

# Industrial Additive Manufacturing

# Key milestones



We have a long **experience in the aerospace industry** as Tier 1 of Airbus.

1995



**Start** of our additive manufacturing activity

2012



**First Metallic Part certified for flight in Spain in ALM**

2016



**Increasing productive capacity**

2022



We achieved **Airbus certification for the supply of parts with PA2241 FR material**

2025



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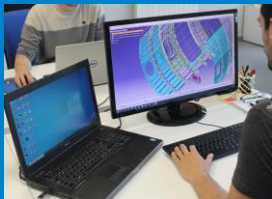
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# Engineering & Manufacturing Capabilities

## Engineering + R&D

- Design
- Selection of materials & technologies
- Redesign for AM
- Strength calculations
- Design optimisation
- Co-design



## Manufacturing & Validation

- Prototype manufacturing
- Material testing
- Parts testing
- Technical validation file
- CMM



## Postprocesses & Supply chain

- Surface finishings
- Surface treatments
- Dyeing, Painting
- Polishing
- Traceability
- Supply chain



We are qualified by the Oficina de Seguimiento Industrial-NGWS (OSI-NGWS) for several of the Pillars defined for the **Future Combat Air System (FCAS)** manufacturing



# Equipment for AM Production

## Additive technologies for metals.

These technologies allow to produce complex geometries and customized parts with high precision. For industries such as aerospace/space, defense, automotive, healthcare, and more.

**Technologies:** DMLS, EBM PBF.

**Materials:** AlSi10Mg, 316L, Ti6Al4V, INCO718, INCO 625, Hastelloy X, 17-4PH, Ti6Al4V (Grade 5 & 23), Cr Co, ...



## Additive technologies for polymers.

These technologies offer a range of benefits including design flexibility, rapid prototyping, and cost-effective production and are widely used in industries such as aerospace, automotive, and consumer goods to create custom parts and prototypes.

**Technologies:** SLS, FDM, Material Jetting.

**Materials:** PA12, PA12 FR, PA12 GF, ASA, ABS, PP, PC, PC-ABS, Ultem 9085 & 1010, Nylon 6, Nylon 12 and Nylon CF, PEKK, ...



## Potprocessing technologies.

Postprocessing technologies play a crucial role in additive manufacturing by ensuring that the printed parts meet the required specifications and quality standards for their intended application.

Surface finishings, Surface treatments, Dyeing, Painting, Management of an E9100 Supply chain.



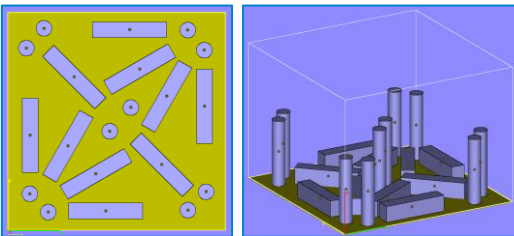
# R&D Projects

The **FUTURALVE** project (3years )aimed to develop the technology needed to participate in future geared turbofan engines that will have high-speed turbines of the first VHBR (Very High Bypass Ratio) engine demonstrator led by Rolls-Royce.

Our participation in the FUTURALVE project aimed to **characterise Nickel, IN718 and Hastelloy X alloy materials.**

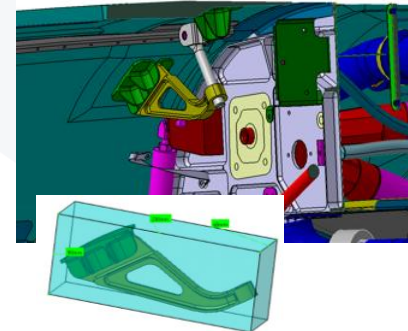
**Definition of the test specimens, materials and geometries,** and the way in which they should be manufactured in order to achieve a high representativeness of the tests (positioning, quantities and process parameters)

Production of the INCO718 and Hastelloy X specimens with EOS laser equipment.

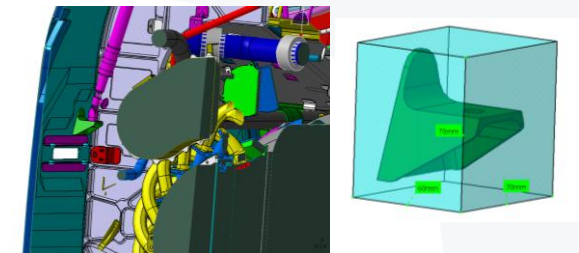


The **CETACEO** project aims to provide fitting concepts (Cat. B – Fatigue requirements) that are being developed for some Door Nacelle parts that can take advantage of the flexibility of AM to explore new concepts for fire resistant, fail safe and any other requirements related to the Nacelle.

