



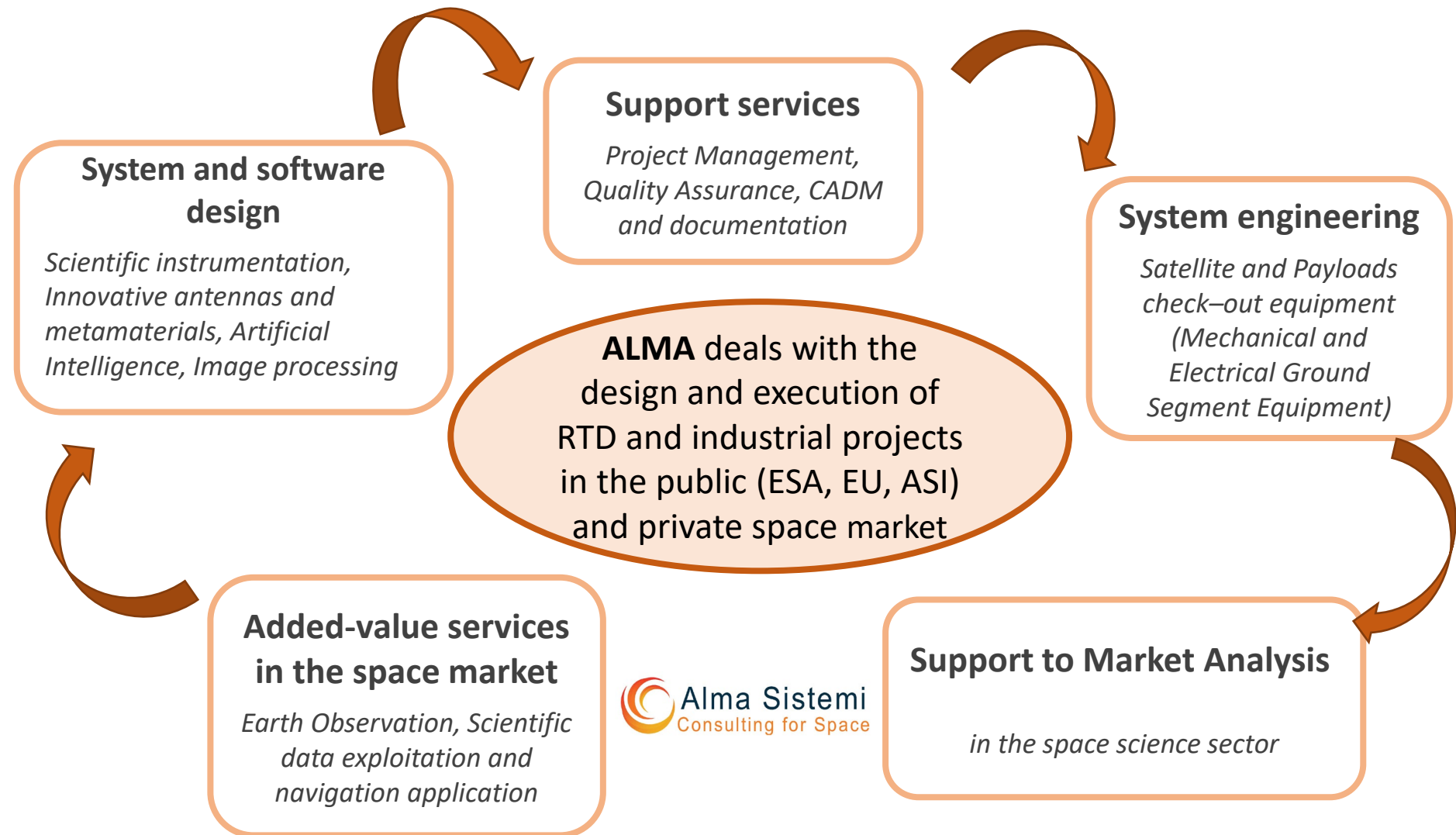
Alma Sistemi
Engineering for Space

ALMA Sistemi S.r.l.

