

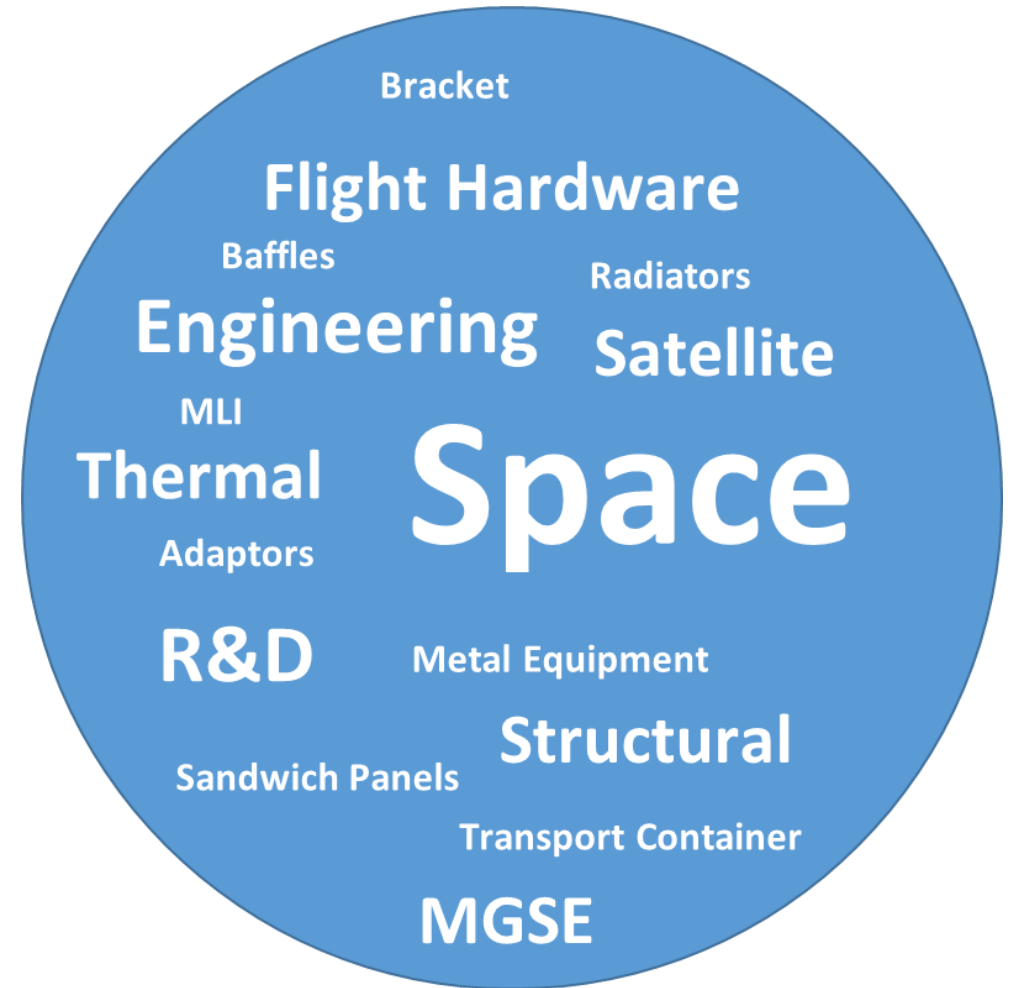


# Admatis

Advanced Materials In Space

## Company introduction

Bárczy Tamás  
CEO



## INTRODUCTION

Admatis was **founded in 2000** by **Hungarian private investors** and specialized in **space engineering** and **production** with strong **material science** background.

Our **core value** is our **competency** in **design, development, production** and **verification** of **space hardware** and their **support equipment**.

The company is an **SME** with about **40 employees**. Admatis is located in **Miskolc** and considered as a **prime in Hungary**.

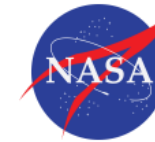
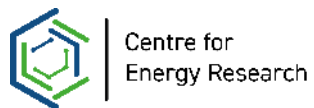
## CERTIFICATES

- **AS / EN 9100:** Quality Management Systems – Requirements for Aviation, Space and Defense Organizations
- **ISO 9001:** Quality Management
- **Central Contractor Registration (CCR)** registration with the Department of Defense (DoD)
- **NATO Commercial and Government Entity (NCAGE)** code
- **European Space Agency (ESA)** cost audit

## OUR MOTTO

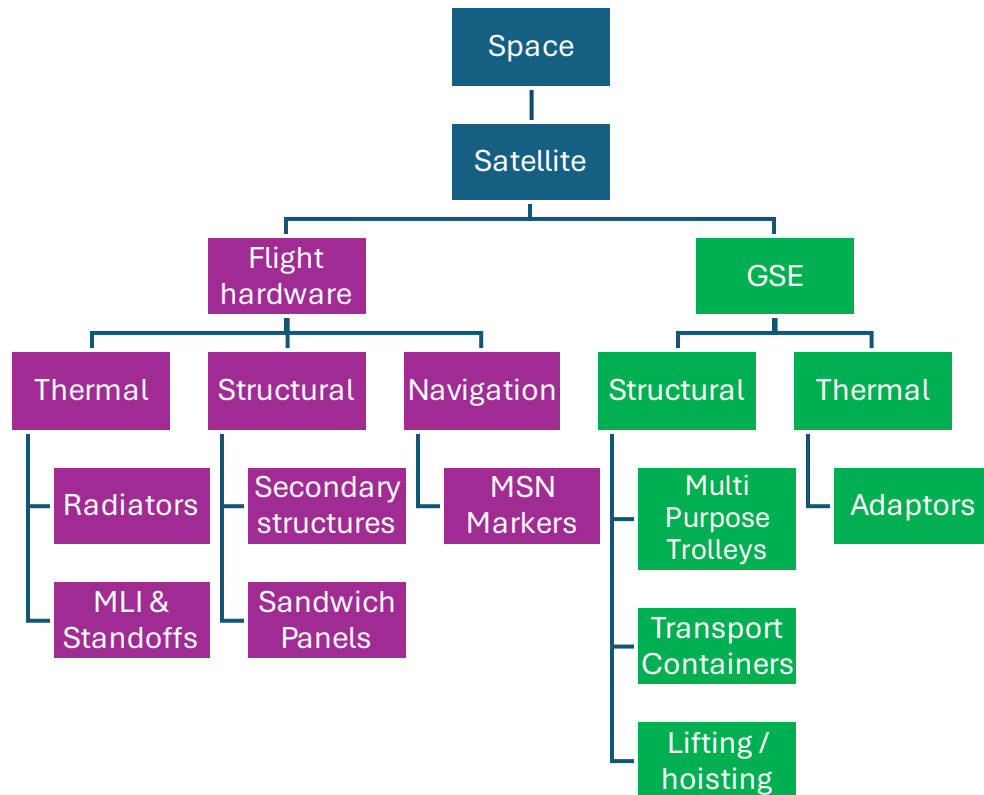
*„Whether you believe you can do a thing or not, you’re right”* Henry Ford  
**We believe we can do it.**





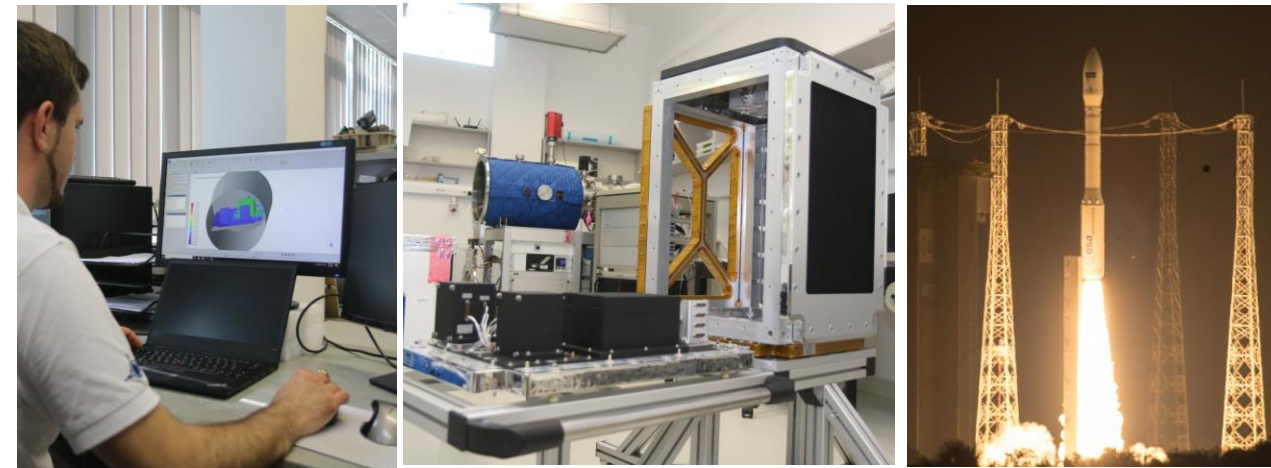
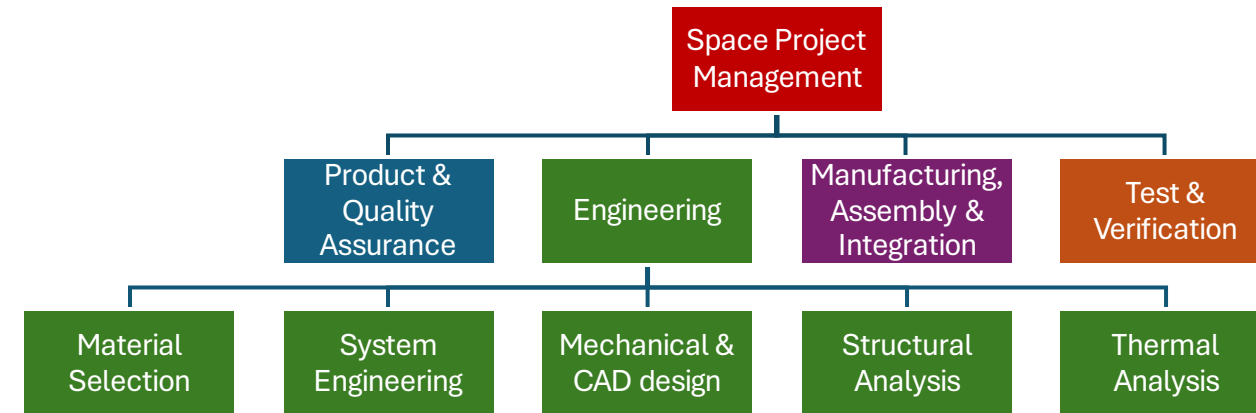
## OUR FOCUS

Admatis is working only in the **space segment** specialized in **structural-thermal hardware** and their **GSE**.



## FROM CONCEPT..TO FLY

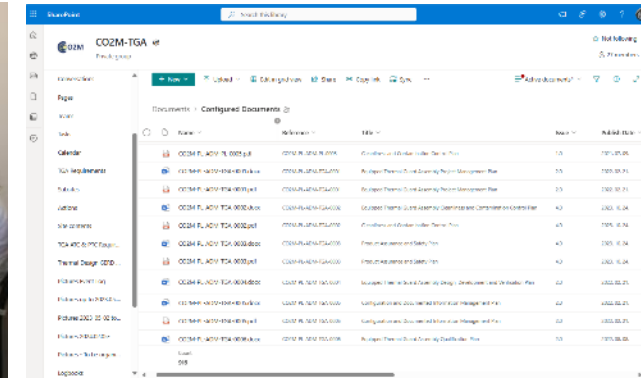
We support our customers with long-term collaboration in **development, design, production** and **test** of **space products** from the conceptual phase till integration and launch.





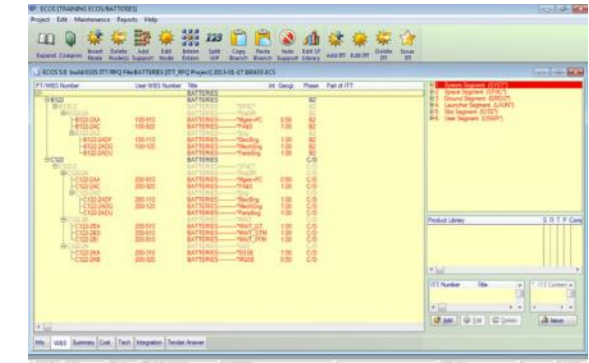
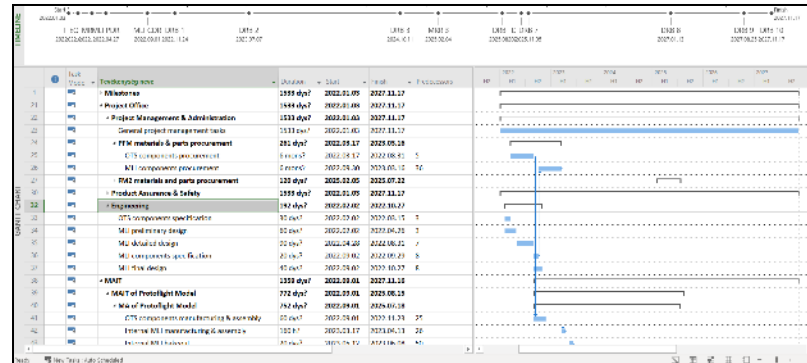
## SPACE PROJECT MANAGEMENT

Admatis is experienced in **planning** and **executing** of **built-to-spec** and **built-to-print type** space projects. Success is ensured by the **commitment** of **team members** and well-defined **task management** system.



## PRODUCT & QUALITY ASSURANCE

Our **stringent quality policy** and **failure-proof thinking** in every part of a project ensure the **high quality** of our products while also compliant with the requirements of ECSS standards.

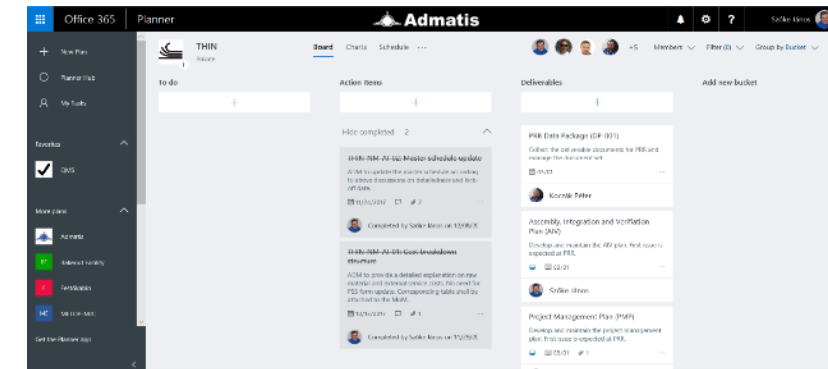


## DOCUMENTATION

One of our strengths is our **documentation system** built **according** to the well-known **ECSS rules**.

### Software tools:

- MS Project
- MS Planner & SharePoint
- MS Office (Word, Excel, PowerPoint, Visio)
- ECOS



## BUILDING SPECIFICATIONS

We offer **system engineering services** even in the conceptual phase of projects by **building requirements specifications** and performing **concept trade-offs** based on traditional and **state-of-the art** technologies.

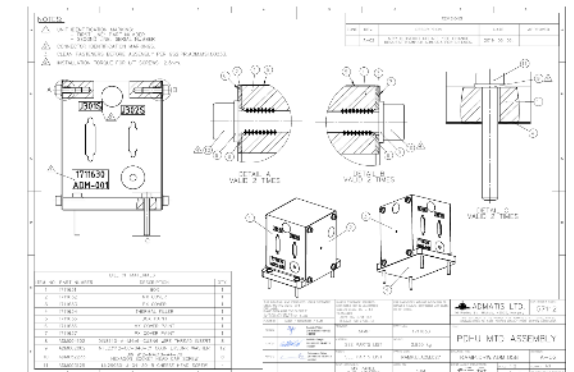
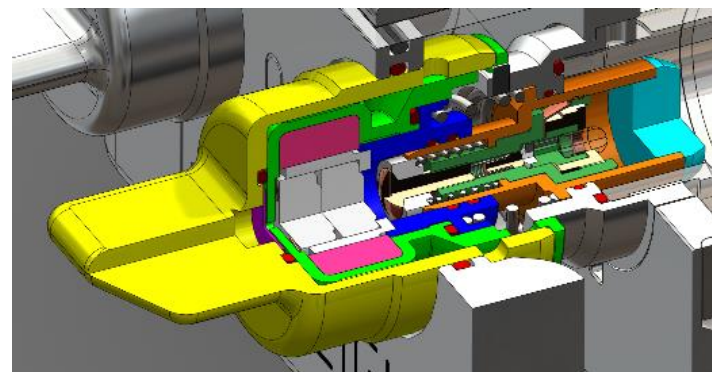
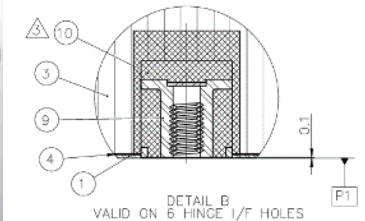
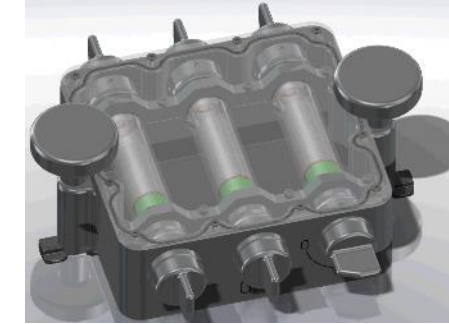
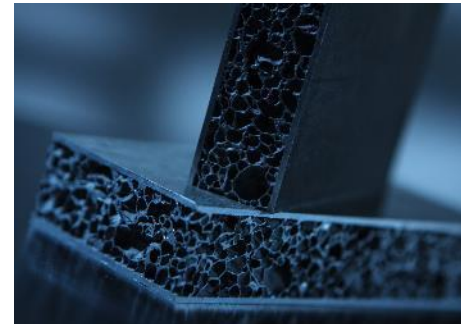
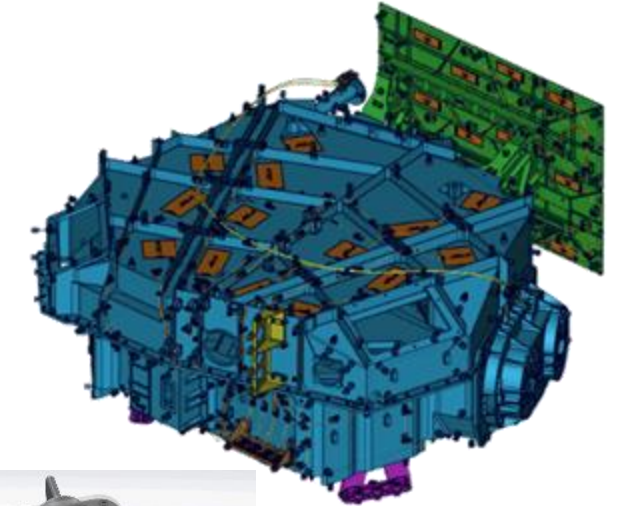
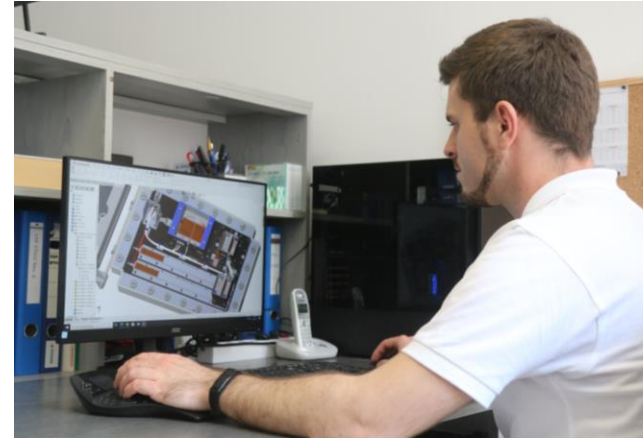
## MECHANICAL & CAD DESIGN

Our design activities starts with the **selection of the best materials** and **mechanical parts** for the given purpose based on our strong **material science background**.

