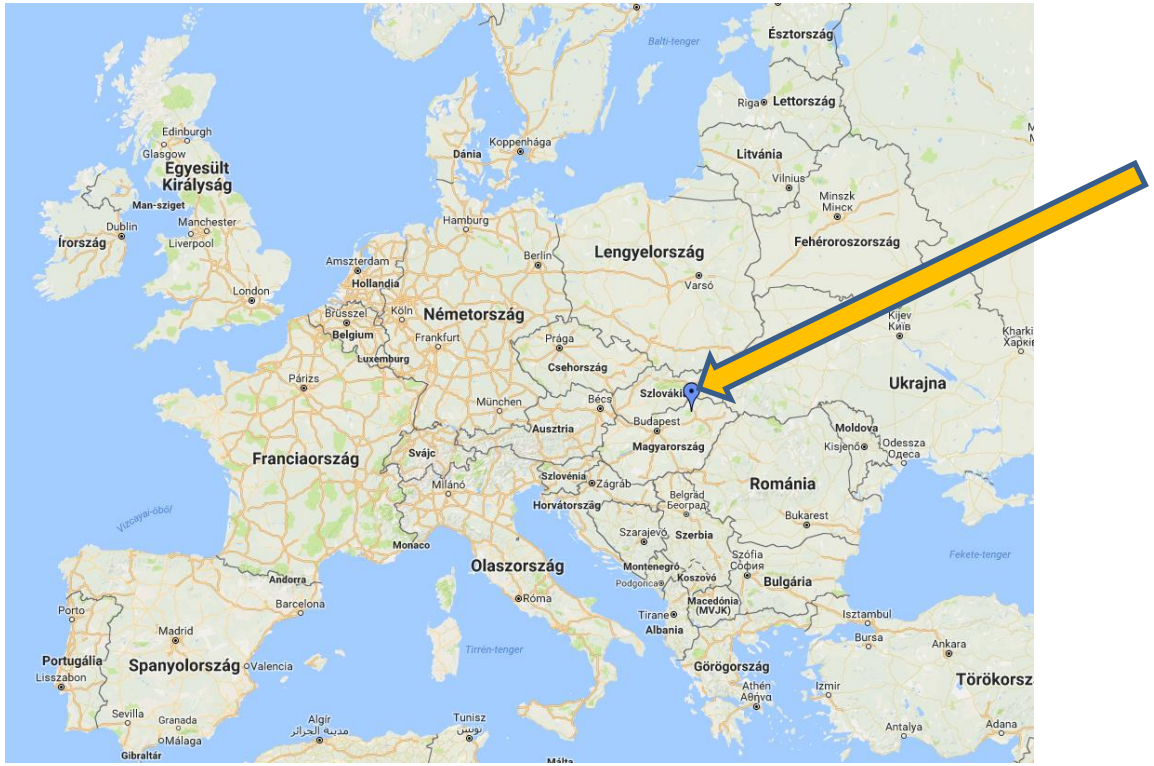
Equipment

1. Clean Bench (ISO5)
2. Surface treatment line for SURTEC and Alodine
3. Painting booth
4. Curing booth
5. MLI assembly area
6. TVC for bake-out, thermal cycling and thermal balance tests
7. Thermal cycling
8. CMMs for 3D measurement (portable arm, bridge)
9. NSS chamber
10. Humidity chamber
11. Thermal imaging
12. Microscope
13. Analytical scale
14. CNC mill for MLI cutting

At our partners (HUNSPACE)

1. Vibration test house (University of Dunaújváros)
2. Mechanical test house (University of Miskolc)
3. Metal machining (several)

Contact



ADMATIS

Kando Kalman street 5.
3534 Miskolc
Hungary

Tamás BÁRCZY

CEO

tamas.barczy@admatis.com

www.admatis.com

+36 46 898-154