Hinge fittings in Inconel718



HOR support in Scalmalloy



One Hinge fitting and one HOR support, in **Inconel 718** and **Scalmalloy** respectively, will be designed, calculated and manufactured with AM technologies to test the new concepts. **Years: 2023 – 2025.**



# Aeronautical Projects

## Tooling for overpressure test C295 Canada

- Design, calculation and manufacture of functional tooling for overpressure testing of the C-295 aircraft.
- The tooling simulates a door of the aircraft.



The tooling installed in the aircraft



The Part in the 3D printing equipment



FDM. Ultem 9085

## Drilling Templates for the assembly of the HTP and VTP of the Falcon 10X program



HTP Drilling Templates



Drilling template storage boxes at Airbus plant.



Drilling template shelf in Airbus plant.

# Aeronautical Projects

## Locking system for an aircraft console joystick

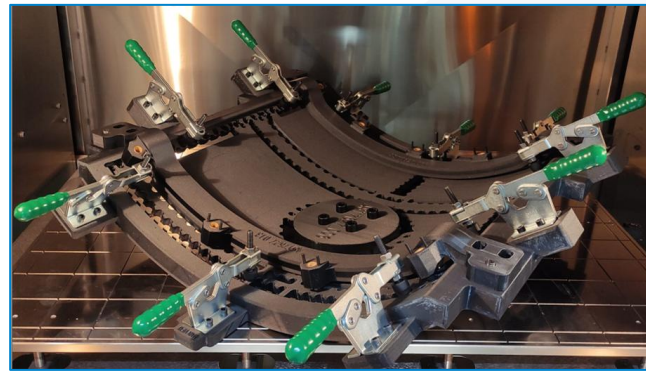
Design & Manufacturing of a RARO console joystick locking system to prevent unexpected movements in any direction (A330 to MRTT conversion).



SLS. PA12

## Fairing countersink tools

Able to deliver big tools on a short time and at a competitive cost.



FDM. PC

## Control Jigs

Design & Manufacturing of jigs to control different characteristics in the aircraft.



Part Shapes control jigs for stringers



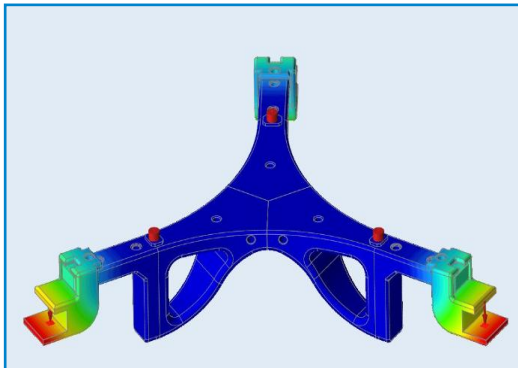
Bent pipes control jigs

SLS. PA12 / ABS/ASA in colours

# Aeronautical Projects

## Light Lifting tool

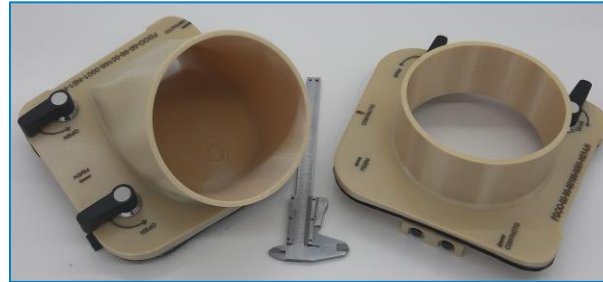
Design, manufacture and CE certification of lifting tools for moving parts within production lines.



SLS. PA12

## Tooling heating unit avionics bays

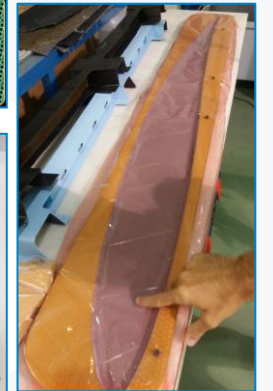
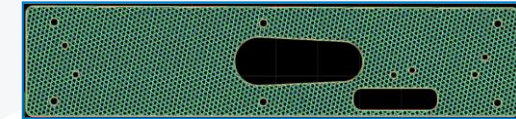
Covers manufactured using additives and laser marked, fitted with standard fasteners and foam/silicone seals.