We provide **3D CAD modelling** of **complex systems** which ends up in 2D manufacturing and assembly drawings.

### Software tools:

- SolidWorks,
- SolidWorks sheet metal,
- SolidWorks routing,
- eDrawings

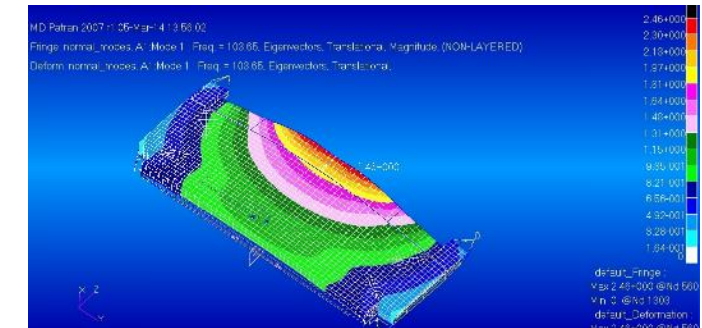
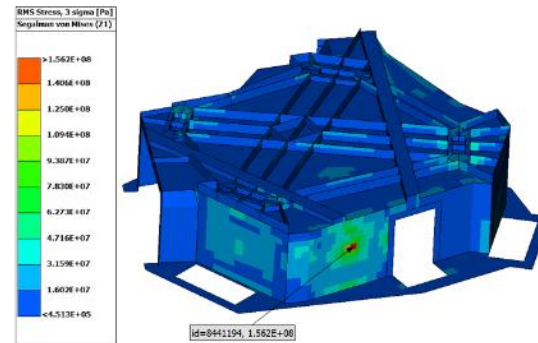
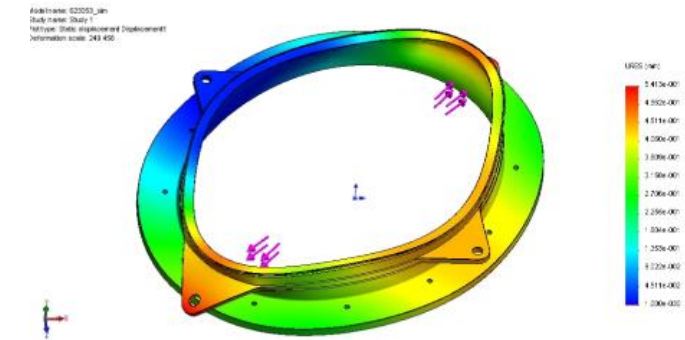




## STRUCTURAL ANALYSIS

Admatis has long heritage on **structural analysis** of complex systems including **building** of structural **FEM**, **modal**-, **thermo-elastic**-, **quasistatic**-, **random**- and **sinusoidal analysis**.

**Acoustic analysis** can also be performed by subcontracting it to one of our partners.

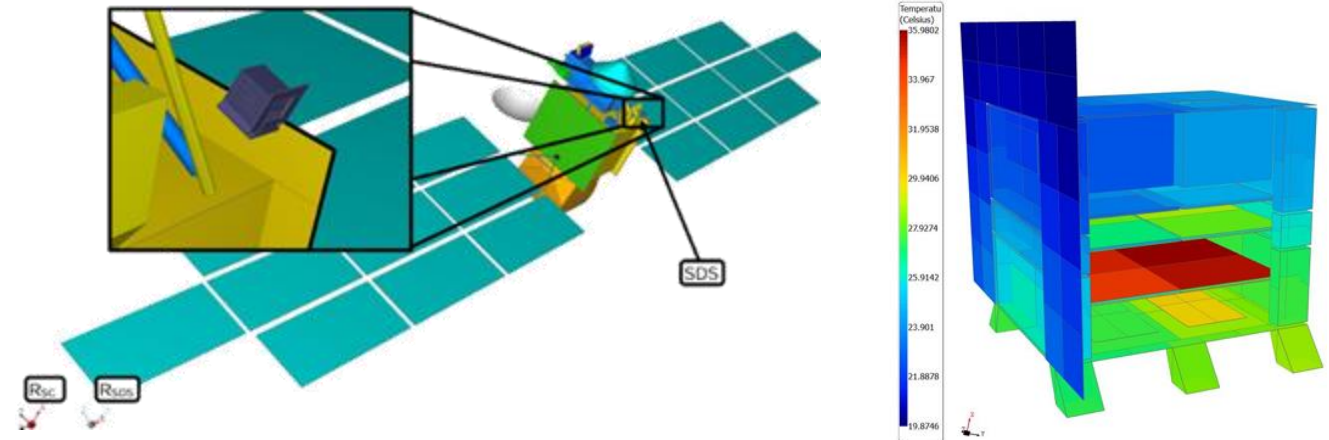


## THERMAL ANALYSIS

Admatis is experienced in **thermal analysis** of complex systems including **building** of thermal **FEM**.

### Software tools:

- SolidWorks Simulation
- NASTRAN,
- ESATAN,
- THERMICA,
- LabView,
- MatLab



## SECONDARY STRUCTURES

Admatis is well experienced in design, **manufacturing** and **testing structural** parts.

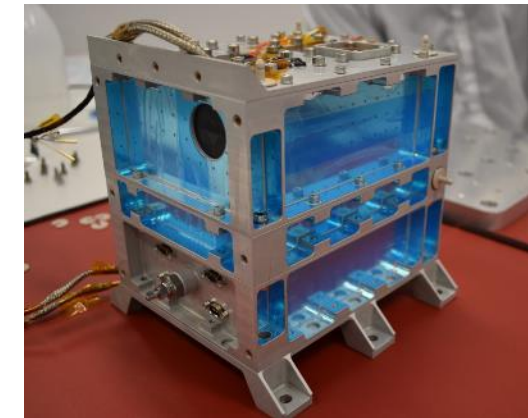
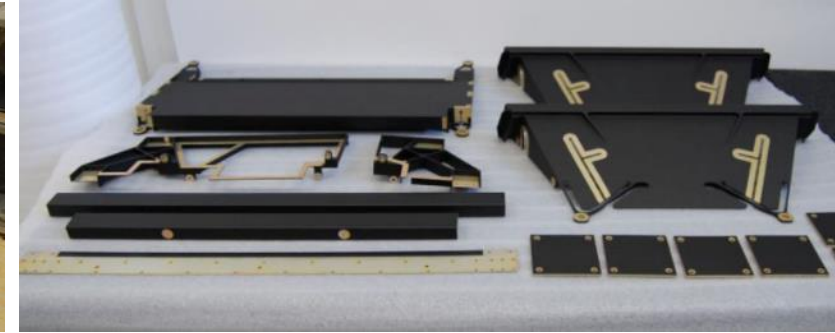
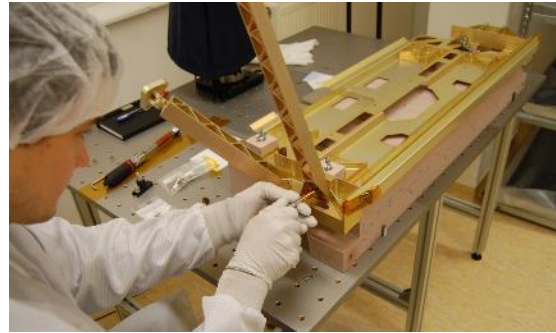
The company developed and delivered specially coated **optical baffles**, **thermal shields**, **brackets** and **isostatic mounts**.

Raw materials of such structures are usually **aluminium** alloys, **titanium** alloys or **stainless steels**.

All **manufacturing technologies** including **machining**, **coating** and **fastening** are developed and **qualified** under flight projects.

### Heritage:

- *Sentinel-2 (launched in 2015)*
- *CO2M (ongoing)*
- *MSR ERO (ongoing)*
- *COMET INTERCEPTOR (ongoing)*





## RADIATORS

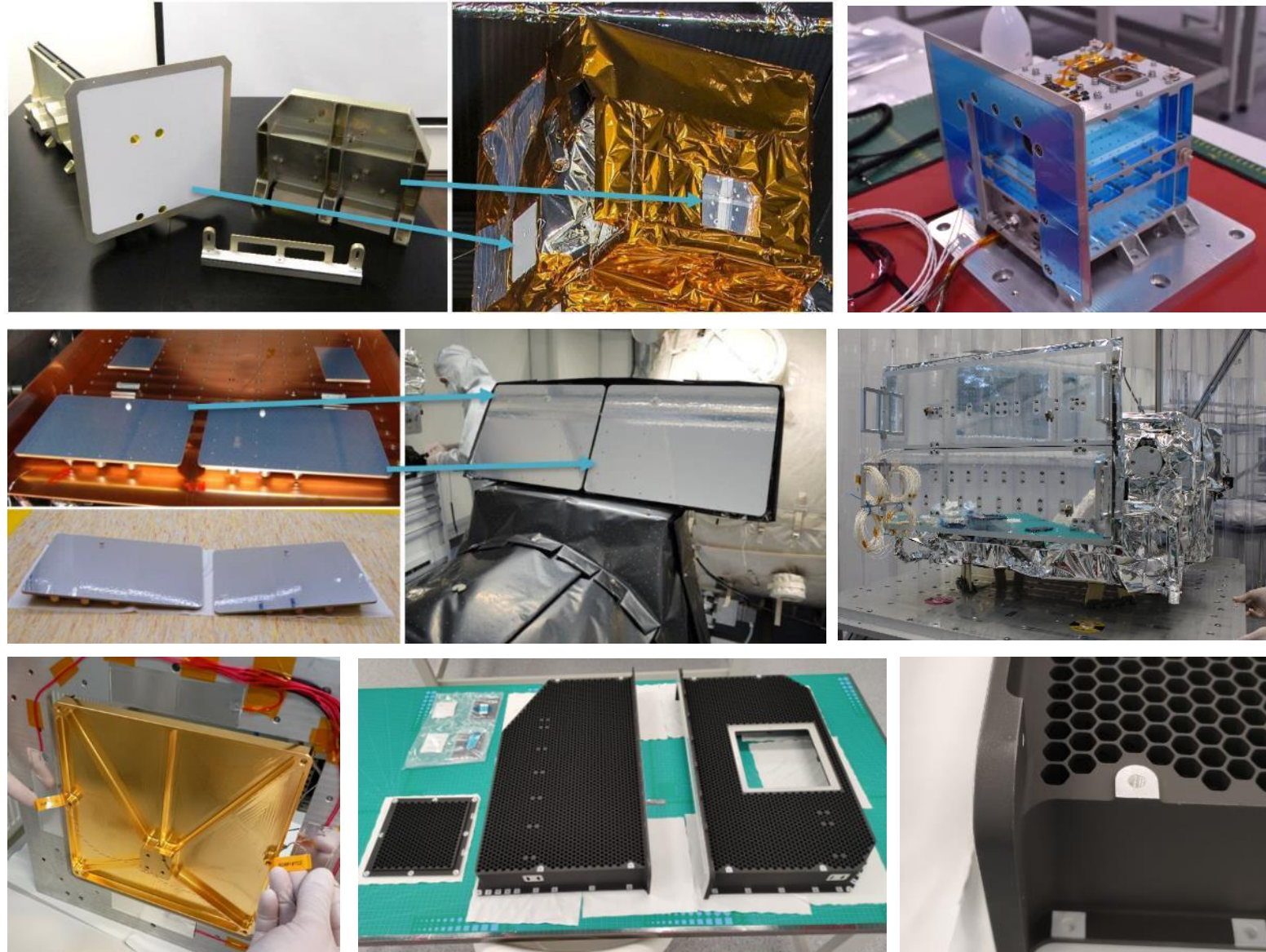
Admatis has more than 10 years of experience developing and testing of **passive instrument-** and **harness radiators**.

Raw material is usually aluminium alloy covered by a variety of special **thermo-optical coatings**.

The company developed radiators coated with **white paint, black paint, second surface mirror** and **gold plating**.

### Heritage:

- Sentinel-2 (launched in 2015)
- CHEOPS (launched in 2009)
- CO2M (ongoing)
- MSR-ERO (ongoing)
- COMET INTERCEPTOR (ongoing)
- ARIEL (ongoing)





## SANDWICH PANELS

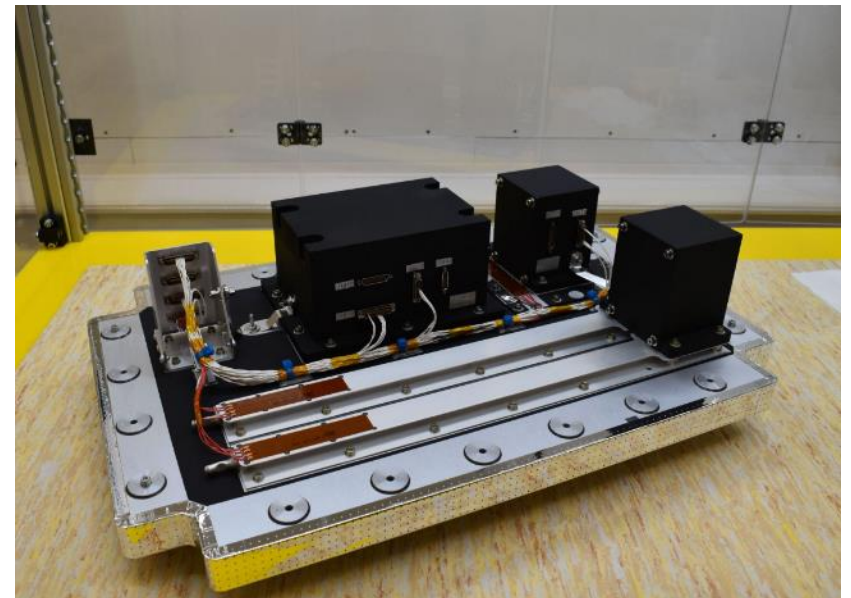
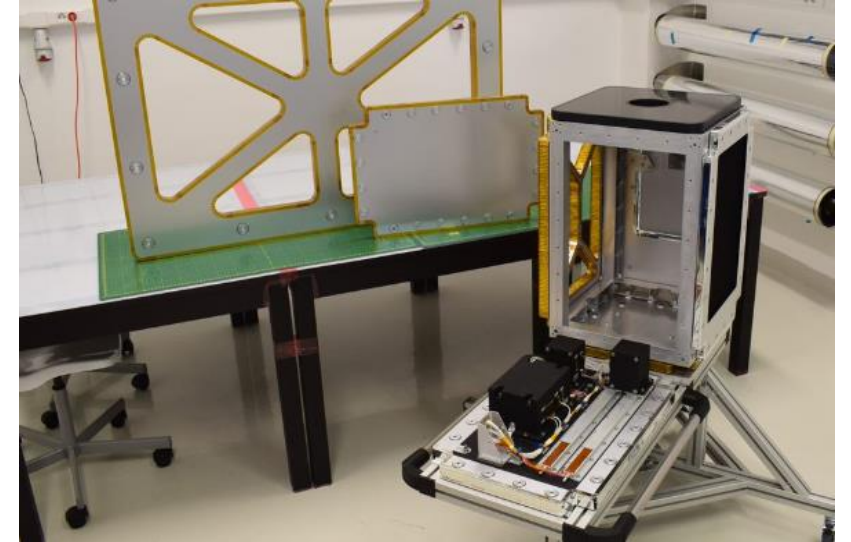
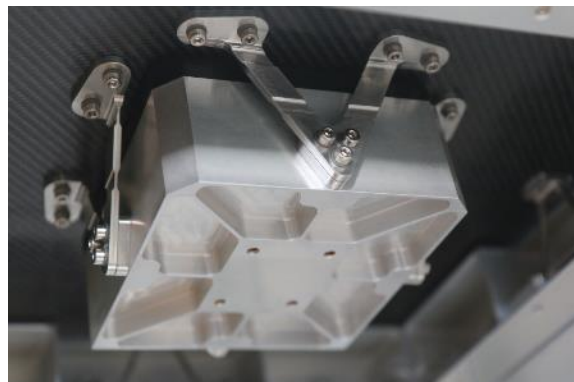
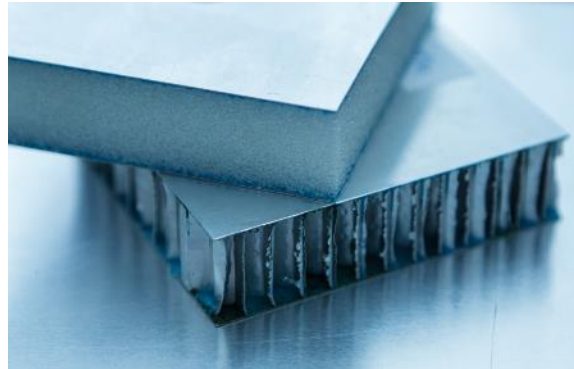
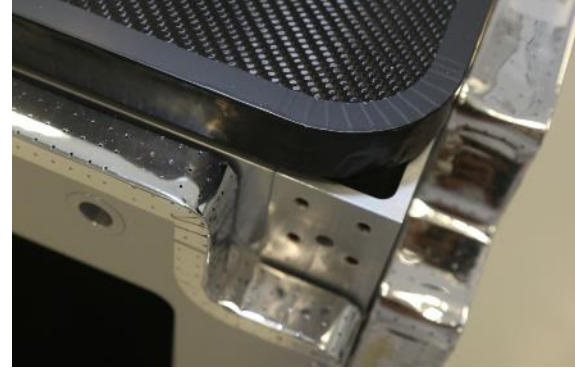
During multiple R&D projects a **spacecraft mockup** has been built made of aluminium struts and **aluminium honeycomb sandwich panels**.

In the frame of the development, a **complex panel radiator**, including **heat pipes**, **active thermal control** hardware, **thermal fillers** and thermo-optical coating are developed to widen our portfolio.

All of the new design, manufacturing, assembly, coating and test **procedures** are **successfully developed** and currently **being implemented in flight projects**.