- ▶ Italian SME providing high level engineering in the space and defence market
- ▶ Established in 2005, 20 employees (plus 3 permanent consultants)
- ▶ Fast growing: 3,2 M€ (2023): 100% increase from 2022
- ▶ Certified ISO 9001:2015
- ▶ New premises in Rome (650 m²) fully owned
- ▶ Focus on industrial contracts (MGSE) and RTD projects

Customer	Completed Projects	On going projects
EC FP7 – Horizon 2020/Europe	9	4 (3 as coordinator) + 1 GAP
MGSE (Airbus, Thales, OHB) + ESA	8	7 (6 as Prime contractor) + 2
Italian / European Space Agency	4 / 2	1 (contract signature)
National RTD Programs	4	3 (coordinator)
Defense	1	1 (coordinator)

Alma offering



MGSE past contracts

ALMA Sistemi has a long-standing relationship on MGSE having provided Mechanical Engineering support to industrial contracts in the frame of European Space Agency programmes:

- *MeteoSat Third Generation (MTG) Spacecraft Transport Container – Customer: Thales Alenia Space, Cannes, France.*
- *MeteoSat Third Generation Platform Transport Container – Customer: OHB System AG, Bremen, Germany.*
- *MeteoSat Third Generation Platform Radiator Tilting Stands – Customer: OHB System AG, Bremen, Germany.*
- *EnMAP Mechanical Ground Support Equipment – Kayser-Threde GmbH, Munich, Germany.*
- *ExoMars Rover Transport Container – Airbus Defence & Space, Stevenage, UK.*

MGSE completed contracts

- *MetOp-2G MicroWaveSounder Mechanical Ground Support Equipment - Airbus Defence & Space, Portsmouth, UK.*
- *MetOp-2G Scatterometer Electronic System Mechanical Ground Support Equipment (BIOMASS MGSE Batch#3) Airbus Defence & Space, Friedrichshafen, DE.*
- *MetOp-2G Lifting and handling Mechanical Ground Support Equipment for Satellite A and B- Airbus Defence & Space, Friedrichshafen, DE.*
- *SpaceBUS NEO (NEOSAT) Solar Array Transport Container – Thales Alenia, Cannes, France.*
- *Cryostat trolley & stand for Physic Particle Accelerometer prototype and series production, European Spallation Source, Sweden.*
- *SpaceBUS NEO (NEOSAT) Satellite Transport Container (subcontractor) – Thales Alenia, Cannes, France.*
- *Copernicus CHIME Instrument MGSE (prime contractor) – OHB System AG, Oberpfaffenhofen, Germany delivered 2 Tilting Trolleys.*
- *Copernicus CHIME adapters (prime contractor) – OHB System AG, Oberpfaffenhofen, Germany.*