FDM. Ultem 9085

## Mould for Composite parts

Moulds in AM allows flexibility in design and better delivery time.



Composite part obtained in the Mould

FDM. Ultem 1010

# Aeronautical Projects

## Oil tube for helicopter engine

Part for the Tiger helicopter in intermittent mass production

**It is the first flight metal certified part in Spain.**



*Four build platforms with different references*

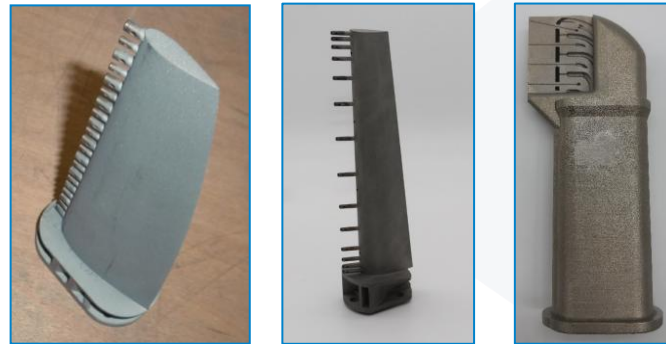


*Original design from 4 parts to one in additive manufacturing*

*DMLS. Inconel 785*

## Instrumentation Rakes

Serial production flying parts



*Different Rakes produced (up to 14 references)*

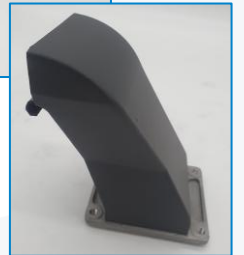
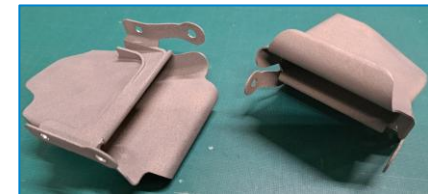


*Different Build plates*

*DMLS. Inconel 785*

## Ducts

Air outlets. The parts are delivered painted according to specifications.



*EBM. Ti6Al4V*

# Aeronautical Projects

## Pneumatic Valve

It belongs to the A400M aircraft. The part process has been developed, and parts have been manufactured and measured for FAI.



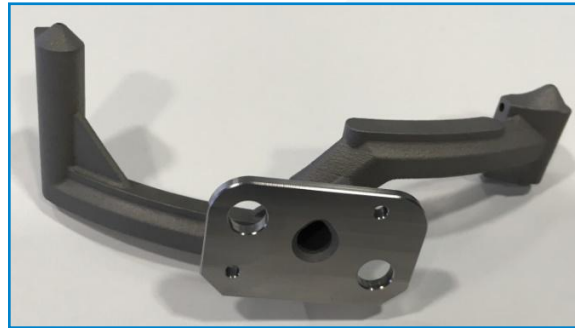
*Build plate*



*DMLS. Inconel 718*

## Oil Nozzle

The part process has been developed, and parts have been manufactured and measured for FAI.



*Lot of parts for FAI*

*DMLS. Inconel 718*

## Certified polymer flight parts

Flame Retardant Polyamide parts for an aircraft.