### Heritage:

- RAMP R&D (completed in 2020)
- SPF R&D (completed in 2021)



## MULTI-LAYER INSULATION

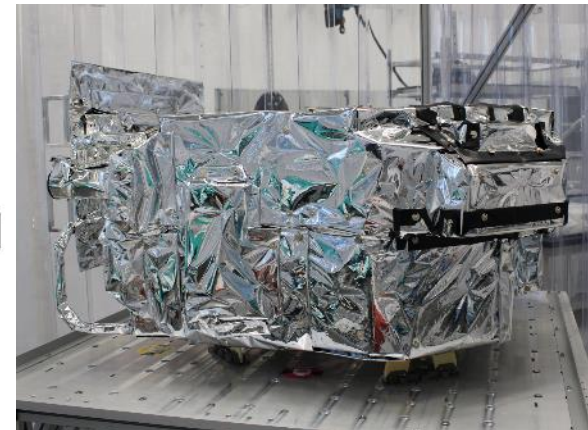
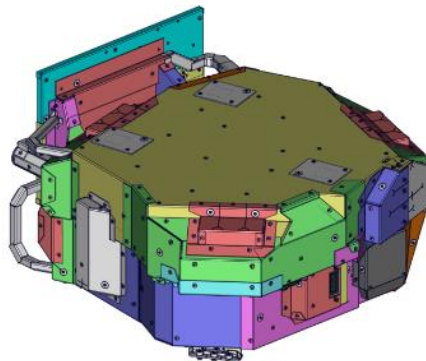
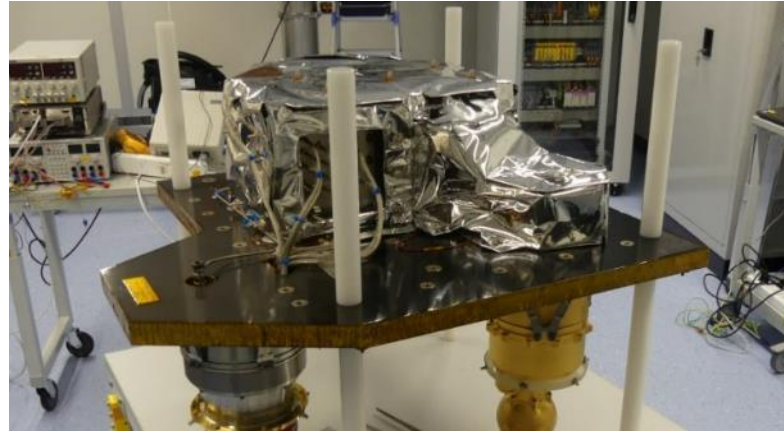
Admatis is becoming increasingly expertized in the MLI field.

Our **development** and **production** include **definition of materials, thermal and mechanical engineering**, layup and layout **design in CAD**, **manufacturing, assembly** and **integration**.

MLI technologies also include the attachment of MLI support devices like **standoffs**, **hook-and-loop fasteners** and **grounding hardware**.

### Heritage:

- COPE R&D (completed in 2021)
- JUICE (launched in 2023)
- CO2M (ongoing)
- MSR-ERO (ongoing)
- COMET INTERCEPTOR (ongoing)





## HEATERS & SENSORS

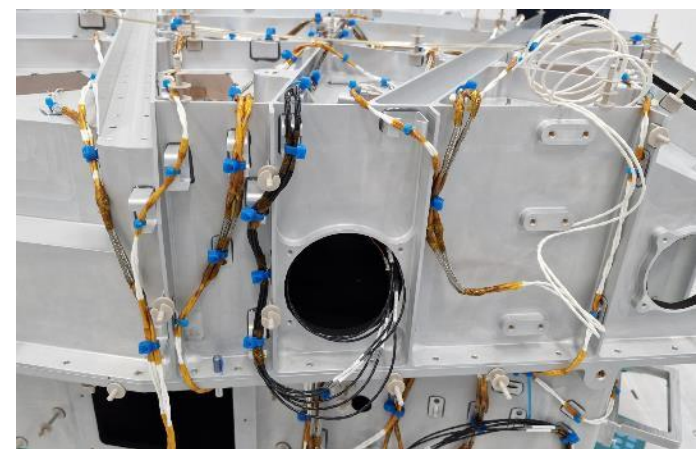
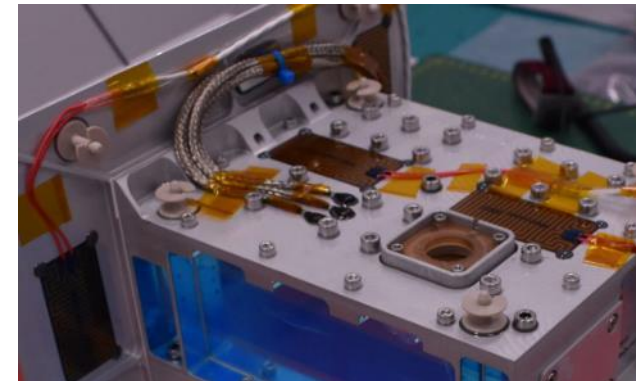
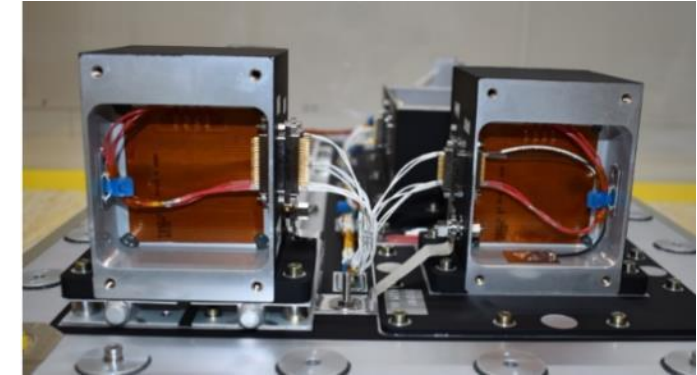
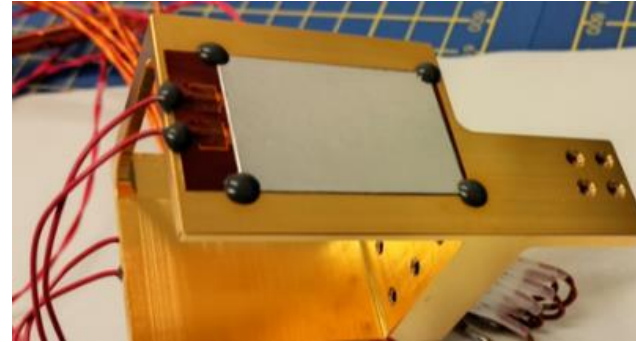
Admatis is experienced in **design** and **definition** of **foil heaters** and **selection** of **qualified thermal sensors** based on the thermal / electrical requirements.

Flight heaters and sensors are **procured from** various **manufacturers** according to corresponding **ESCC specifications**, while **test heaters** and **sensors** are **selected** from **off-the-shelf** products.

**Integration** activities including **gluing**, **wire assembly** and **harness fixation** can be performed by Admatis according to qualified processes.

### Heritage:

- RAMP R&D (completed in 2020)
- CO2M (ongoing)
- MSR-ERO (ongoing)
- COMET INTERCEPTOR (ongoing)
- ARIEL (ongoing)



## TROLLEYS AND LIFTING DEVICES

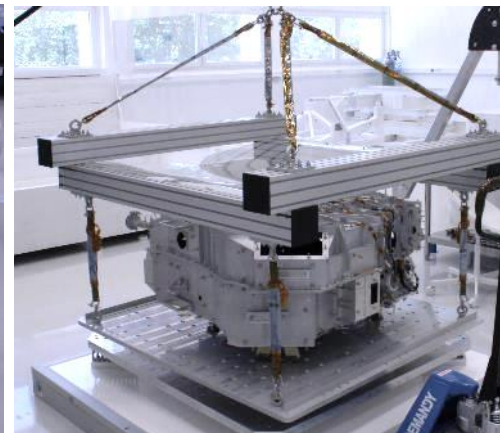
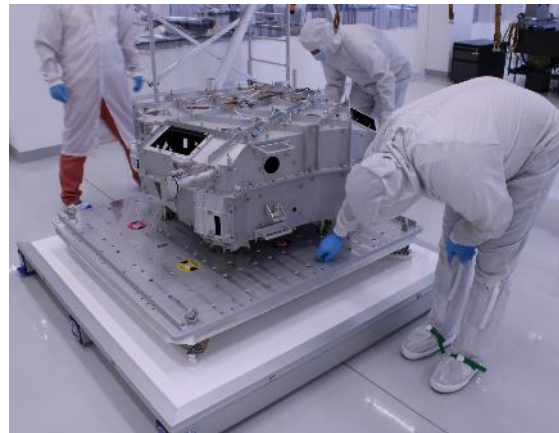
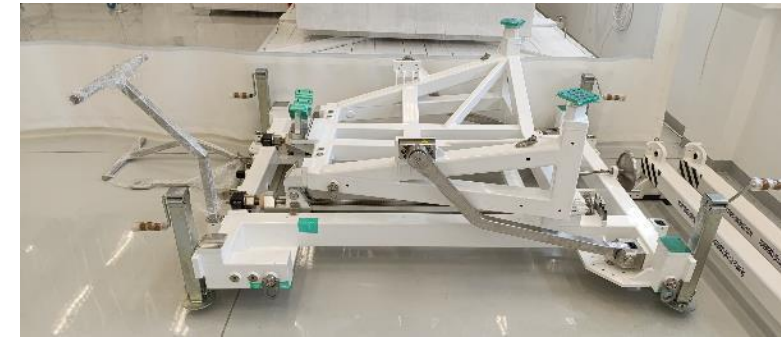
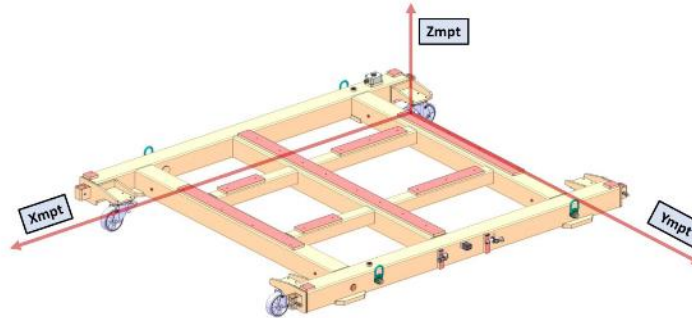
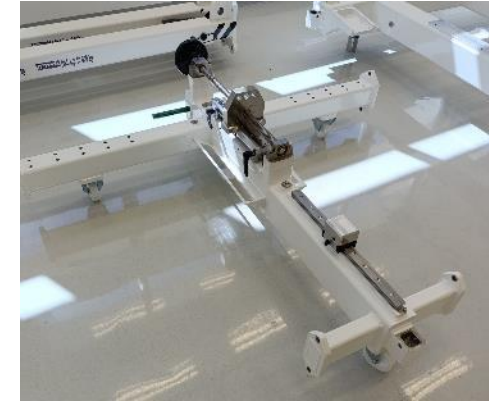
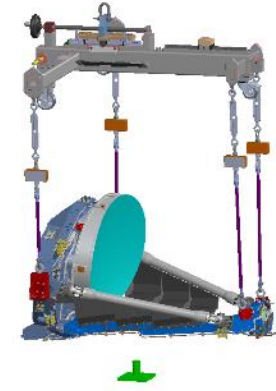
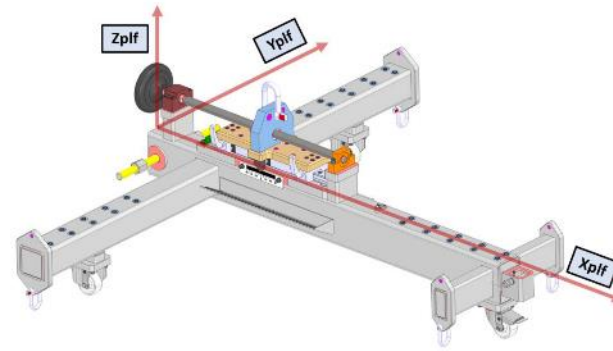
Admatis is expertised in **design** and **manufacturing** of equipment used to **manipulate flight hardware** during **internal AIT** activities and as an **end product**.

Such devices are various **lifting frames**, **transport trolleys** and **rotating equipment**.

**Cleanliness** and **quality level** of GSEs is **the same** as the **hardware** to be manipulated to ensure that **no degradation** is caused by the GSE.

### Heritage:

- CO2M (ongoing)
- ARIEL (ongoing)





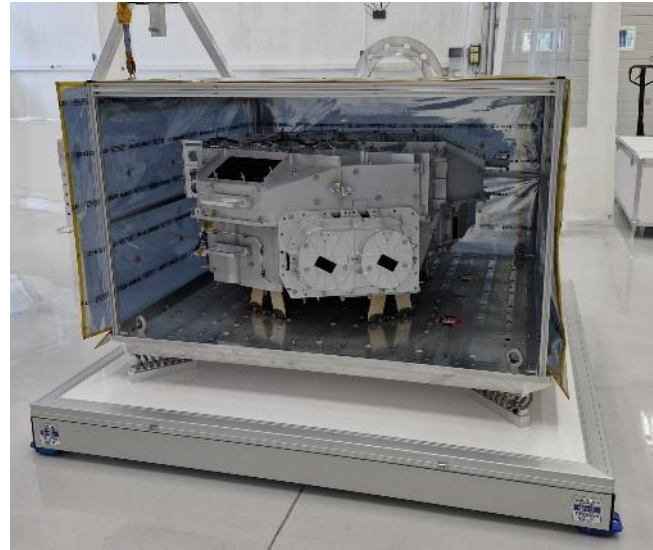
## TRANSPORT CONTAINERS

Admatis is capable to **design** and **manufacture** various **transport** and **storage containers** for intermediate and final delivery of equipment and Payloads.

Containers can be equipped with **active thermal control**, **pressure control with gas inlets** and **tracking equipment**.

### Heritage:

- CO2M (ongoing)
- ARIEL (ongoing)





## TEST EQUIPMENT

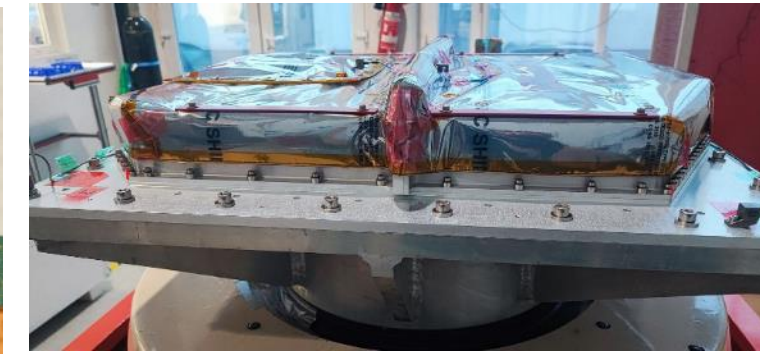
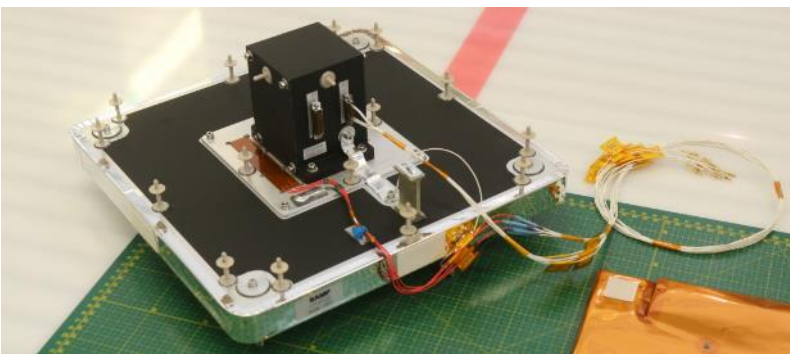
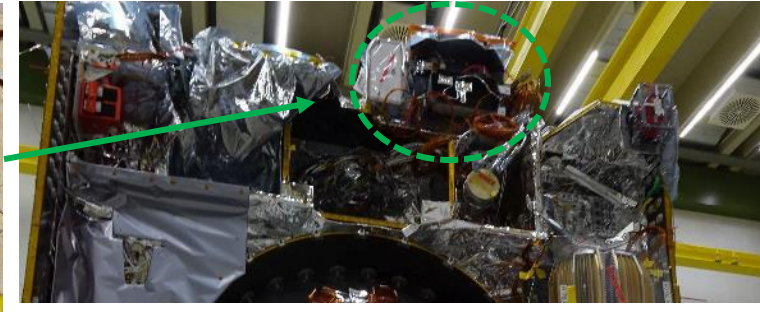
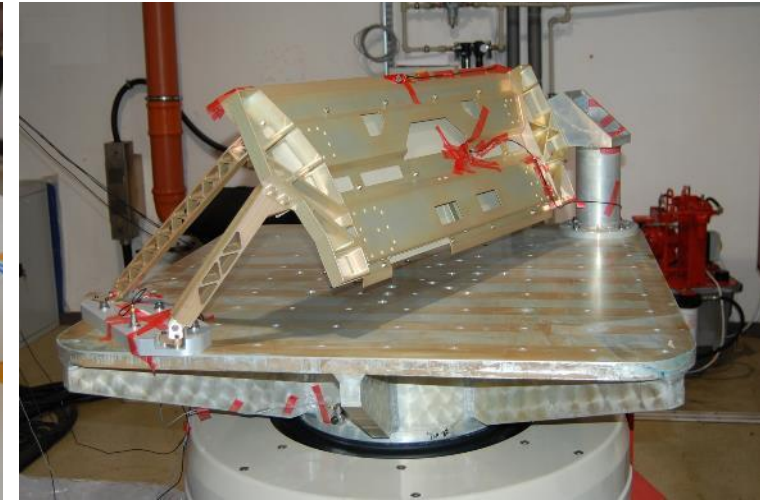
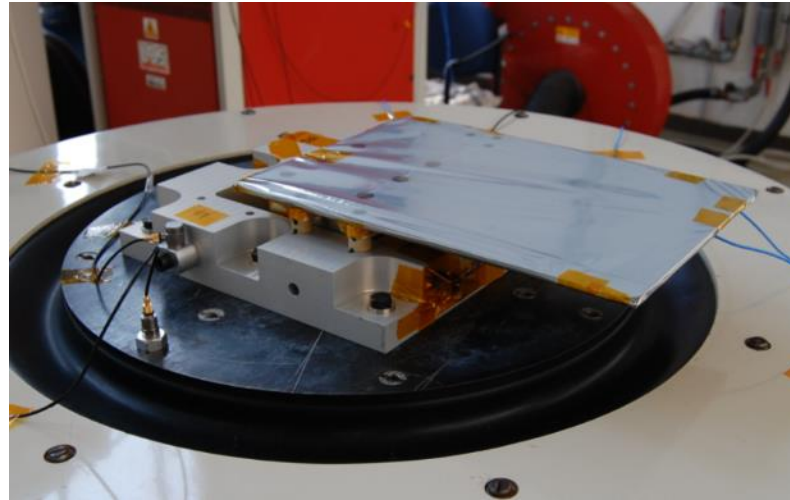
Admatis is expertised in **design** and **manufacturing** of test devices equipment used during **mechanical** and **thermal test** of equipment and Payloads.

**Test adaptors** are used during **vibration test** as an **interface** between **shaker** and **item under test**.

**Mass-thermal dummies** are used to **simulate** unit or **instrument mass** and **thermal properties** during **test** activities.