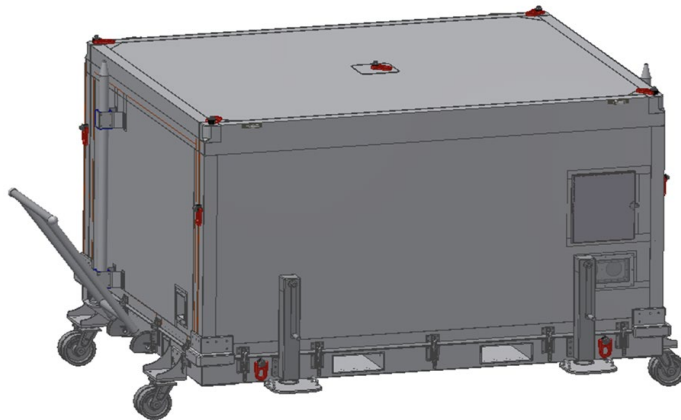
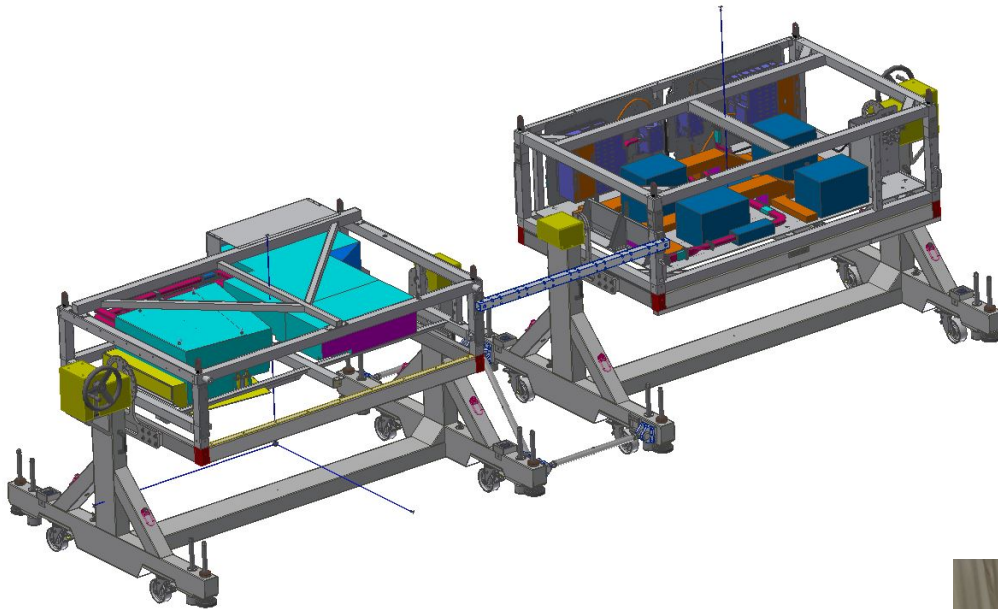
MGSE ongoing contracts

- **Copernicus CRISTAL Operational MGSE (prime contractor) – Airbus Defence and Space, Immenstaad, Germany (TRR-TRB phase);**
- Copernicus LSTM MGSE Batch#1: Transport Container (prime contractor) – **Airbus Defence & Space Spain. (CDR phase);**
- **Copernicus LSTM MGSE Batch#3: Spacecraft Adapters (prime contractor) – Airbus Defence & Space Spain. (TRR-TRB phase);**
- **ARIEL structural model MGSE (subcontractor) – Airbus Defence & Space, Toulouse, France (TRB phase);**
- ROSE-L Thermal fixture MGSE (prime contractor) – **Thales Alenia Space, Rome, Italy (TRR-TRB phase);**
- CIMR S/C MGSE (prime contractor) - **Thales Alenia Space, Rome, Italy (CDR).**
- CIMR Instrument Transport Container (prime contractor) - **OHB, Milan, Italy (design phase);**