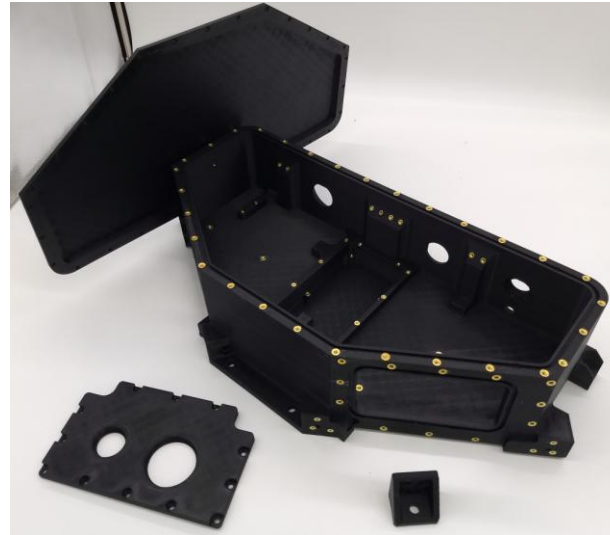


*SLS. PA2241 FR*

# Defence Projects



**Laboratory Flow meter**  
90 x 90 x 300 mm. SLS. PA12



**Parts for a "Vehículo de Apoyo Cadenas (VAC)"**  
FDM. ABS



**Housings for electronic warfare devices**  
SLS. PA12



**Support parts**  
SLS. PA2241 FR



**Windscreen wiper arm prototype**  
FDM. ASA



**Air duct. 170 x 150 x 110 mm.** FDM. Ultem 9085

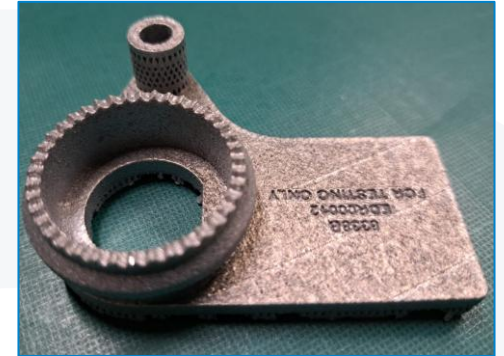
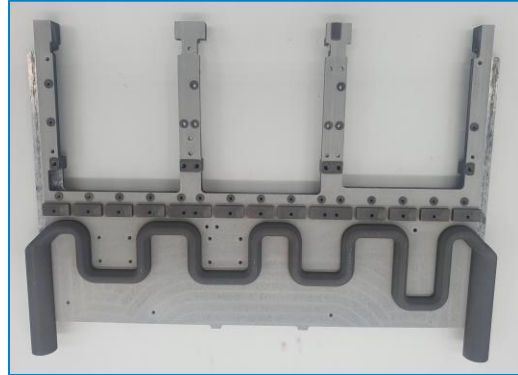
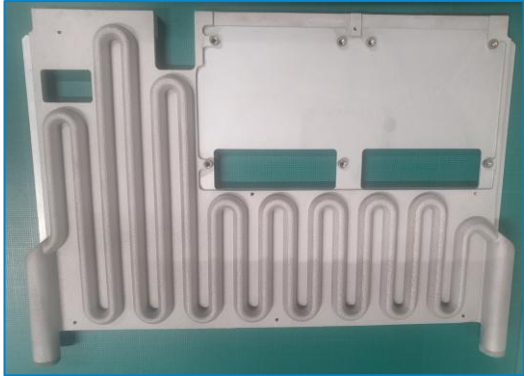


**Multi-system support**  
280 x 160 x 230 mm. FDM. Ultem 9085



**Air duct. 270 x 120 x 80 mm.** FDM. Ultem 9085

# Defence Projects

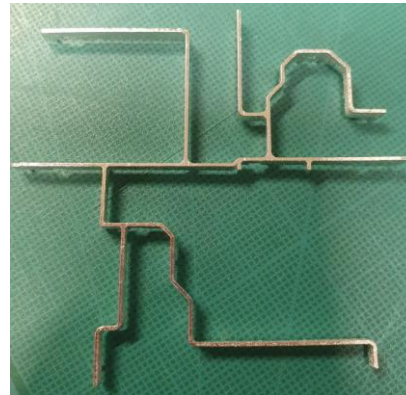
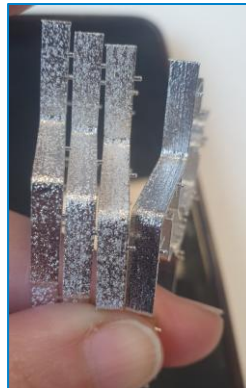