### Heritage:

- SENTINEL-2 (launched in 2015)
- CHEOPS (launched in 2019)
- JUICE (launched in 2023)
- CO2M (ongoing)
- MSR-ERO (ongoing)
- COMET INTERCEPTOR (ongoing)
- ARIEL (ongoing)
- VARIOUS R&D PROJECTS.



## MARKERS SUPPORTING NAVIGATION (MSN)

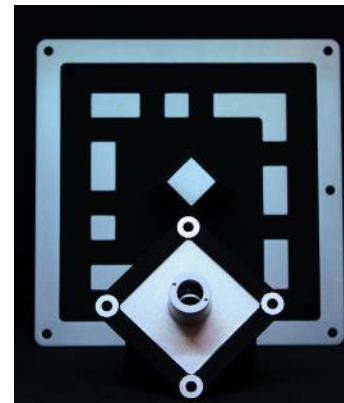
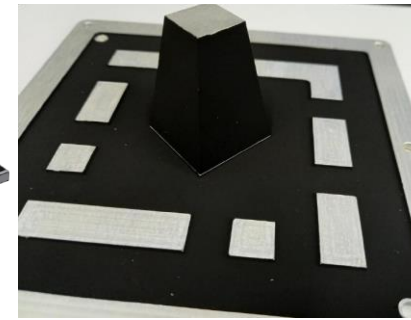
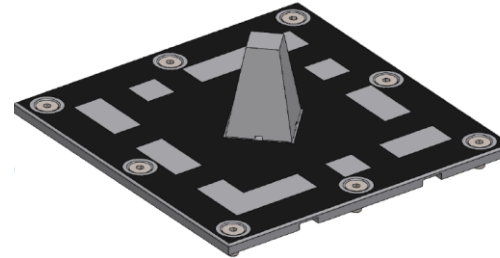
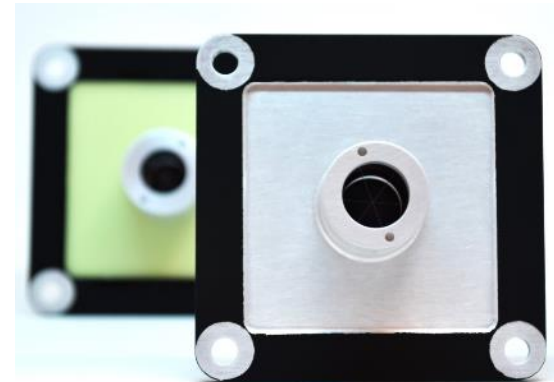
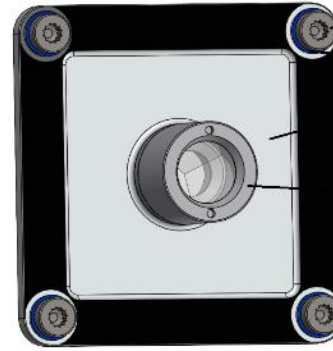
**MSNs** can be used for relative **navigation** and **safe approach** to a spacecraft during **active debris removal or in-orbit servicing** in case the spacecraft becomes uncontrollable.

**MSN60s** can be detected in the **IR** and **VNIR** wavelength ranges from **50m to 5m** distances, and **MSN150** supports the capturing process from **5m**.

Markers are **developed** under an **ESA R&D project portfolio** as part of the **Clean Space programme**. Due to the successful development, first industrial orders are received for **LUR-1**, **CRISTAL**, **LSTM** and **CO2M** satellites.

### *New developments are running:*

- Phosphorescent painted Markers,
- GNC test facility,
- Markers for constellations,
- System level leader of international team



Properties	MSN60 	MSN150 
Dimensions (L, W, H) [mm]	60x60x16,5	150x150x43
Weight [g]	~29,6	~211,2
Baseplate Material	Aluminium	Aluminium
Surface Passivation	Conversion Coating	Conversion Coating
Coating	Space qualified paint	Space qualified paint
Central Element	Laser retroreflector	Pyramidal element
Fixation	4 pcs MJ4x10 Cheese head screw	5 pcs MJ4x10 Cheese head screw
Navigation Support	from 50 m to 5 m	from 5 m to 0 m



## MLI BASED ON AEROGEL (MBA)

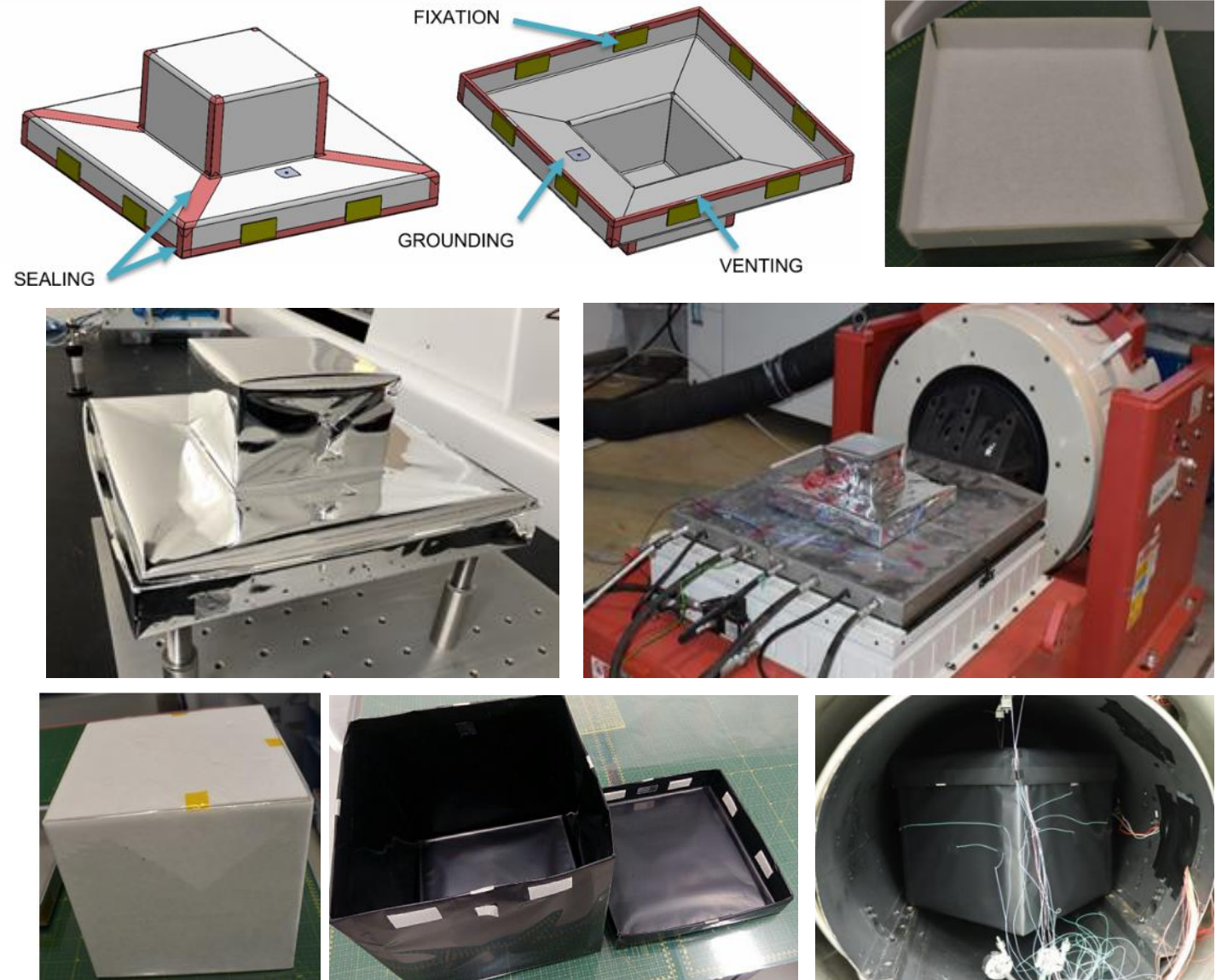
**MBA** was a joint **technology development** activity of **Admatis** and **Thales Alenia Space** France to develop innovative **thermal insulation** products based on **aerogels**.

Envisioned **self supporting** product expected to **reduce system mass** by **eliminating the need of secondary structures** designed to support the MLI.

A **breadboard** is manufactured from an **aerogel** product and **survived vibration test** sequence, and its **thermal efficiency** is **measured** by **ESA**.

Most of the **key requirements** are **fulfilled** including **self-supporting** and **3D forming** capability.

Existing nonconformances will be addressed in a **follow-up project**. Current product is **proposed to test houses** to **replace** tent-like **test blankets** during thermal testing.





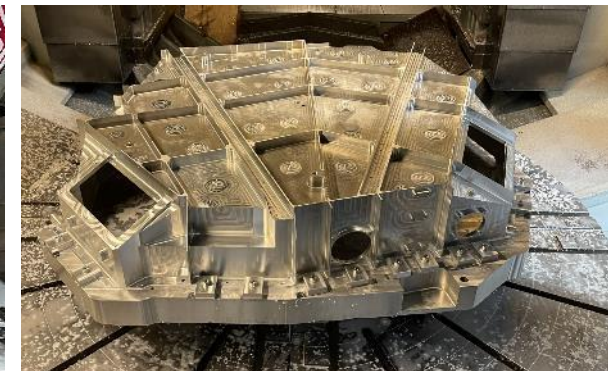
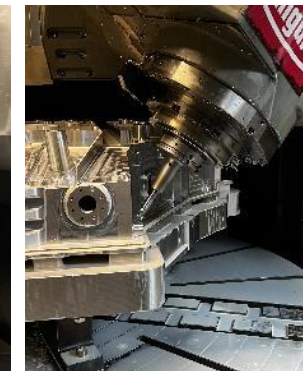
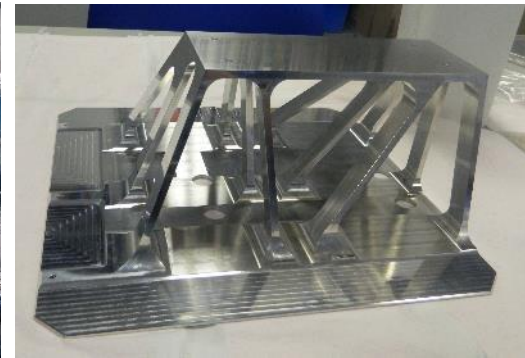
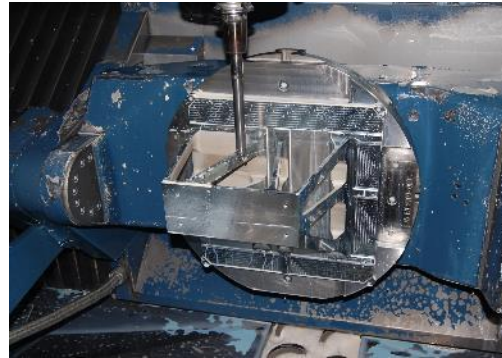
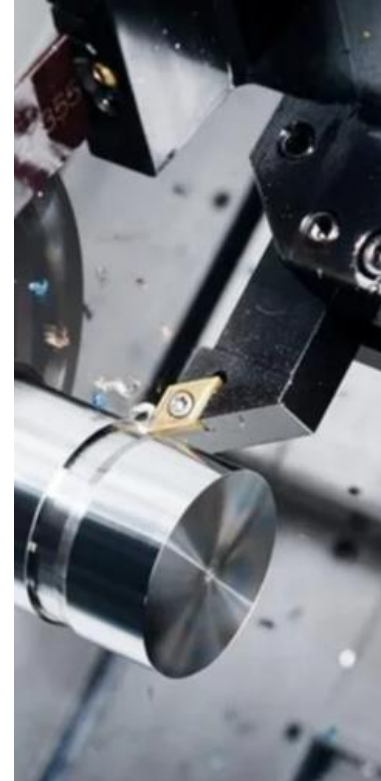
## MACHINING

General fabrication process is **machining** which is **performed together** with **our partners**.

**Machining** technology is **fine-tuned** to achieve the **high quality** and **workmanship** required for **space hardware**.

### **General information:**

- Universal or CNC turning of cylindrical parts.
- 3, 4 and 5-axis milling of complex shapes.
- Materials: aluminium, titanium, structural steels, stainless steels, Invar, PTFE, PEEK, PI.
- Dimensions up to 6000mm x 4500mm x 1500mm
- Tolerance up to 0.005 mm
- TRL 9





## CONVERSION COATING

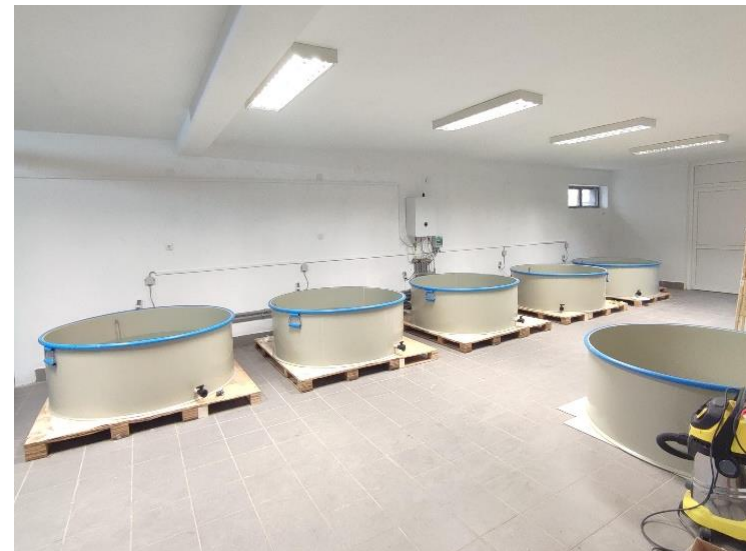
Aluminium surfaces are protected **against corrosion** by **SurTec 650** conversion coating (in replacement to Alodine 1200).

Admatis has **two internal facilities**, one for **small and medium sized parts** (up to 600mm x 300mm) and one for **large parts** (Ø1300 x 300 mm).

For **extra-large** sized hardware (above 1500mm), **brush-on technology** can be implemented.

### General information:

- Alloys: 1xxx, 2xxx, 5xxx, 6xxx and 7xxx series.
- Color: pale / dark grey
- Coating mass: 0.1...0.5 g/m<sup>2</sup>
- Process: manual, immersion or brush-on
- Selective coating is possible.
- Compliant with ECSS-Q-ST-70-14 and PREN4729
- Passed 168h NSS and 240h humidity test.
- Passed 100 cycles between -100°C / +100°C
- TRL 9



## PAINTING

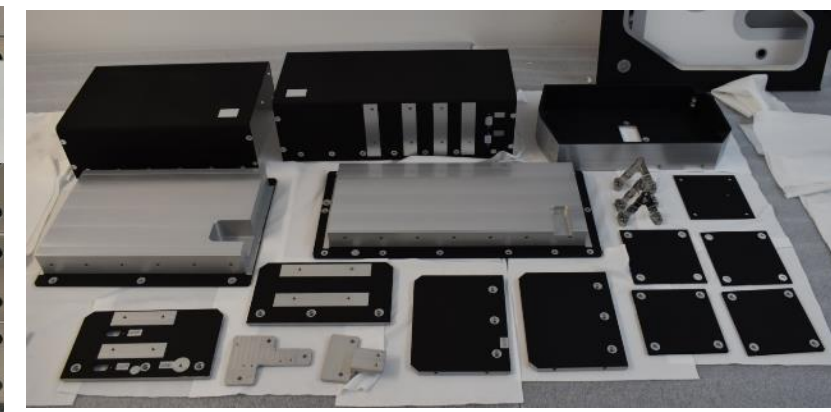
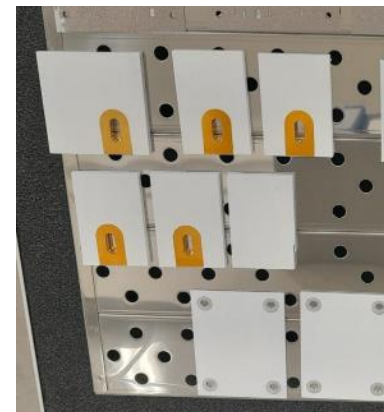
To help **regulate heat transfer**, surfaces can be **covered by thermo-optical coatings**.

Admatis has an **internal painting booth** inside an **ISO 8** cleanroom linked to a **preparation room** for preparatory and **masking-demasking** activities.

Coatings **can also be outsourced** to our partners are also available to apply **paint** and **inorganic coatings (PEO/MAO)**.

### General information:

- Hardware size: max. 2m<sup>2</sup>
- Paint systems: MAP PU1, MAP SG121FD, MAP PUK, Aeroglaze Z306, AQ PUK under qualification
- Process: manual, not automatic
- Selective coating is possible by masking
- Best painting quality can be achieved few hours after our SurTec 650 coating.
- Passed 240h humidity test.
- Passed 100 cycles between -100°C / +100°C
- TRL5 to TRL9





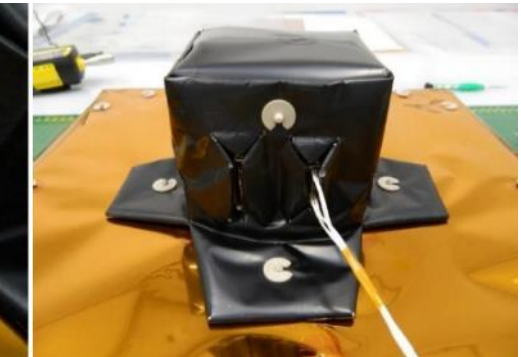
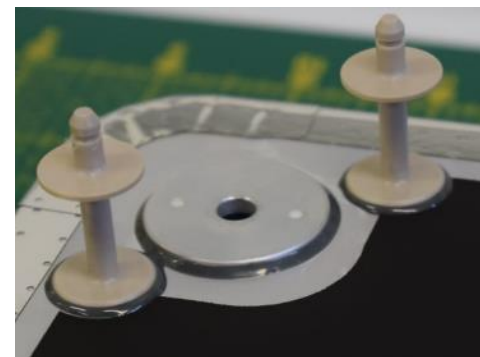
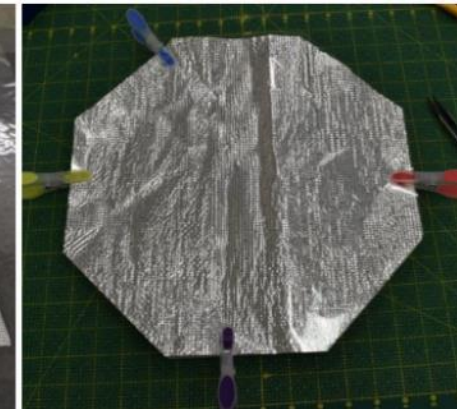
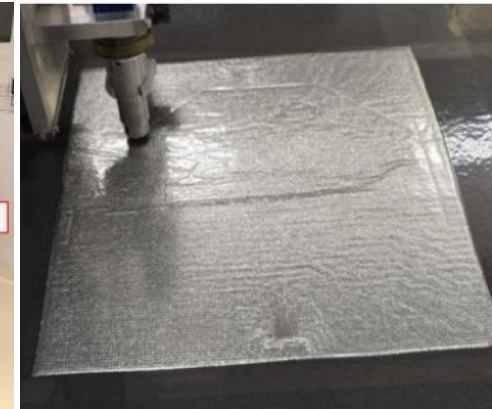
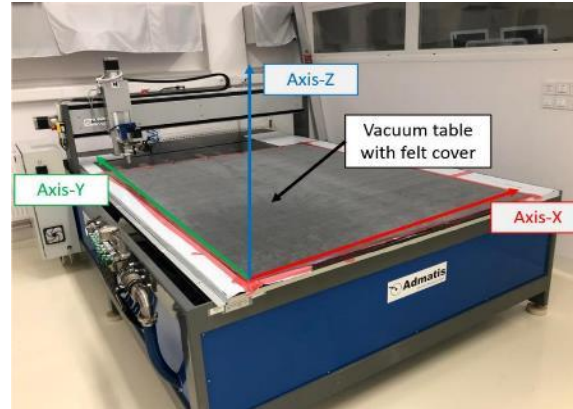
## MLI MANUFACTURING

Manufacturing and assembly technologies used for MLI blankets are **performed in ISO 8 cleanrooms**.