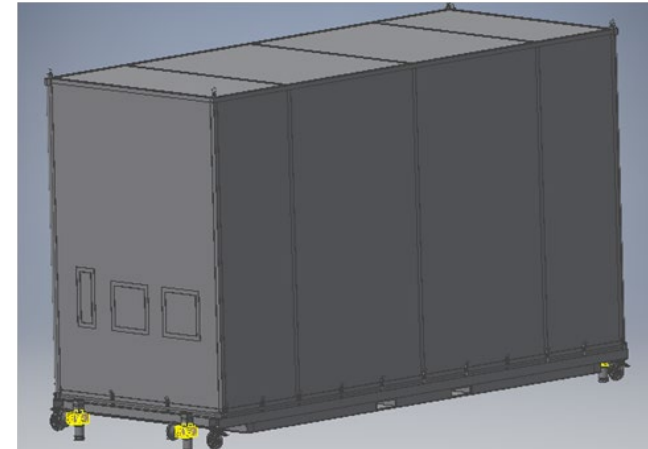
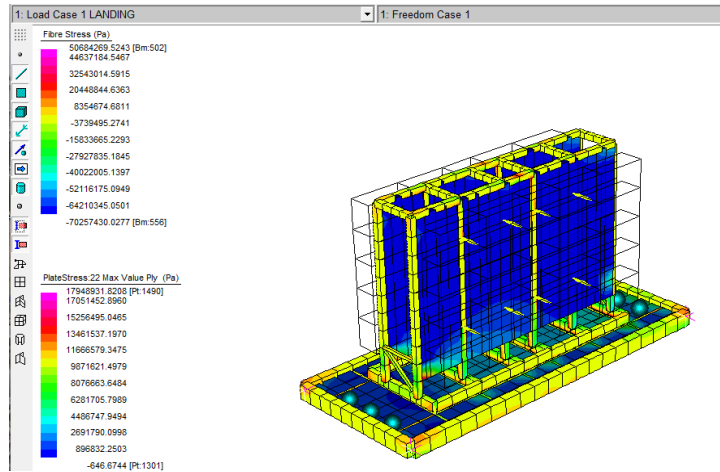
MGSE contracts supporting Quantum Innovation IKE (GR)

- *CHIME PROGRAM –Spacecraft MGSE SATInteg-1 (subcontractor to ADAMANT GR) Final customer:*
Thales Alenia Space, Cannes, France (Manufacturing phase).
- **CRISTAL IRIS Transport Container (prime contractor).**
Thales Alenia Space, Cannes, France (Manufacturing phase).

MGSE: *MetOp-2G Scatterometer* MGSE (Airbus, DE)

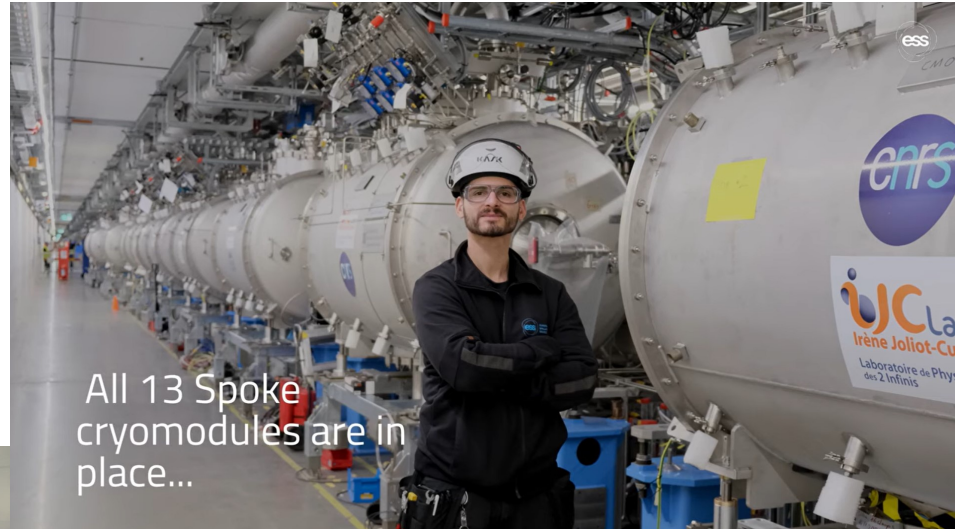
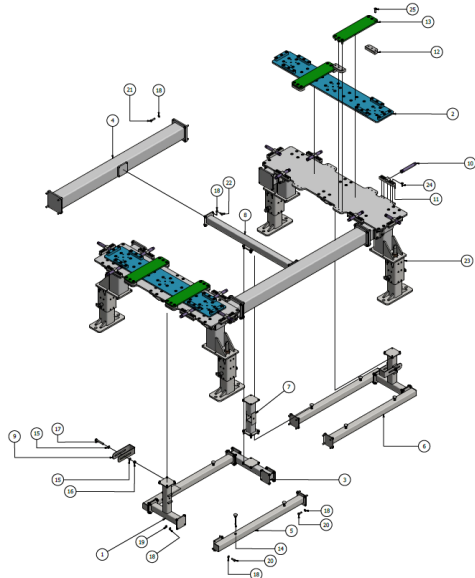