*Cooling plates for electronic circuits. DMLS (Hybrid manufacturing). AlSi10Mg*

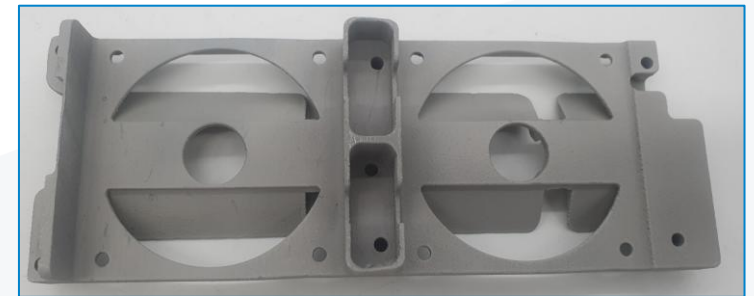
*DMLS. AlSi10Mg*



*DMLS. 1.2709*



*DMLS. 1.2709*

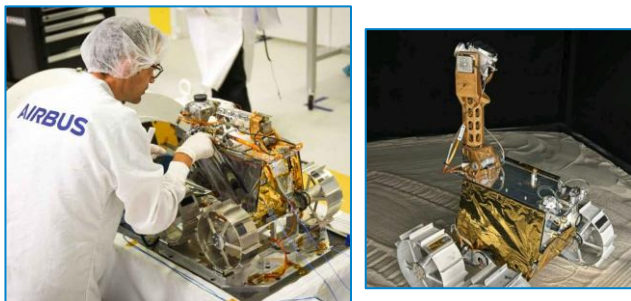
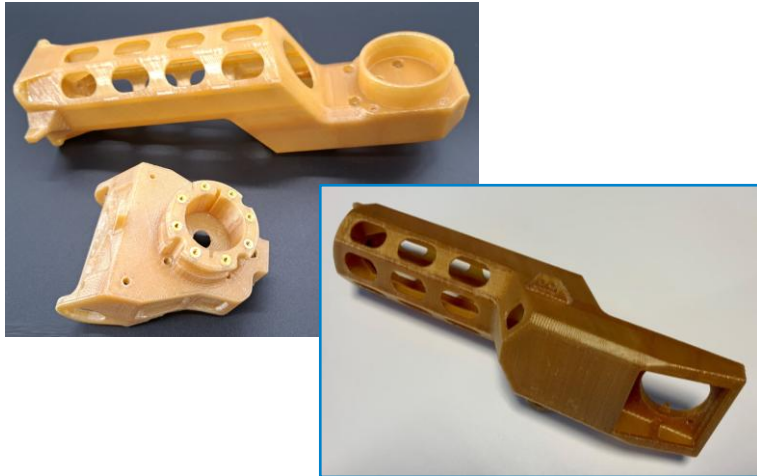


*DMLS. AlSi10Mg*

# Space Projects

## Parts for a lunar Rover

Arm and some other parts for the UAE's Rashid Rover.



*FDM. Ultem 1010*

## Covers for the Third Generation Meteosat Scanner

Design criteria: use in space, thermal conditions and cleanliness.