**Cutting** is performed by **CNC machine**, while the **assembly processes** (pinning, taping, gluing) are performed **manually**.

### General information:

- Blanket size: max. 3m x 2m
- Covers: VDA coated Kapton or Black Kapton.
- Reflectors: VDA coated PET or Kapton
- Fasteners: PEEK tag pins,
- Grounding: aluminium foils, rivets, removable fasteners
- MLI installation: standoffs or hook-and-loop fasteners
- Passed 240h humidity test.
- Passed 100 cycles between -70°C / +150°C
- TRL5 to TRL9





## CLEANING & PACKAGING

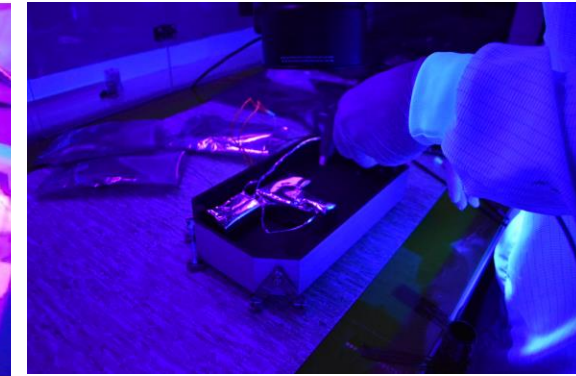
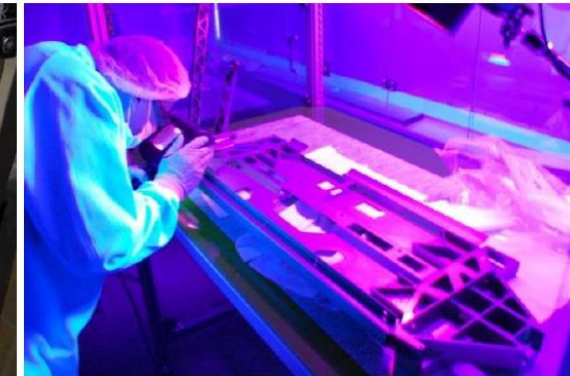
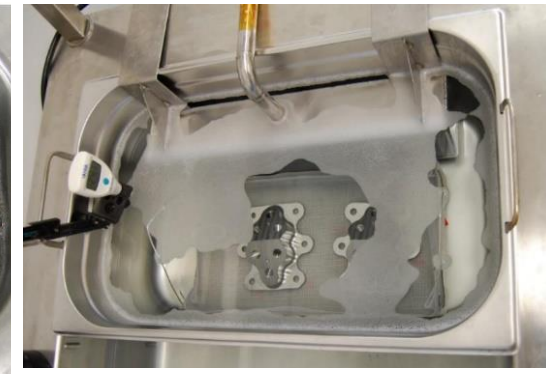
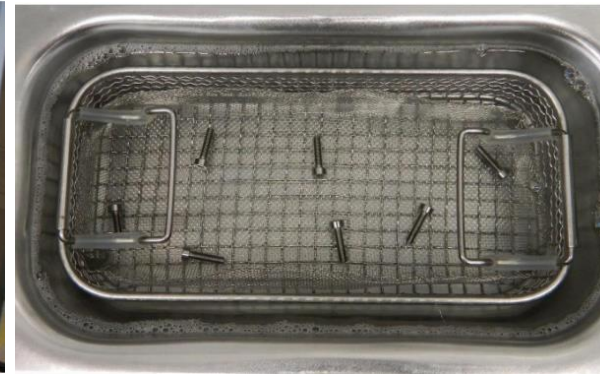
Cleaning and packaging activities are **performed in ISO 8 cleanrooms** or in **ISO 5 clean bench** depending on the cleanliness requirement.

Various process is available including **ultrasonic cleaning, flushing, brushing** and **wiping** with **analytical grade** solvents.

Items are placed in **double ESD bags** including the corresponding **desiccants** and **humidity / temperature indicators**.

### General information:

- Materials: IPA, acetone, N<sub>2</sub> gas, clean wipe
- Packaging: PE bag, metal-in ESD bag
- Cleanliness can be reached:
  - Molecular: <math>< 5 \cdot 10^{-8} \text{ g/cm}^2</math>
  - Particle: <math>< 50 \text{ ppm}</math>
- TRL9





## NON-DESTRUCTIVE INSPECTIONS

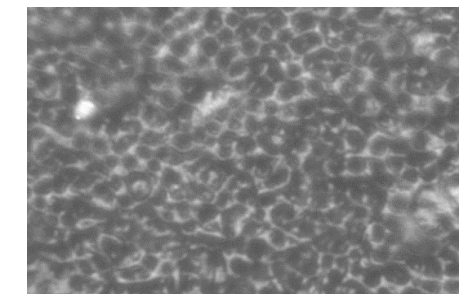
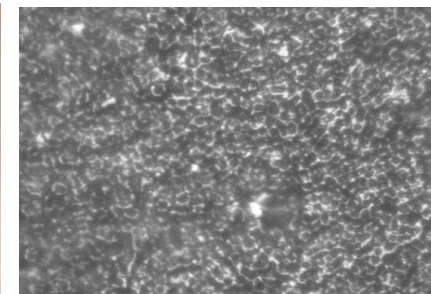
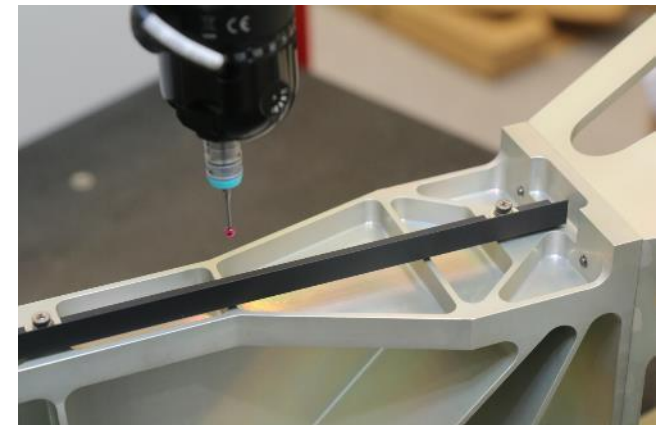
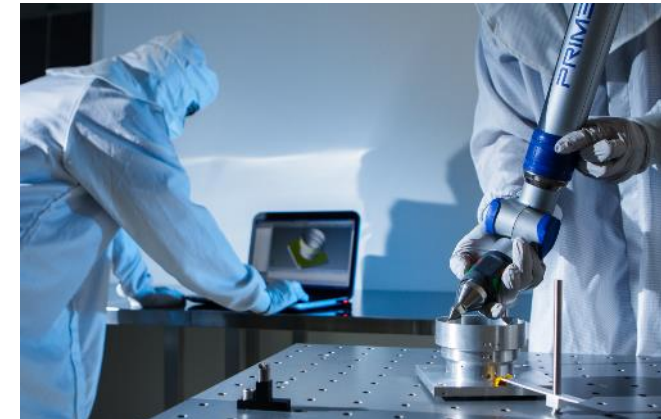
**Dimensional measurement** is performed using standard **linear tools** like **calipers** and **micrometers** and **special gauges**.

**3D measurement** is performed by an articulated **measurement arm** (1.8m volume) and a **bridge CMM**.

Surface quality is checked by portable **surface roughness tester**.

Detailed **visual inspection** is possible with **optical microscope**.

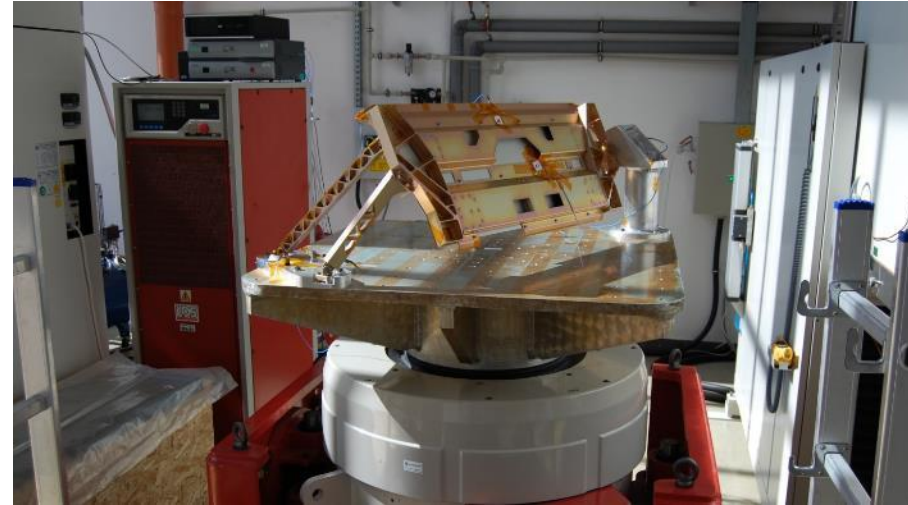
**Air cleanliness measurement** by portable **particle counter**, **hardware cleanliness** measurement under **white** and/or **UV light** with magnification.



## VIBRATION TEST

Admatis is expertised to **perform** and **evaluate vibration test** to verify mechanical analysis results.

An **LDS 35kN shaker** is available at our partner in Hungary equipped with **head expanders** and **slip table**.



## THERMAL TEST

**Bakeout**, thermal balance and **thermal vacuum cycling** can be performed by Admatis to verify thermal behaviour.

**Thermal vacuum chamber** is available at **Admatis ISO 8 cleanroom** and at external facilities.





## CLEANROOMS

Admatis has **five cleanrooms** which are the main workspaces for space hardware production and test activities. They are utilized for different activities.

- **Cleanroom A** is an **ISO 8** area with **22m<sup>2</sup>** floor space and used for final cleaning and packaging. Cleanroom is equipped with a **2m<sup>2</sup> ISO 5 Clean Bench**.
- **Cleanrooms B and C** are **ISO 8 areas** with **160m<sup>2</sup>** floor space. These rooms are the headquarters of MLI manufacturing and assembly activities and they can be separated to improve cleanliness if required.
- **Cleanroom D** is an **ISO 8** area with **40m<sup>2</sup>** floor space. It's only accessible from Cleanroom C through an interlock. TVC is operated here and it's planned to upgrade it to ISO 5 facility.
- **Cleanroom L** is the biggest **ISO 8** cleanroom at Admatis site. It is separated into three parts, total floor space is **240 m<sup>2</sup>** A **semi-ISO 5 Clean Tent** is operated in the innermost area with **15 m<sup>2</sup>**.





## THERMAL VACUUM CHAMBER

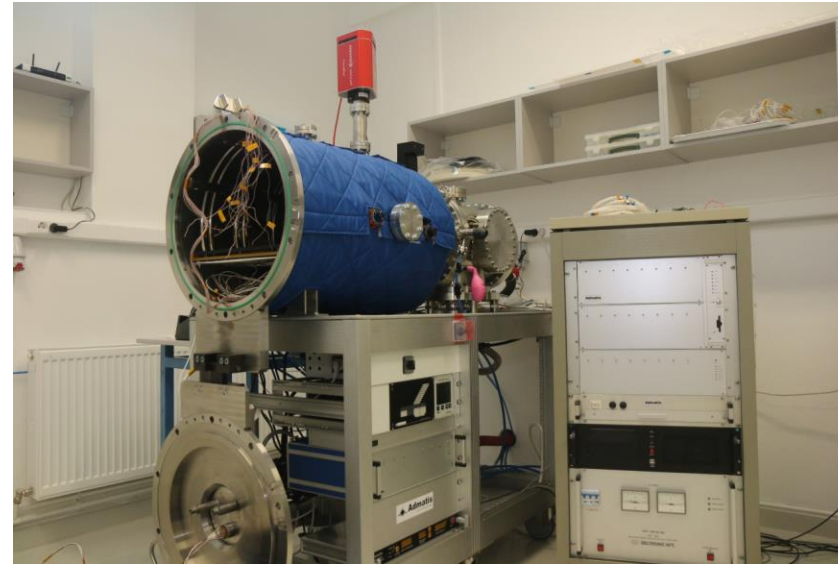
Admatis has a **thermal vacuum chamber (TVC)** operated in **ISO 8 cleanroom**.

TVC is made of **stainless steel** and has a set of **connectors** to perform **measurements** and **powering** of item under test.

TVC is equipped with a **temperature-controlled quartz crystal microbalance (TQCM)** and a **Residual Gas Analyser (RGA)**.

### **General information:**

- Available dimensions: 400x670 mm<sup>2</sup>,
- 50x50 mm grid of Ø5 mm holes for sample fixation,
- Heating rate up to 5-6 K/min,
- Operating temperature -70°C to 90°C.
- Up to 48 type K thermocouples





## MISSION OVERVIEW

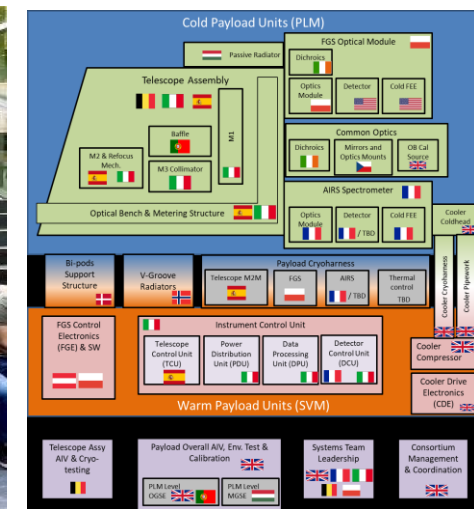
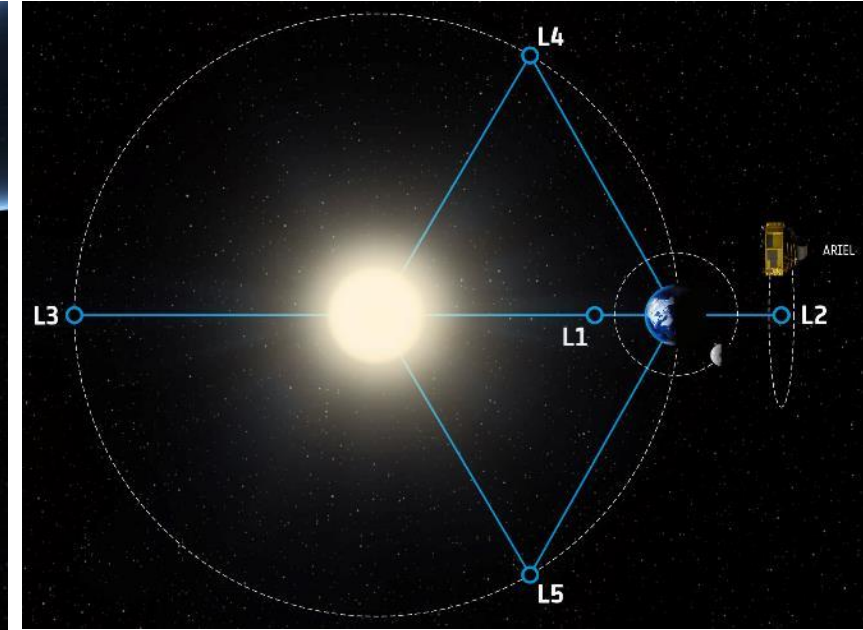
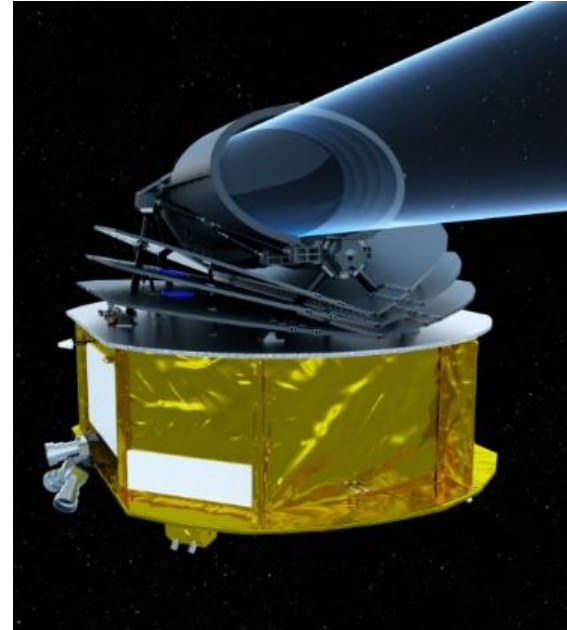


**ARIEL** is the **M4 mission** in the **ESA Cosmic Vision** plan. Mission is aimed at **observing** at least **1000** known **exoplanets** studying and **characterising** the planets' **chemical** composition and **thermal** structures.

**ARIEL Payload** is developed by a **consortium** led by **RAL Space UK**. Contribution of more than **50 institutes** from **16 ESA countries** and **NASA, JAXA** and **CSA**. Prime contractor is **ADS**.

### Facts & figures:

- **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.



## ADMATIS WORK PACKAGE 1

Admatis is responsible for development of ARIEL **Instrument Radiator (IR) Subsystem** as a **built-to-spec** type project.