MGSE: Spacebus NEO Solar Array Transport Containers (TAS-F)

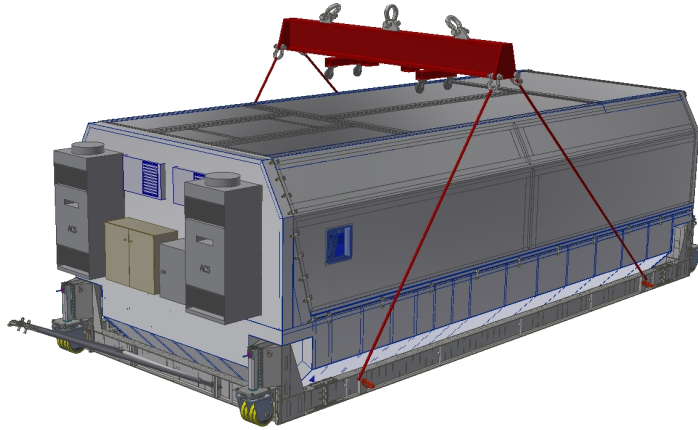


Dimension (L x W x H): 6,0 x 2,4 x 3.5 mt.

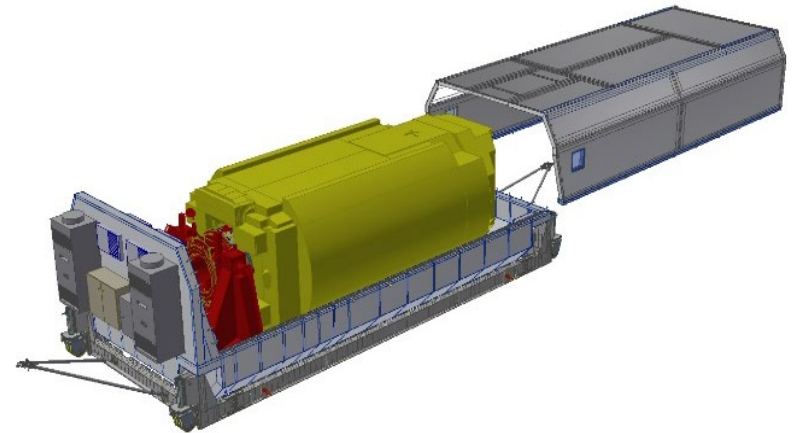
MGSE: Spoke Cryomodule trolley (European Spallation Source, SE)



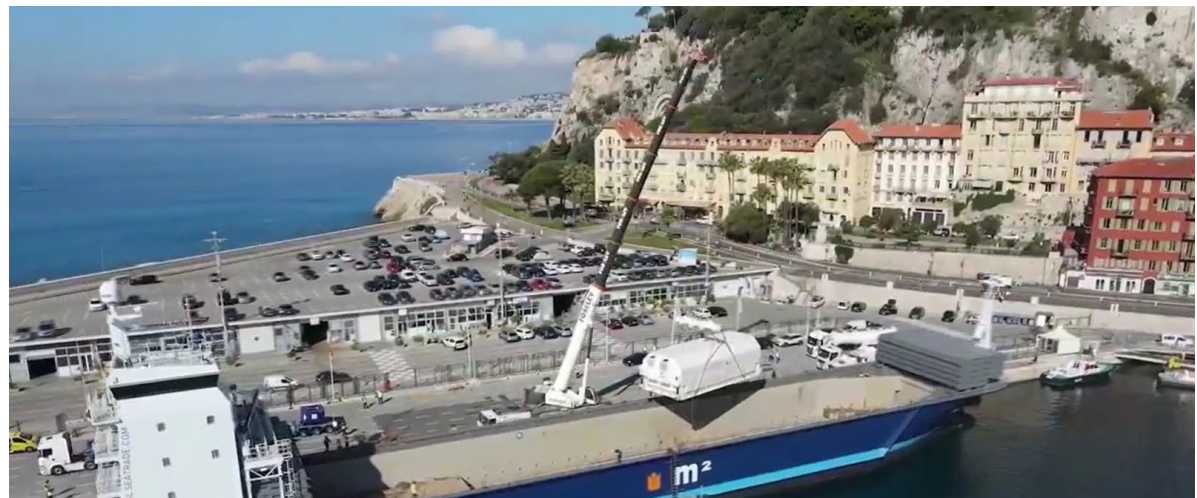
MGSE: Spacebus NEO Satellite Transport Containers (TAS-F)