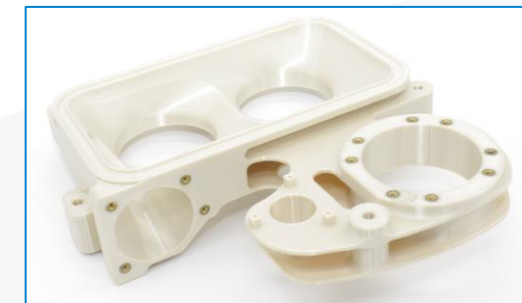


*FDM. Ultem 9085*

## Ventilation system devices



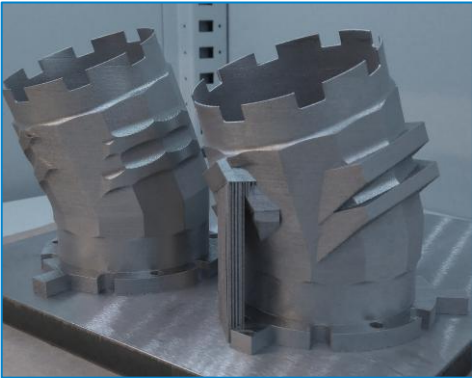
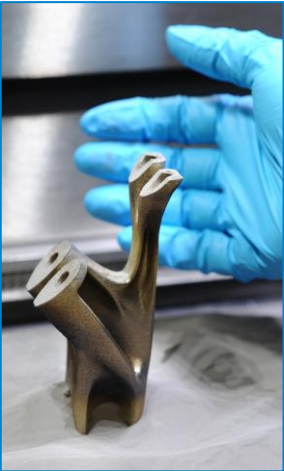
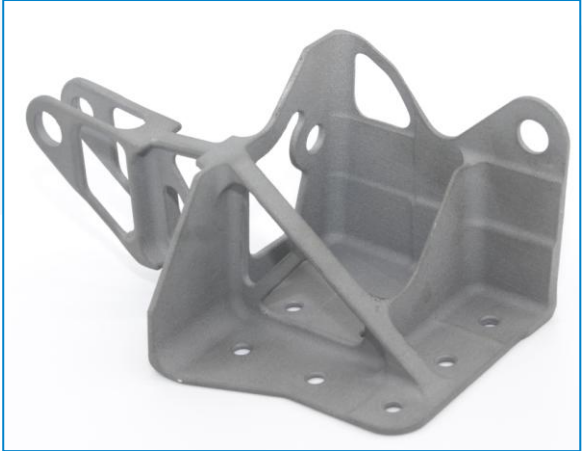
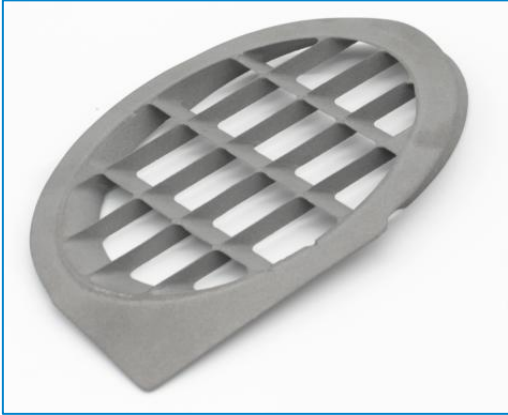
*140 x 110 x 80 mm*



*160 x 120 x 80 mm*

# Space Projects

Metal parts in DMLS & EBM technologies and materials such as Inconel 625 & 718, Ti6Al4V and others