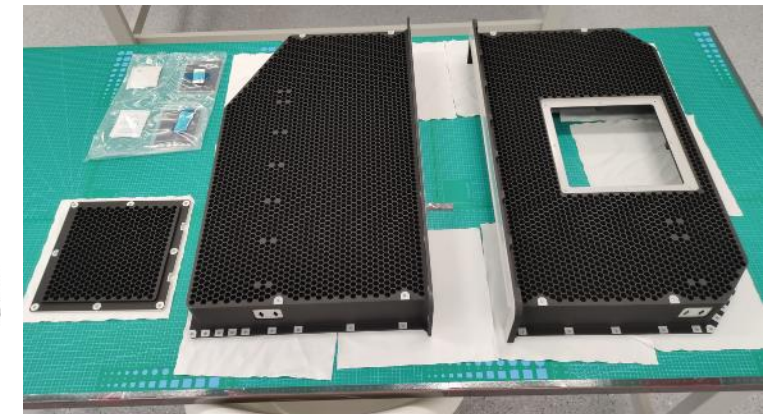
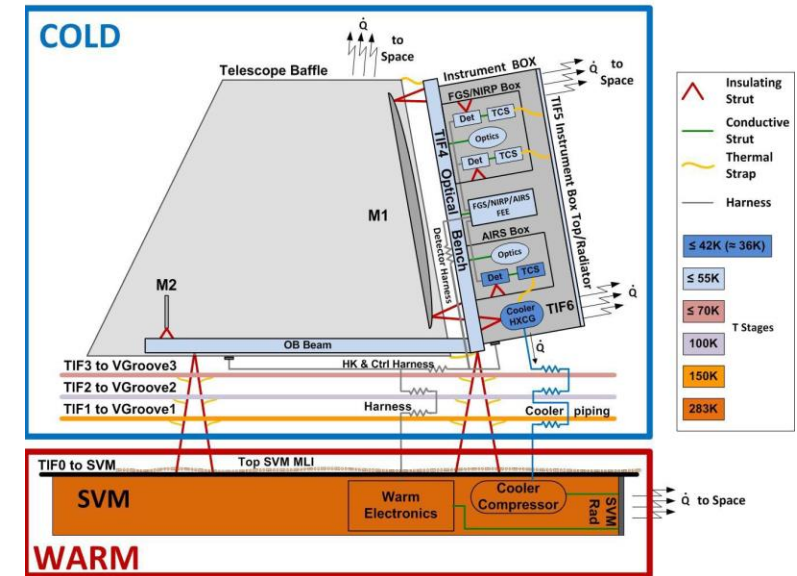
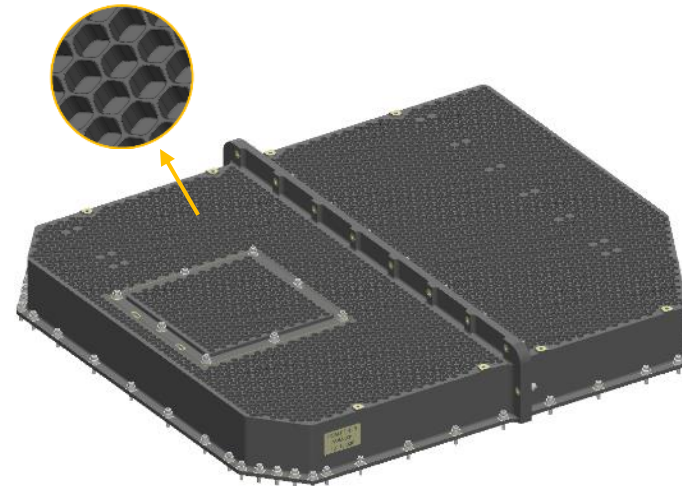
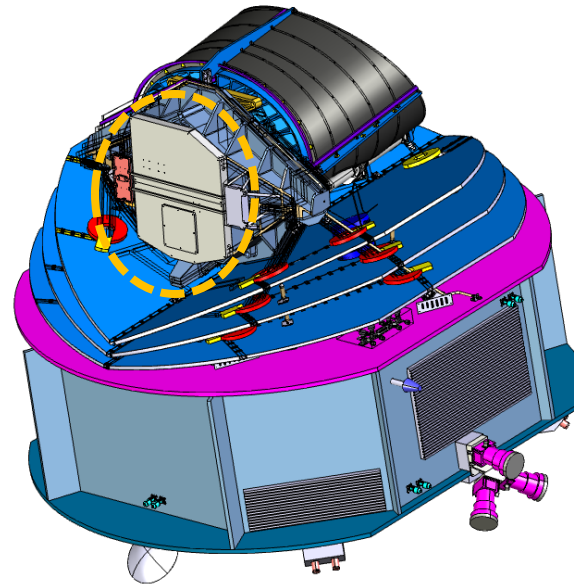
IR function is to **light tightly** seal instrument **cavity** while ensuring the necessary **radiative cooling** capacity to dissipate heat produced by instruments into deep space.

### Challenges:

- All parts and processes shall be qualified to the **cryogenic (45K) operation temperature**.
- Special **honeycomb radiative interface** shall be developed to **compensate** coating's **low emittance** at cryo.

### Status:

- Structural Model (SM) successfully passed the test sequence and delivered to RAL.
- Structural Thermal Model (STM) is completed and ready for delivery.





## ADMATIS WORK PACKAGE 2

Admatis is also responsible for development a set of **MGSE** for **hoisting** and **lifting** of **ARIEL Payload** and the full **spacecraft**.

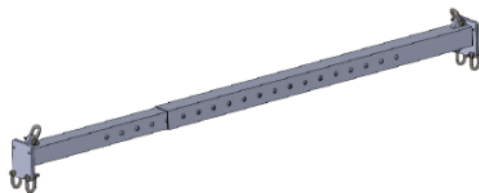
### Challenges:

- All used materials and processes shall be manufactured to the same quality and cleanliness level as the Payload
- Due to the large size, a new Cleanroom was built at Admatis new site.

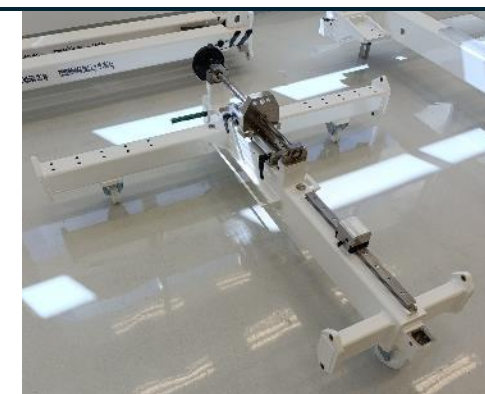
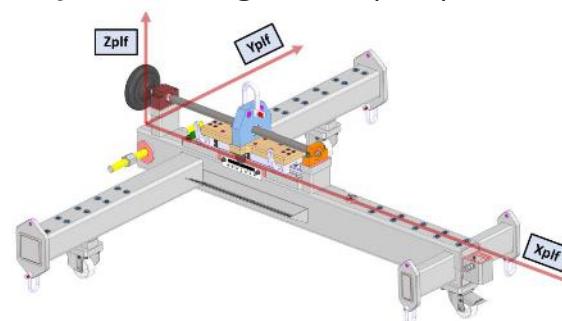
### Status:

- First batch of MGSE is being finished and ready to delivery in 2024.

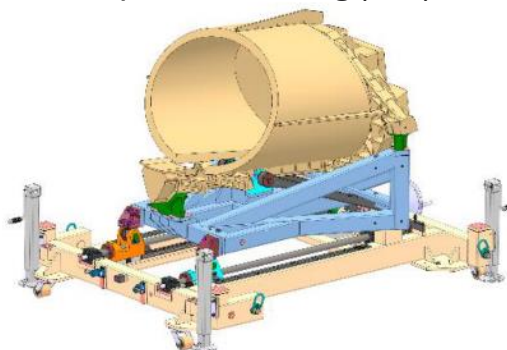
Universal Lifting Beam (ULB)  
Container Lifting Beam (CLB)



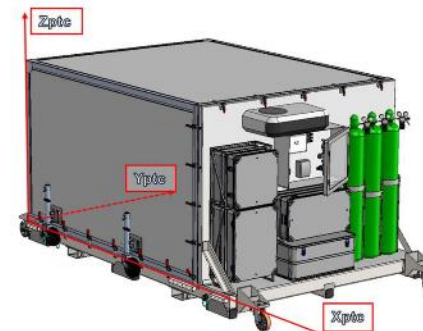
Payload Lifting Frame (PLF)



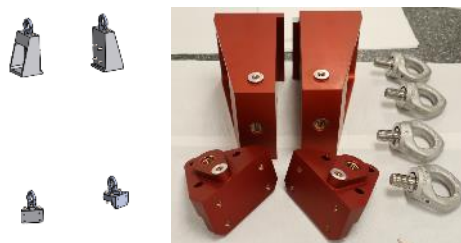
Telescope Rotation Jig (TRJ)



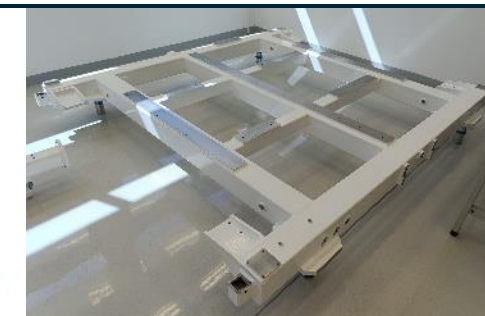
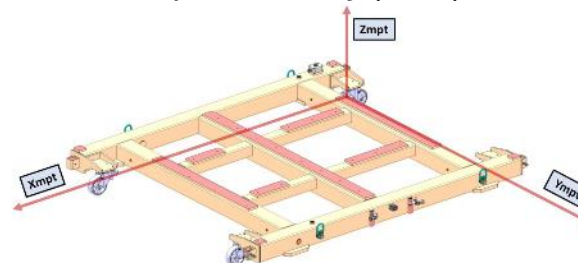
Payload Transport Container (PTC)



Telescope Lifting Adaptor (TLA)



Multi-Purpose Trolley (MPT)



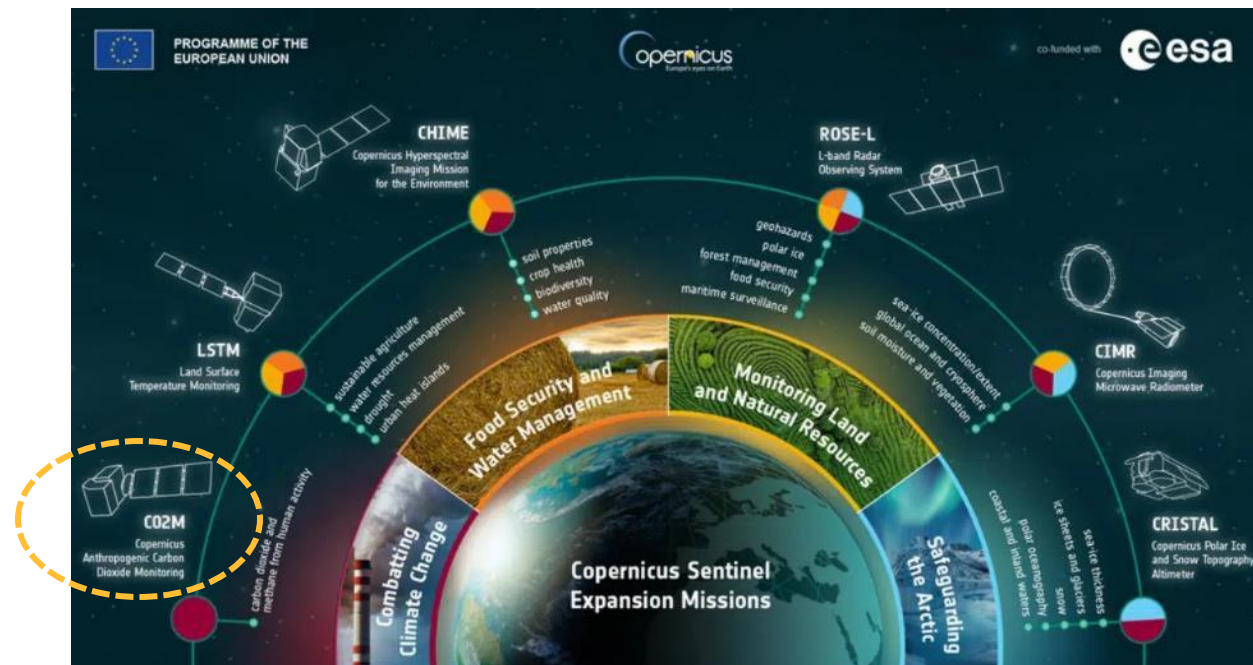
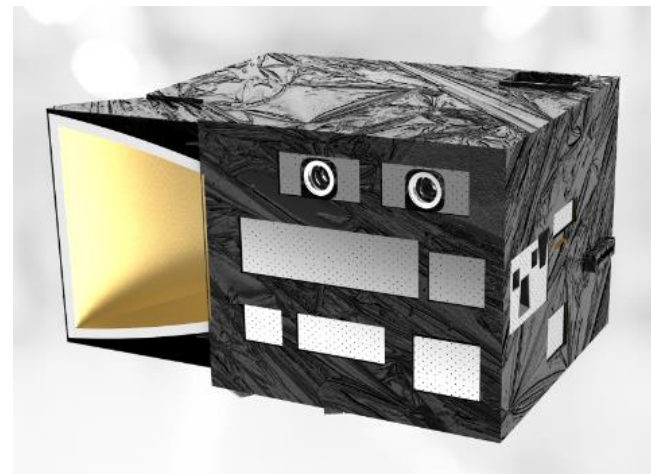
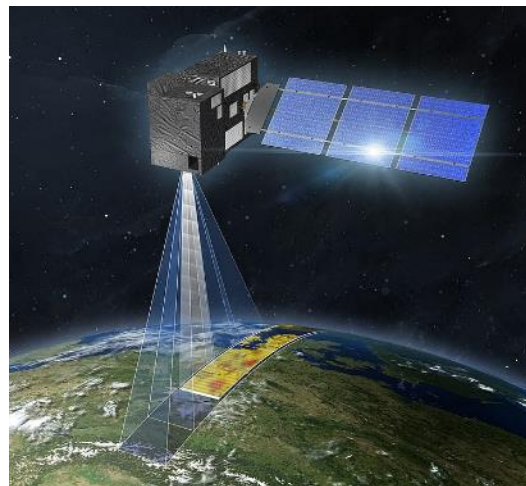
## MISSION OVERVIEW

**CO2M** is part of **ESA High Priority Candidate Missions**. The aim of the CO2M mission is to **measure** how much climate damaging gas - focusing on **carbon dioxide** and **nitrogen dioxide** - is **released** into the atmosphere specifically through **human activity**.

CO2M will be equipped with **three instruments**. **Prime contractor is OHB** and Payload Prime contractor is **Thales Alenia Space France**.

### Facts & figures:

- **Mission type:** Earth observation
- **Three satellites:** CO2M-A, CO2M-B, CO2M-C
- **Mission lifetime:** at least 7.5 years in orbit
- **Orbit:** Sun-synchronous
- **Instrumentation:**
  - CO2I: Integrated CO2 & NO2 Imaging Spectrometer
  - CLIM: 3-band Cloud Imager
  - MAP: Multi-Angular Multi-band Polarimeter
- **Launch date:** 2026 (CO2M-A, CO2M-B)





## ADMATIS WORK PACKAGE

Admatis is responsible for development of **Thermal Guard Assembly (TGA)** flight models as a **built-to-spec** type project.

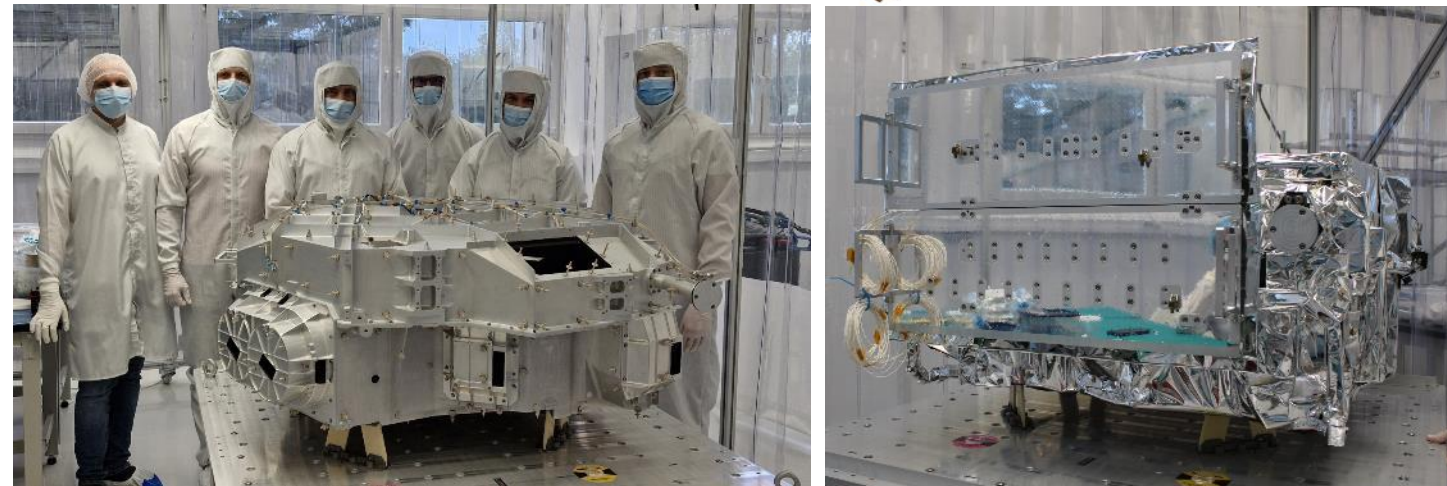
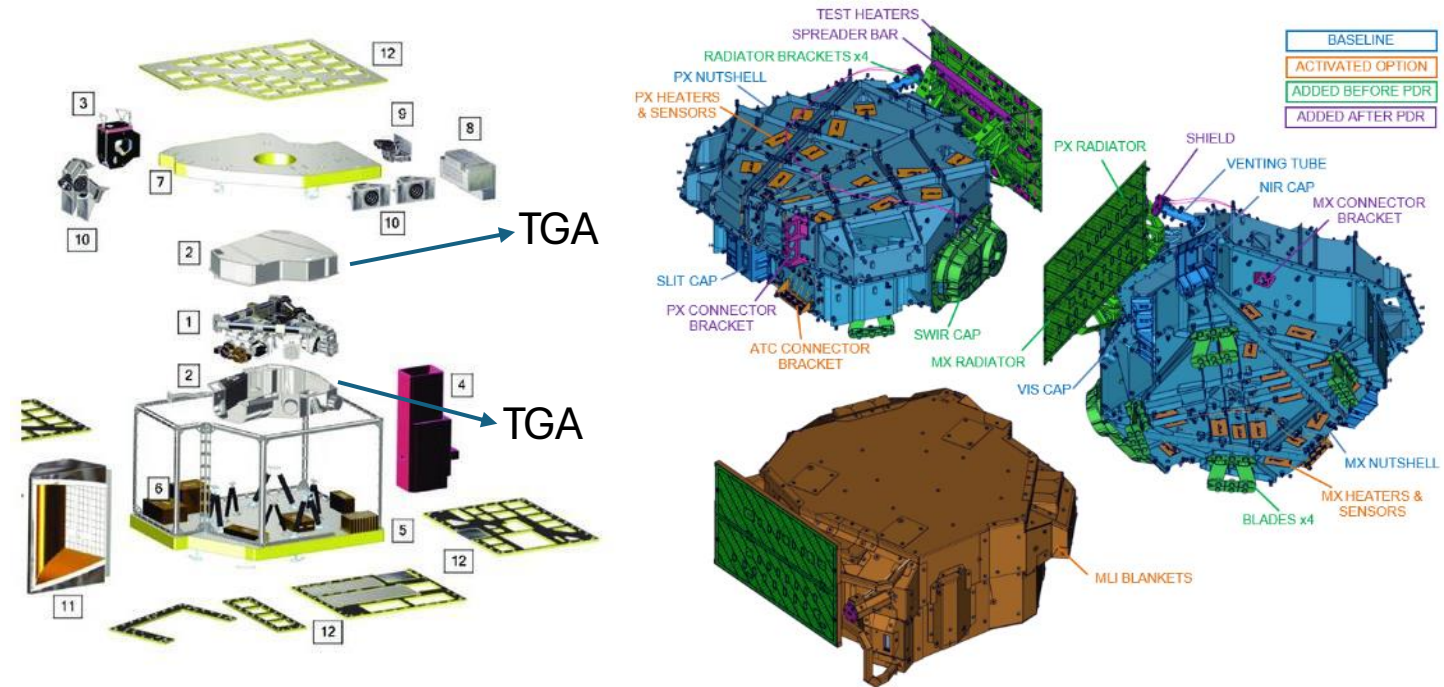
TGA function is the **encapsulation** and **thermal insulation** of **CO2I instrument**.