Dimension (L x W x H): 13,0 x 5,4 x 4,2 mt.

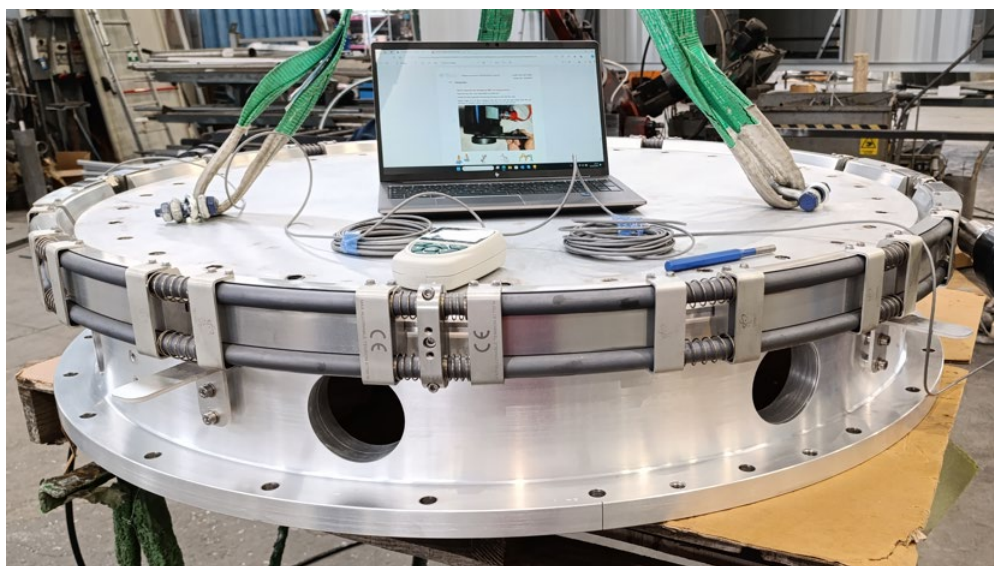


MGSE: Spacebus NEO Satellite Transport Containers (TAS-F)



GROUND HANDLING ADAPTER

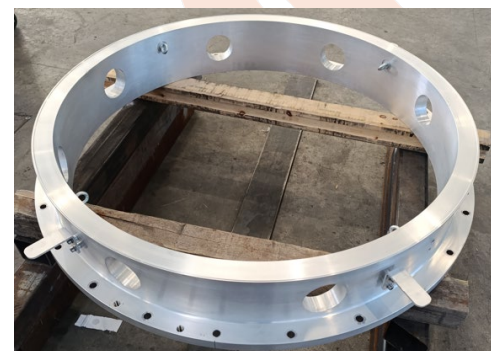
PROJECT:
LSTM



CUSTOMER: AIRBUS MADRID

MAIN FEATURES :