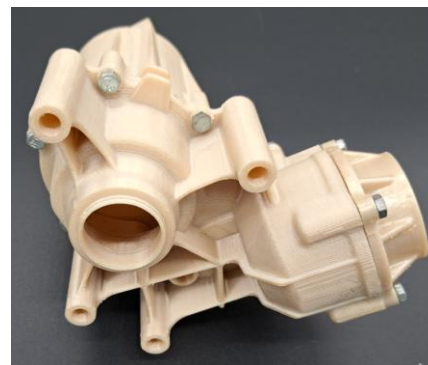


# Other Sectors Projects

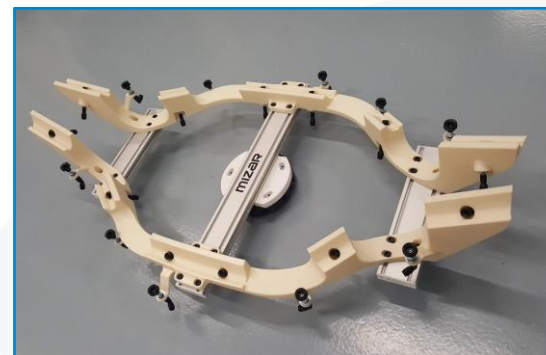
## GENERAL Industry



**Box & Cover Prototype to house electronic circuitry**  
260 x 250 x 125 mm. SLS. PA12



**Pump casings for liquids**  
160 x 150 x 100 mm. FDM. PC



**Robot grippers for picking up large parts**  
FDM. ABS/ASA



**Prototype flanges**  
D410 x 310 mm. SLS. PA12



**Housing for a forklift truck**  
SLS. PA12



**Robot grippers for transferring parts in a plastic injection moulding process.**  
FDM. ABS/ASA



**Clamping levers**  
Steel 1.2709



**Housing for a radiological equipment**  
SLS. PA12



**Sets of walkie-talkies**  
SLS. PA12

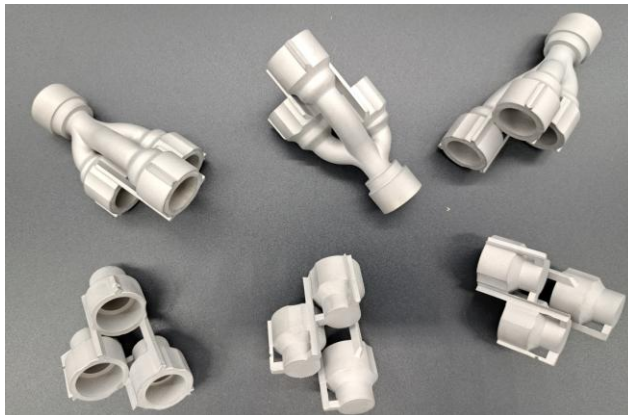
# Other Sectors Projects

## NUCLEAR Industry

**AISI 316L** part for an antenna of the **ITER Project**.  
*Size: 356,5 x 339,8 x 320,0 mm. Weight: 44,6 kg*



## HYDROGEN Industry



*DMLS. Inconel 718*

## NAVAL Industry

**Gearboxes** (x2) for an America's Cup boat in **Ti6Al4V**.  
*Weight: 16,5 kg*

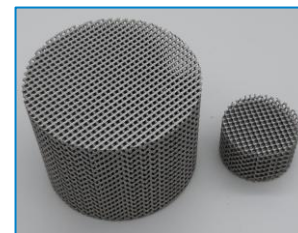


*Burners*

Sets of **Propellers** (x16) for a boat in **AlSi10Mg**.  
*Size: D220 mm*



## ENERGY Industry



*DMLS. AISI 316L*

**Parts** for an America's Cup boat in **Ti6Al4V**.  
*Different sizes*



*Impellers*

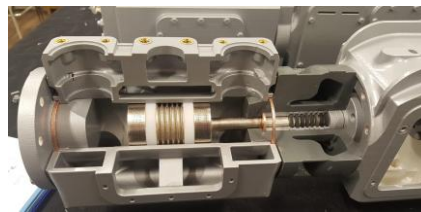
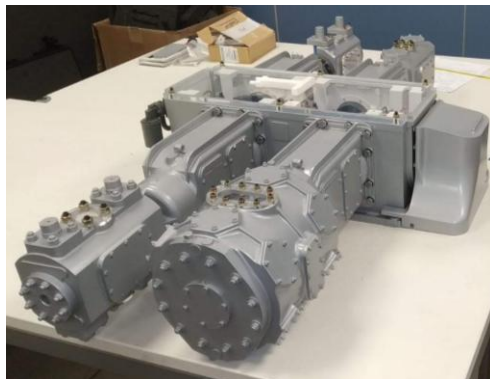
# Functional Prototypes / Industrial Mock-ups



**Jig for testing the assembly of equipment in the forward section of the EuroMALE/Eurodrone fuselage at a scale of 1:1**  
 Dimensions: 6,50 x 1,35 x 1,35 meters