### Challenges:

- Equipment includes several units with multiple function including **structural** parts, **passive-** and **active thermal control**.
- To **ensure** the **thermal insulation** function and **reduce mass**, main **two component** is made of **one part** in **1.3m x 1.3m x 0.3m** with **2mm** wall thickness.

### Status:

- Proto-flight Model (PFM) is under the final qualification test sequence.
- Flight Model 2 (FM2) is being manufactured.



## MISSION OVERVIEW

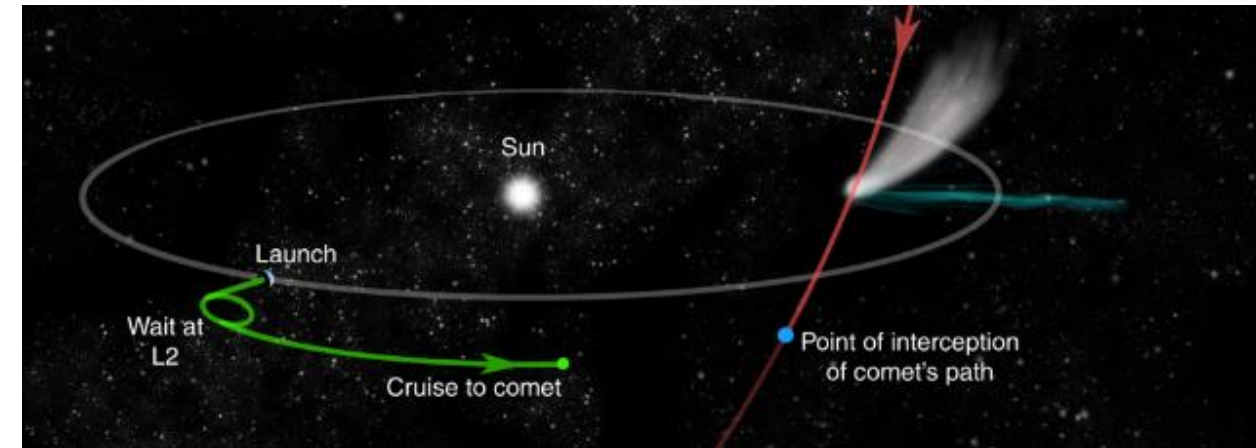
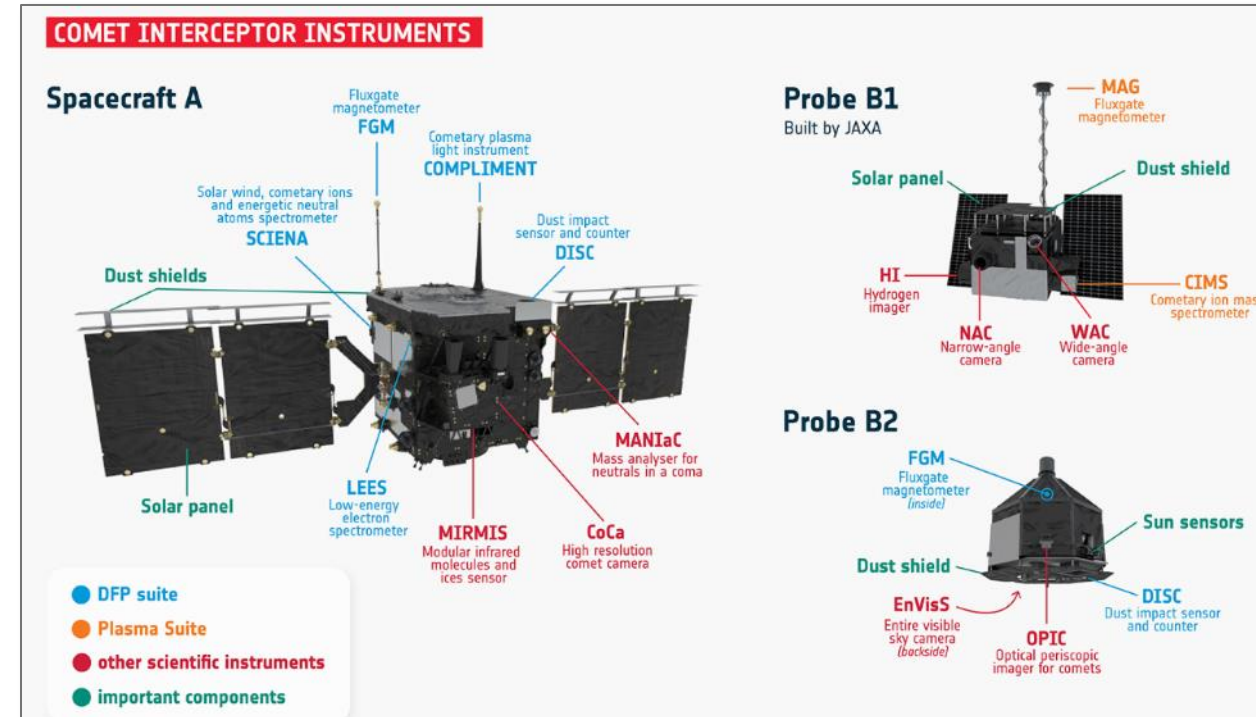


Comet Interceptor is the first **F-class mission** of **ESA**. **Primary science goal** is to **characterize** for the first time, a dynamically-new **comet** or **interstellar object**, including its **surface composition, shape, and structure**, the composition of its **gas coma**.

Development is led by **ESA** in cooperation with **JAXA**. Prime contractor is **OHB Italy**.

### Facts & figures:

- **Mission lifetime:** nominal 5 years with max. 6 months of science operations
- **Dry mass / wet mass:** 665 kg / 796kg
- **Instrumentation:**
  - 8 instruments on Spacecraft A
  - 4-4 instruments on Probe B1 and B2
- **Launch date:** 2029
- **Destination:** Sun – Earth Lagrange Point 2 (L2) at waiting phase, Heliocentric trajectory close to Earth at transfer phase
- **Launch vehicle:** Ariane 6-2. Launch shared with ARIEL.





## ADMATIS WORK PACKAGE

Admatis is responsible for development of **passive** and **active thermal control hardware (THW)** of **Camera Support Unit (CSU)** of **Comet Camera (CoCa)** instrument.

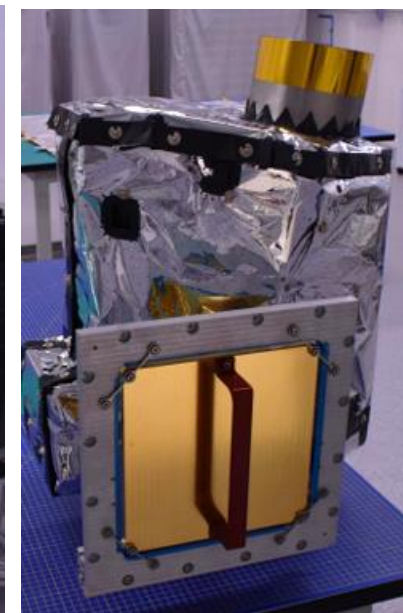
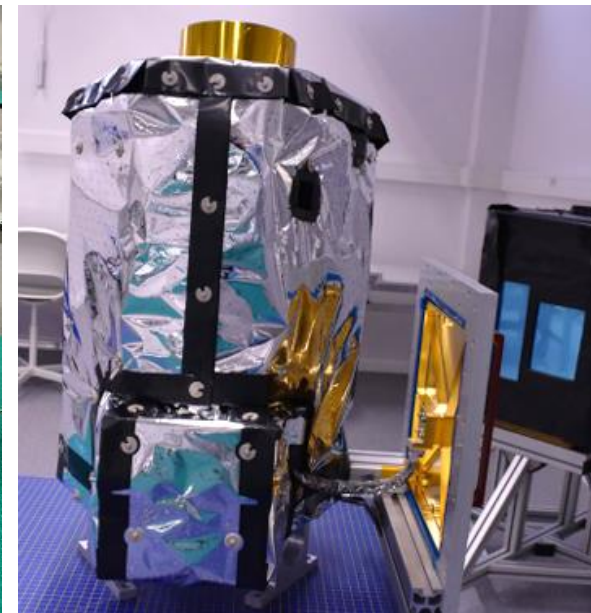
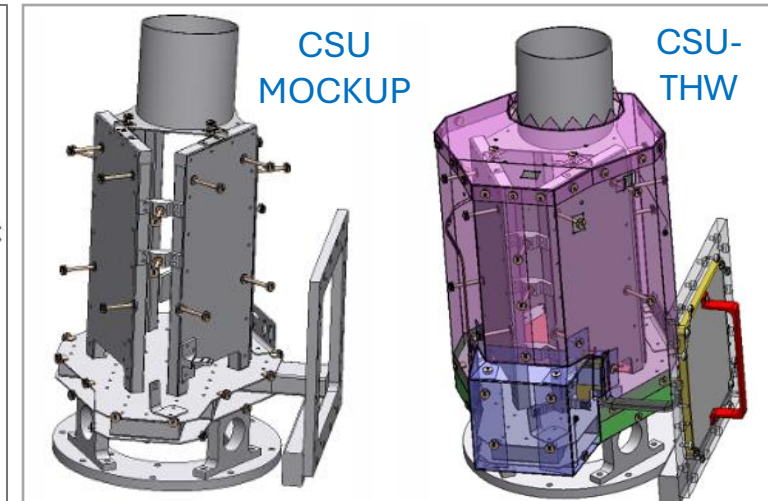
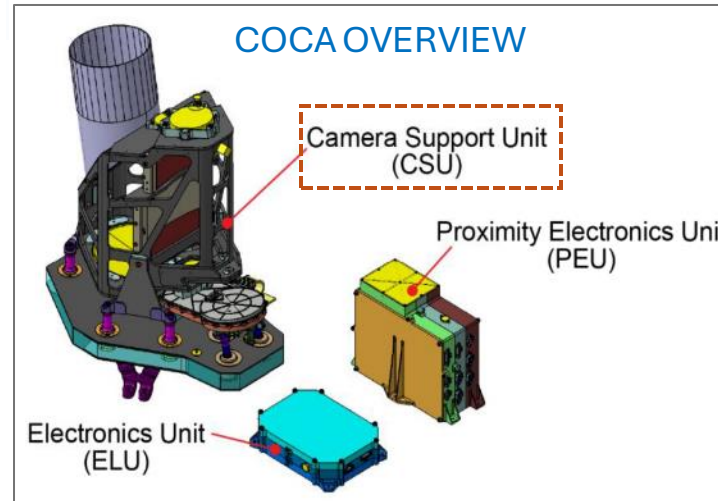
Work is performed in close **cooperation** with **University of Bern**, who is the responsible for **CoCa**.

### Challenges:

- For the integration and testing of thermal hardware, **multiple mockups** are needed to **simulate CSU** geometry.
- New components and technologies are required like **graphite thermal straps** and **gold-plated Radiators**.

### Status:

- Structural-thermal Model (STM) is delivered.
- Prot-flight Model (PFM) manufacturing is being started.



## MISSION OVERVIEW

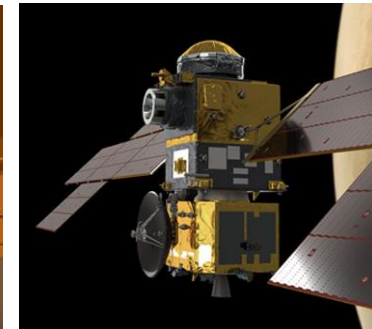
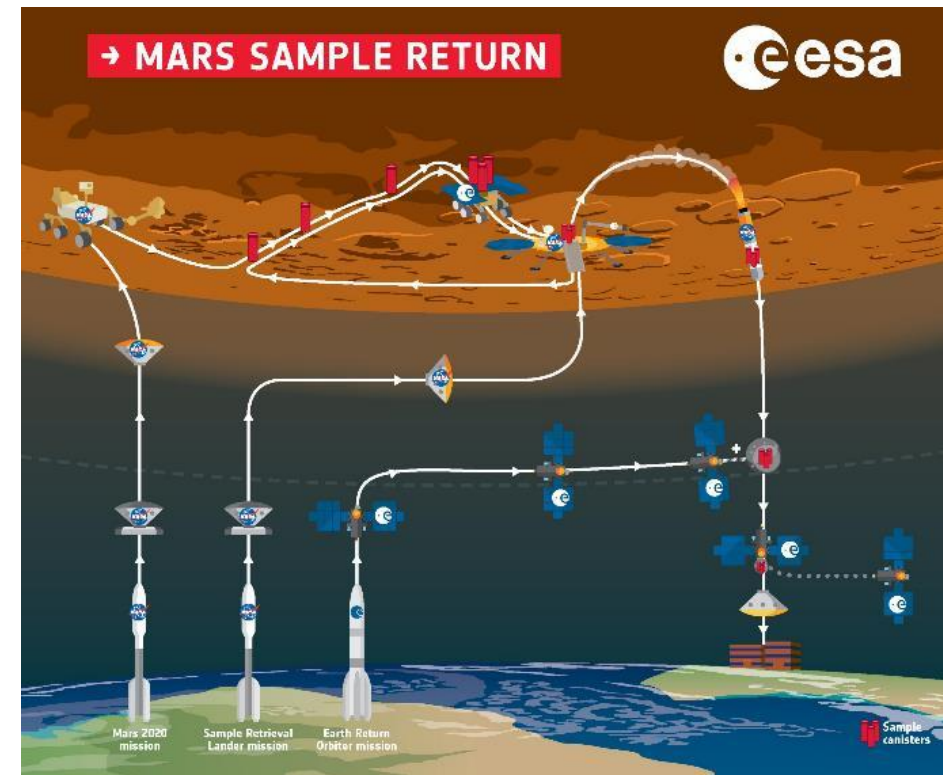
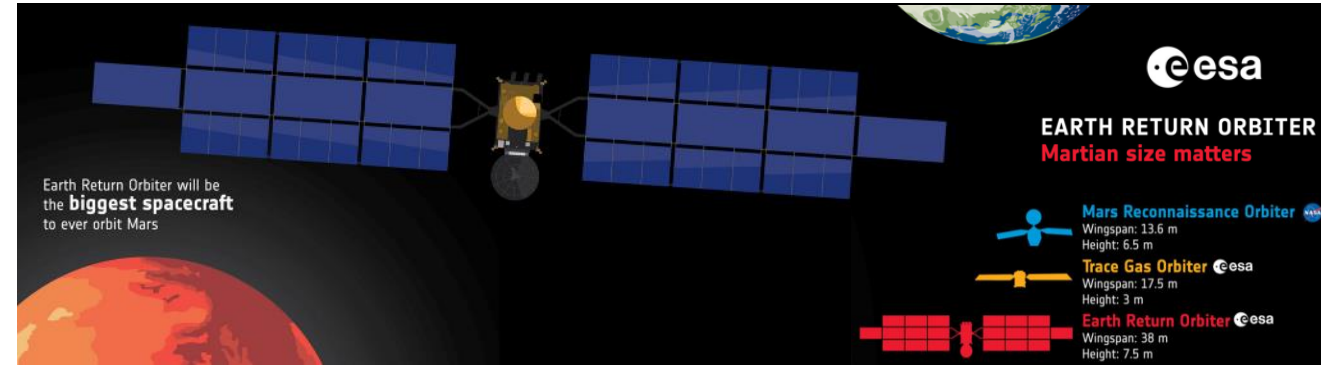


The **Earth Return Orbiter (ERO)** is ESA's major contribution to the **Mars Sample Return (MSR)** campaign. ERO will be the first **interplanetary spacecraft** to **capture an object in orbit** around **another planet** and make a full round trip to **Mars** and back.

ERO will be the **biggest-ever spacecraft** to orbit the **Red Planet**. Prime contractor is **Airbus**.

### Facts & figures:

- **Wingspan / heighth:** approximately 38m / 7.5m
- **Mass:** 7000kg
- **Solar panels:** 144 m<sup>2</sup>
- **Payloads:** NASA-provided Earth Entry System and Electra UHF Communications Package
- **Launch date:** 2027





## ADMATIS WORK PACKAGE

Admatis is responsible for development of **Structural & Thermal Subsystem (STSS)** of **Space Dosimetry System (SDS)** which is a **scientific** instrument to monitor **radiation environment**.