**Mini4EEO satellite**  
 Dimensions: 0,60 x 0,60 x 1,00 meters



**ABC Horizontal Synchro model 355 kW Compressor at a scale of 1:1**  
 Dimensions: 1,00 x 0,55 x 0,25 meters

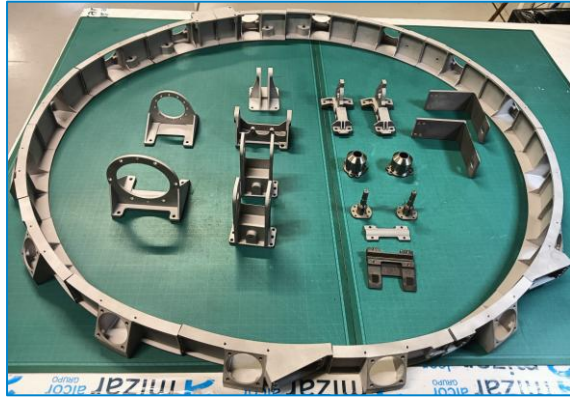


**Jammer antenna sets (x2)**  
 Dim: 0,60 x 1,00 x 1,10 meters

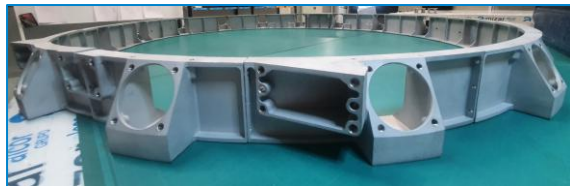


**Radome**  
 1,40 x 0,70 x 0,50 meters

# Functional Prototypes / Industrial Mock-ups



**Grab and Release Unit for the MSR ERO  
Martian Rover**  
Parts in AISi10Mg and Ti6Al4V



**Tracked Support Vehicle**  
Dimensions: 200 x 100 x 85 mm



**Antenna SATCOM AESA**  
Dimensions: 0,58 x 0,41 x 0,15 meters



**Transparent box to house electrical  
circuitry**  
Dimensions: 0,50 x 0,37 x 0,20 meters



**Oxygen Bottle for  
A400M Aircraft**  
Dim: D150 x 380 mm



**S80 Submarine Sail**  
Dim: 1,35 x 0,76 x 0,54 meters



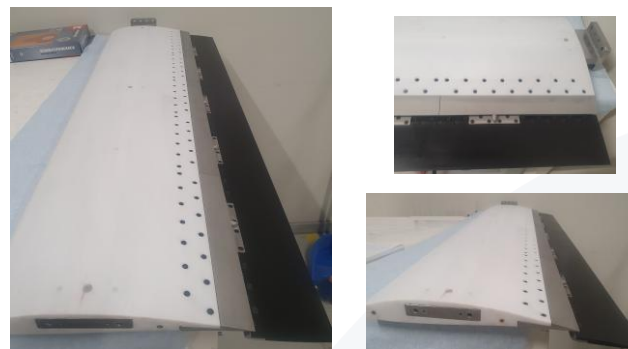
**Ground  
Electronic  
Warfare  
Station**



# Functional Prototypes / Industrial Mock-ups



**Multipurpose Air Vehicle VALERO**  
3,50 meters lenght

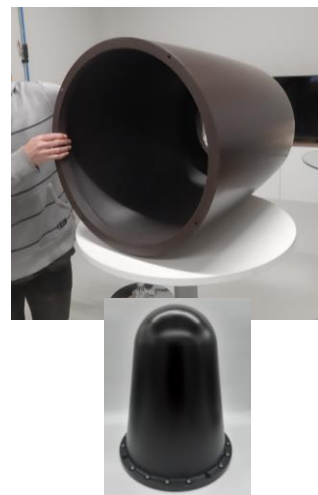
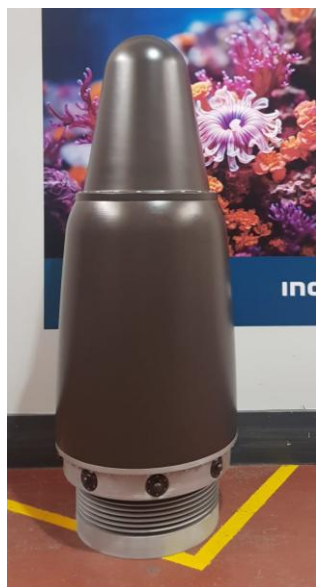


**Aircraft wing for wind tunnel testing**  
Dimensions: 1,00 x 0,35 x 0,18 meters



**Naval Antenna**  
1,50 x 1,15 x 0,95 meters  
Weight: 130 kg

**Naval Antenna**  
1,10 x 1,10 x 2,15 meters  
Weight: 110 kg



**Submarine Radome**  
1,30 x 0,55 x 0,55 meters



**NEMUS Radar System**  
Dimensions: 0,65 x 0,550x 0,38 meters



**Antennas (several models)**  
0,85 x 0,45 x 0,40 meters



# Certifications



DEFENCE AND SPACE

**AIRBUS** [ Airbus Amber ]

This certificate is granted by Airbus Defence and Space to:

**MIZAR HEALTH**

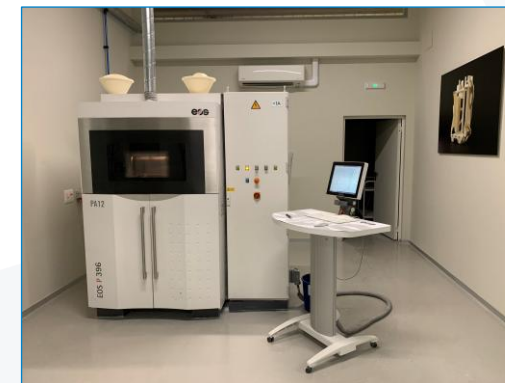
C/ Arriurdina, nº 11 P.I. Júndiz, 01015 Vitoria-Gasteiz

This certificate demonstrates conformance and recognition of process certification according CASA-1400 for:

**ADDITIVE MANUFACTURING LASER POWDER BED FUSION OF POLYMER**

according to

**AIPS03-07-022 ; AIP103-07-022**






  
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