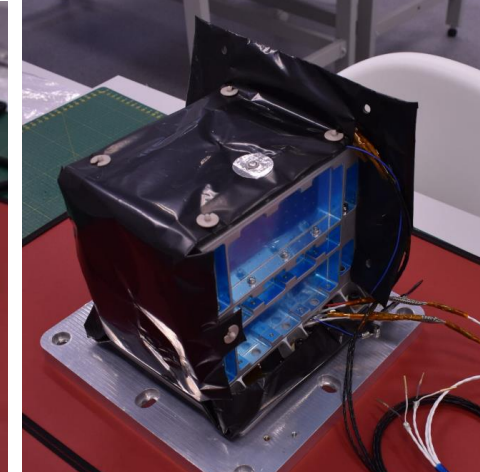
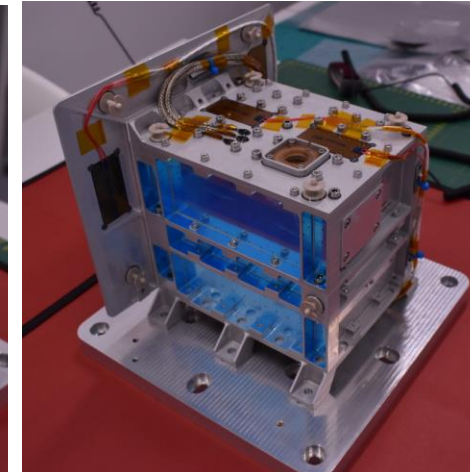
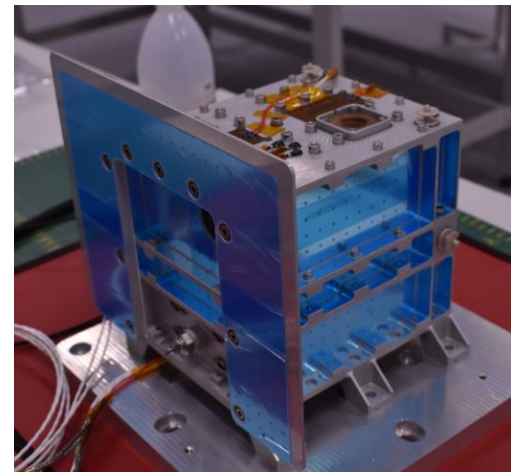
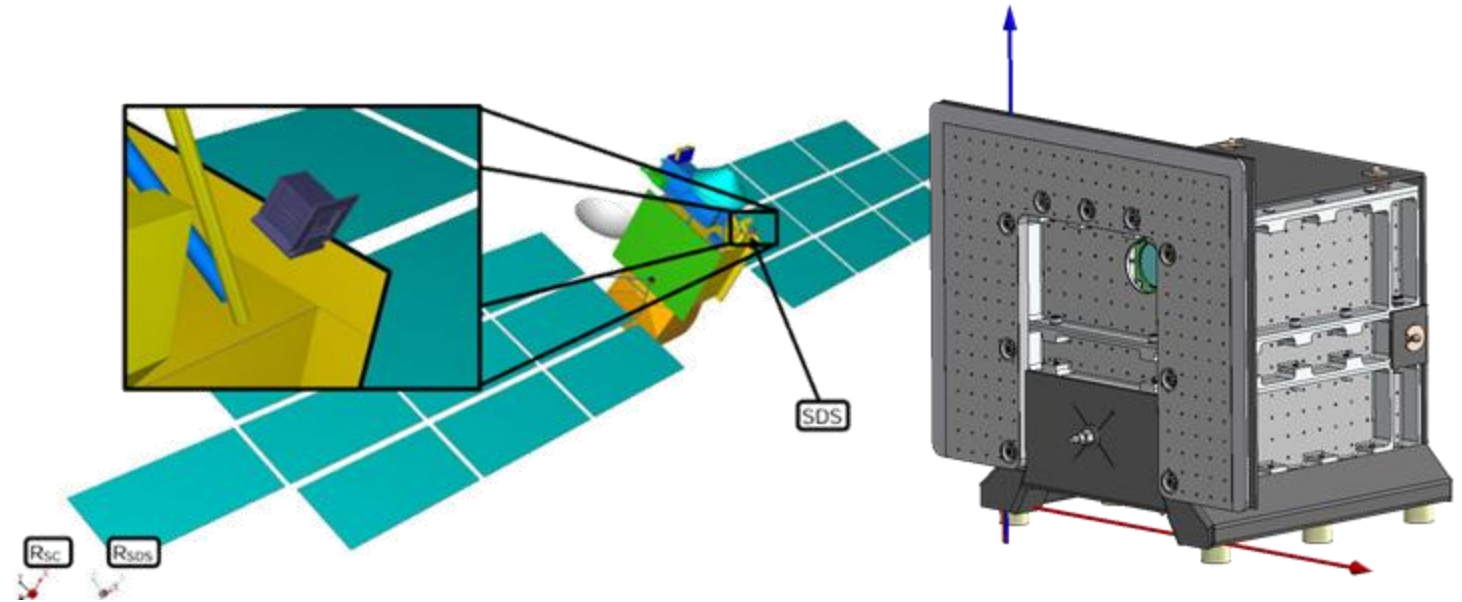
Work is performed in close **cooperation** with **EK (Centre for Energy Research)**, who is the responsible for **SDS**.

### Challenges:

- **Variable** thermal, magnetic and radiation **environment** between Earth and Mars.
- Existing technologies shall be **fine-tuned** to **small scale** and **confined space** for integration.

### Status:

- Structural-Thermal Model (STM) is under the qualification test sequence.



## OVERVIEW



### sentinel-2

is a **four-satellite** fleet and part of the **Copernicus** programme. Their payloads are the **Multi Spectral Instrument (MSI)** aiming at continuous Earth Observation on 13 channels. Prime contractor was **Airbus Defence & Space**.

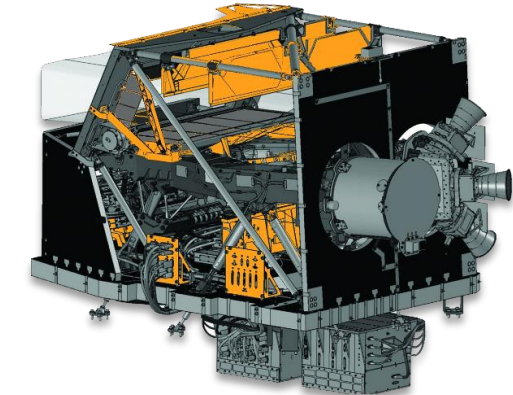
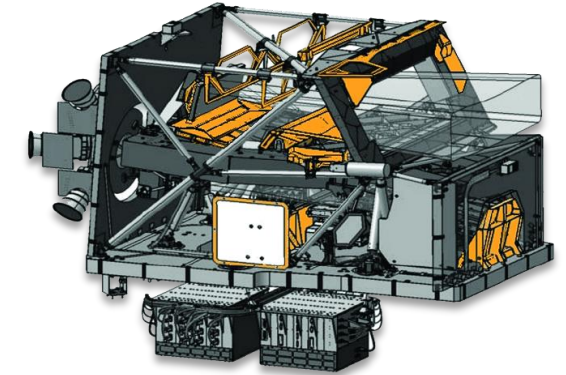
Admatis was in charge of **design, manufacturing and testing** of several **metallic, mechanical and thermal hardware (MMTH)** as part of Sentinel-2 Payload secondary structure. Project was implemented from 2009 to 2018.

#### Delivered hardware (orange parts in the right):

- In total, more than **2700 parts** have been delivered per satellite.
- Two types of FEE and one type of harness radiators
- Thermal shields, telescope and calibration baffles
- Harness supports and brackets
- Invar and titanium brackets and mounts.

#### Launch:

- Sentinel-2A: 23 June 2015
- Sentinel-2B: 7 March 2017
- Sentinel-2C: 5 September 2024
- Sentinel-2D: 2028 (planned)





## OVERVIEW



**Characterising ExOPlanet Satellite** is a photometric observatory launched into LEO to measure transits of **Exo-planets**. **CHEOPS** was the **first S-class** mission of **ESA**.

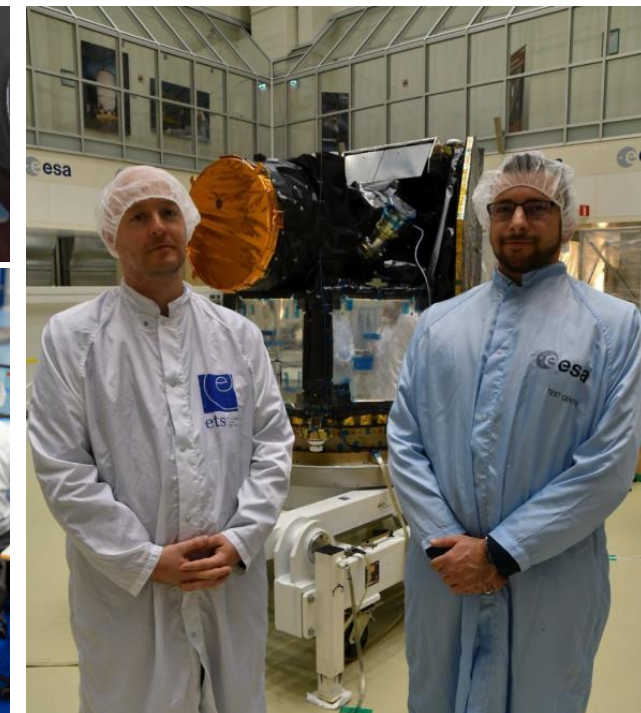
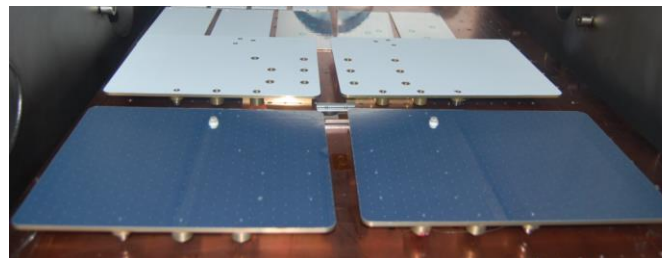
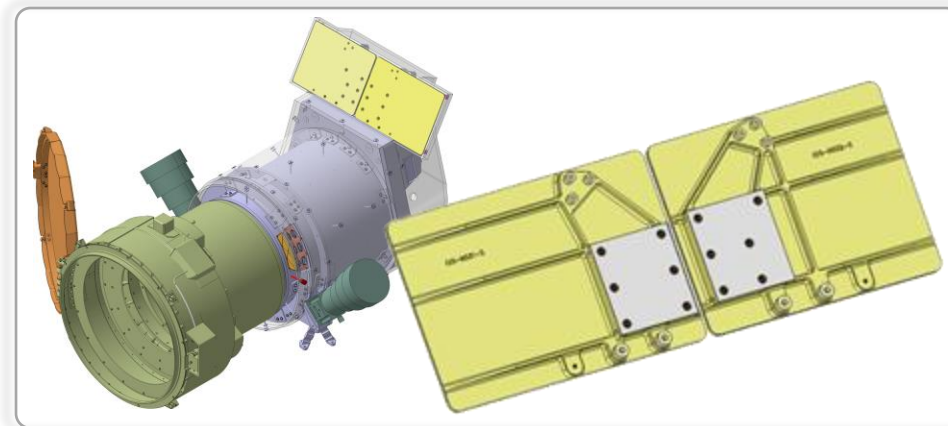
Admatis was in charge of **design, manufacturing and testing** of **Instrument Radiator** made of an **FPA** and an **FEE Radiator**. ESA was the mission architect, while the **Consortium** was led by **University of Bern**. Project was implemented from 2013 to 2017.

Main challenge was to ensure the instruments **50 mK temperature stability** under its  $-55^{\circ}\text{C}$  and  $10^{\circ}\text{C}$  operational temperature.

### Delivered hardware:

- FPA Radiator STM, PFM and Flight Spare.
- FEE Radiator STM, PFM and Flight Spare.

**Launch:** 18 December 2019





## OVERVIEW



ESA's **Jupiter Icy Moons Explorer**, will make **detailed observations** of the giant gas planet and its **three large** ocean-bearing moons: **Ganymede, Callisto** and

**Europa** – with a suite of remote sensing, geophysical and in situ instruments.

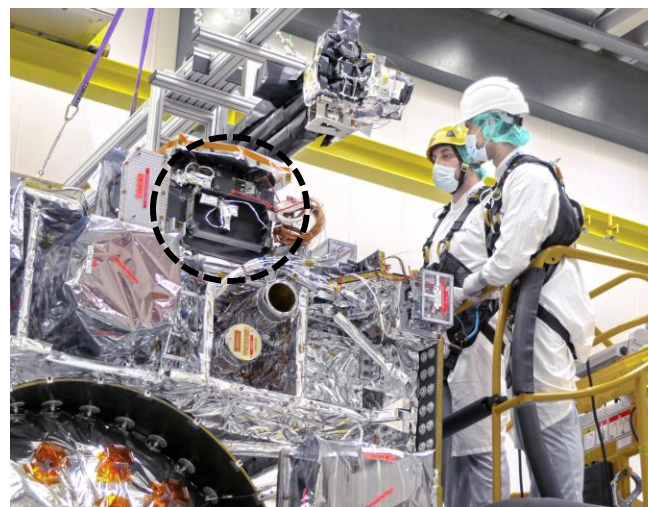
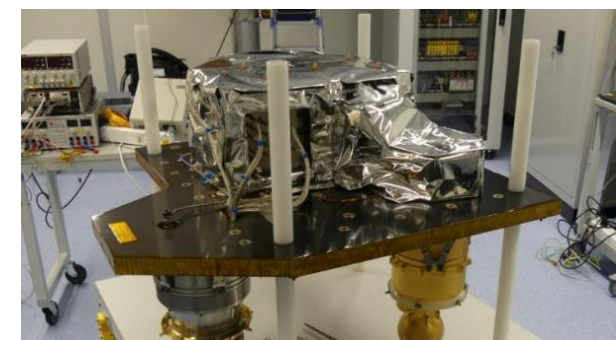
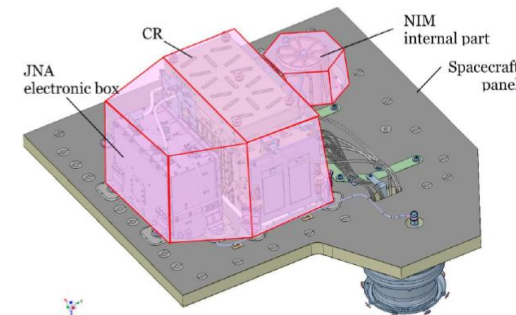
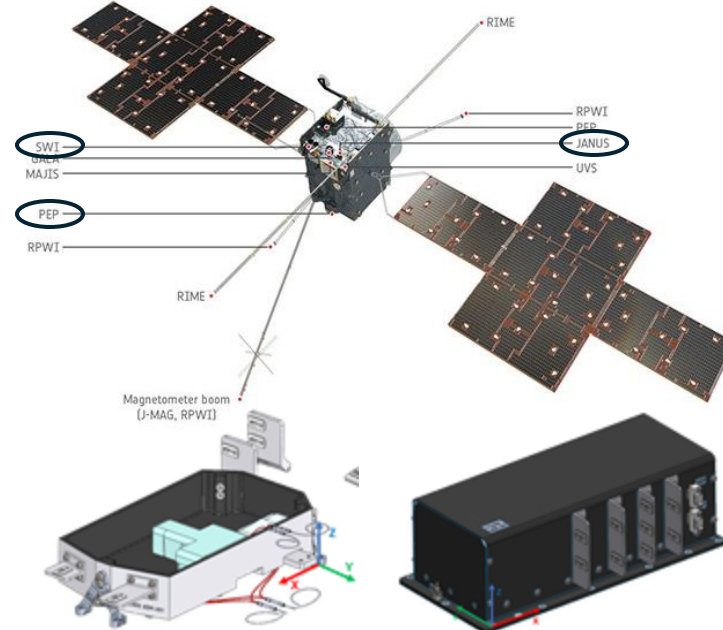
Development was led by **ESA**, prime contractor was **Airbus**. Admatis provided the **MLI blankets** for Particle Environmental Package (**PEP**) instrument and three **thermal dummy models** of **SWI** and **JANUS** equipment for spacecraft thermal test. Project was implemented from 2019 to 2020.

### Delivered hardware:

- PEP Instrument MLI STM and PFM.
- SWI and JANUS Thermal Dummy Models.

**Launch:** 14 April 2023

**Arrival to Jupiter:** July 2031





## OVERVIEW



**Foam Casting and Utilization in Space** was a foaming experiment on board of **International Space Station** in February 2010.

Test is performed in the frame of ESA's **SURE** project which was an

opportunity of scientists and SMEs in **new EU Member States** to perform tests on ISS. **Scientific background** and **hardware development** is given by **Admatis**.

The experiment container was sent to Baikonur, and reached the ISS with the **PROGRESS-36P cargo flight**. The **experiment** was **performed** by **NASA astronaut Jeffrey Williams**.

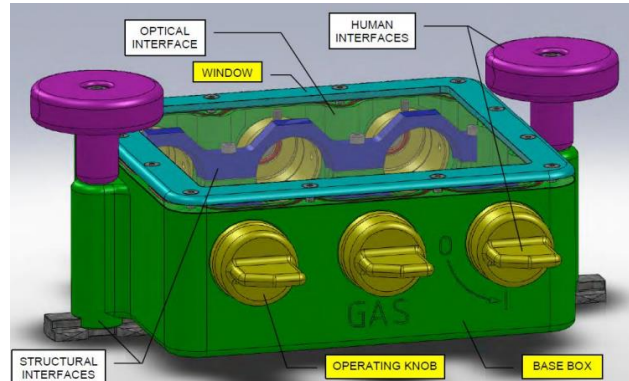
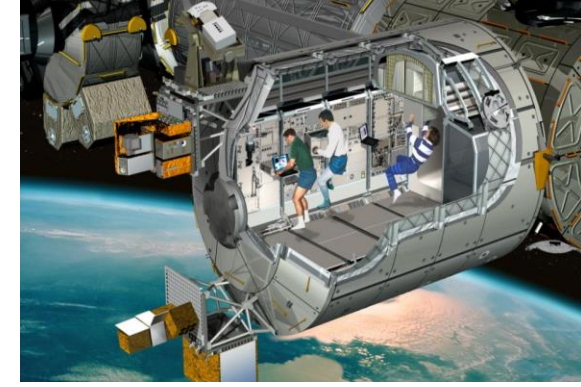
### Delivered hardware:

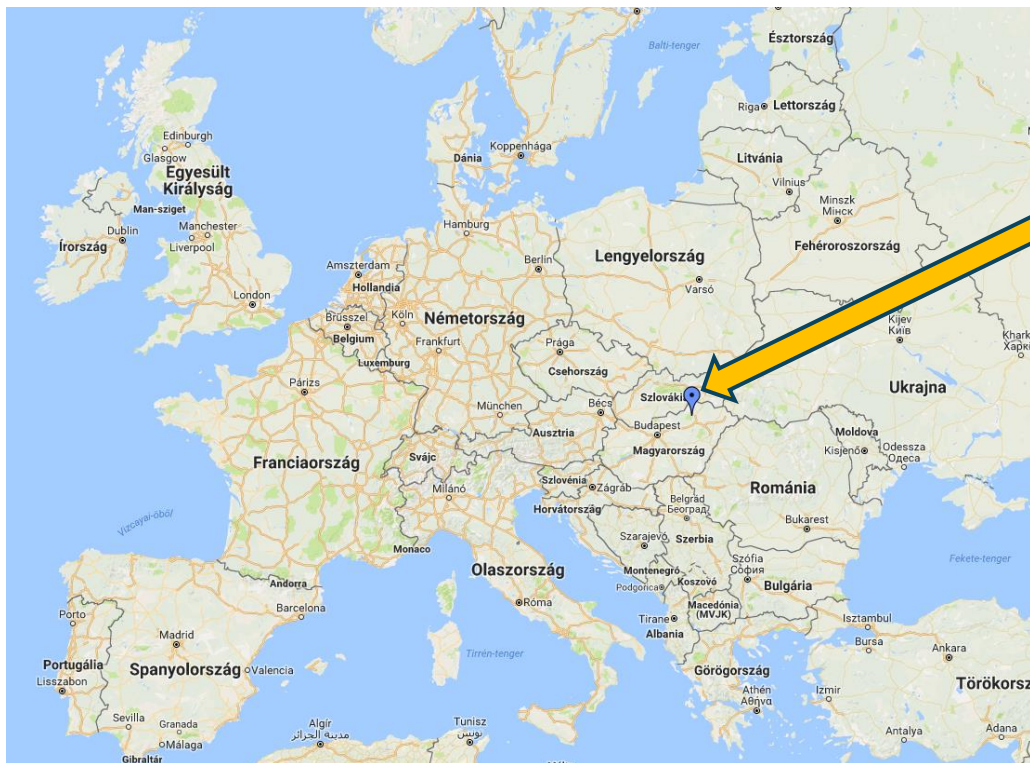
- FOCUS Training Model and Flight Model.

**Launch:** 3 February 2010


**Docking:** 5 February 2010

**Test:** 7 February 2010






## ADMATIS

 5 Kando Kalman street  
3534 Miskolc, HUNGARY

 **Tamás BÁRCZY**  
CEO

 [barczy.tamas@admatis.hu](mailto:barczy.tamas@admatis.hu)

 +36 46 898-154

 [www.admatis.com](http://www.admatis.com)