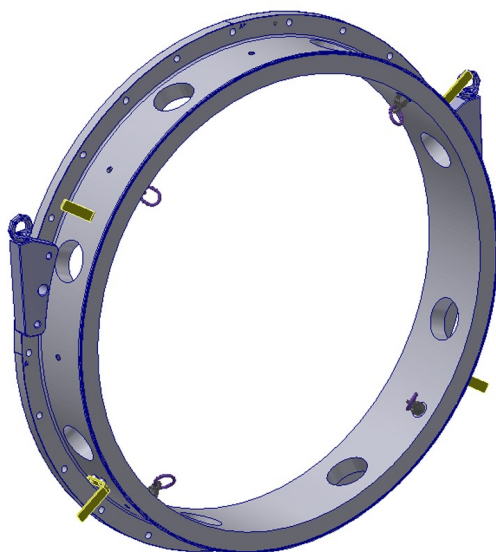
- Forged Al 6061 T6
- Clamp band i/f 1194mm
- SWL: 1460 kg
- Proof tested 4380 kg (in vertical and horizontal orientation)
- ISO 8 clean room level



GROUND HANDLING ADAPTER

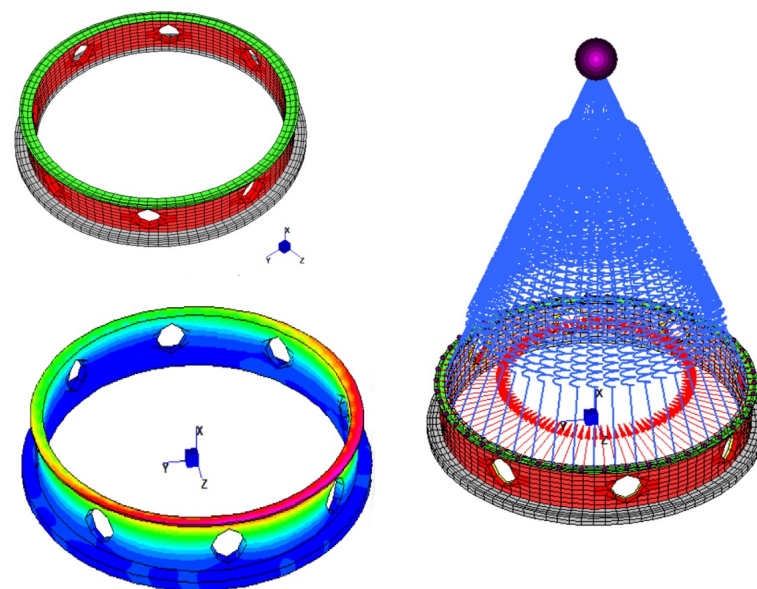
PROJECT:
LSTM

CAD MODEL



CUSTOMER: AIRBUS MADRID

FEM MODEL



TRASPORT CONTAINER FOR STRUCTURAL MODEL

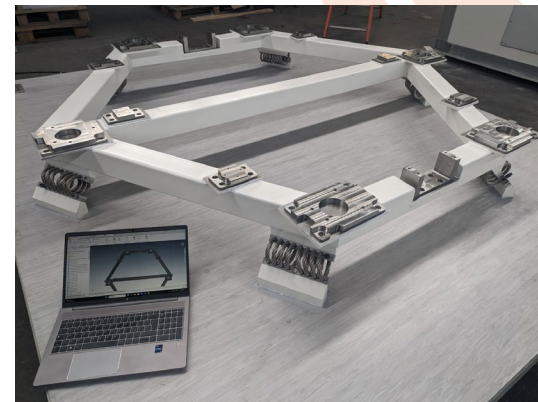
PROJECT:



CUSTOMER: AIRBUS TOLOUSE

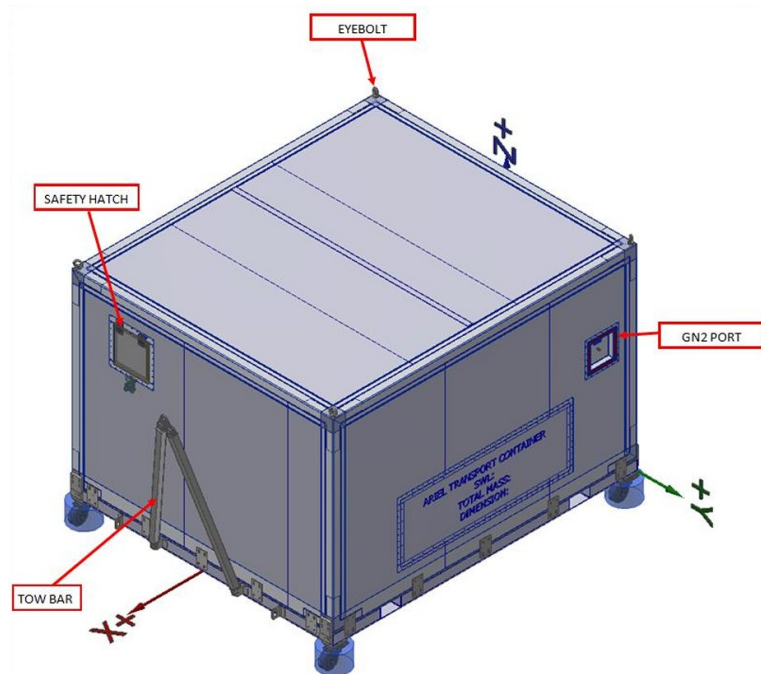
MAIN FEATURES:

- LxWxH = 3090x2550x2110 [mm]
- IATA compliant for flight transport
- Passive thermal controlled
- Nitrogen purging for the control of the internal environment
- SWL: 471,5 kg
- Proof tested: 707,25 kg
- Iso 8 clean room level



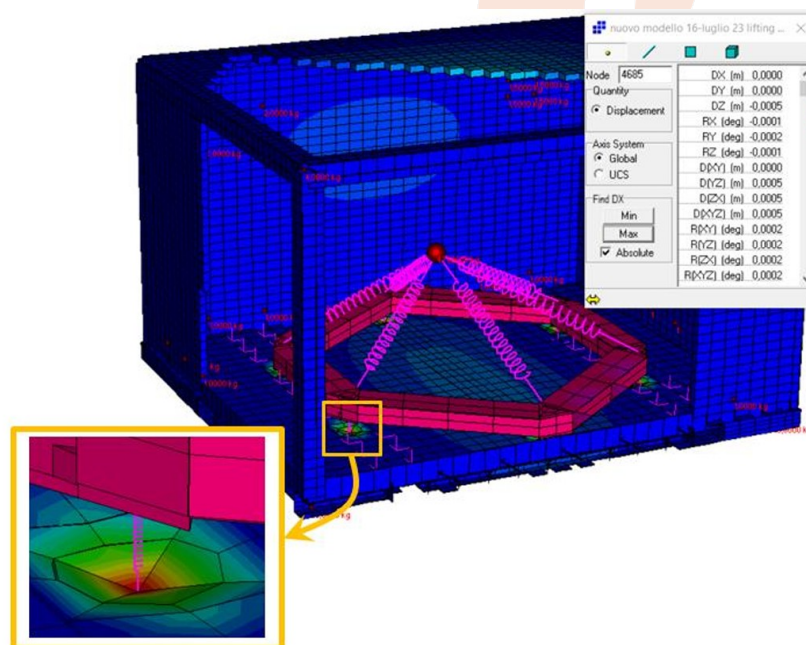
TRASPORT CONTAINER FOR STRUCTURAL MODEL

PROJECT:
ARIEL
CAD MODEL



CUSTOMER: AIRBUS TOLOUSE

FEM MODEL



TURN TABLE TROLLEY FOR FLIGHT INSTRUMENT

PROJECT: CHIME



CUSTOMER: OHB GERMANY

MAIN FEATURES:

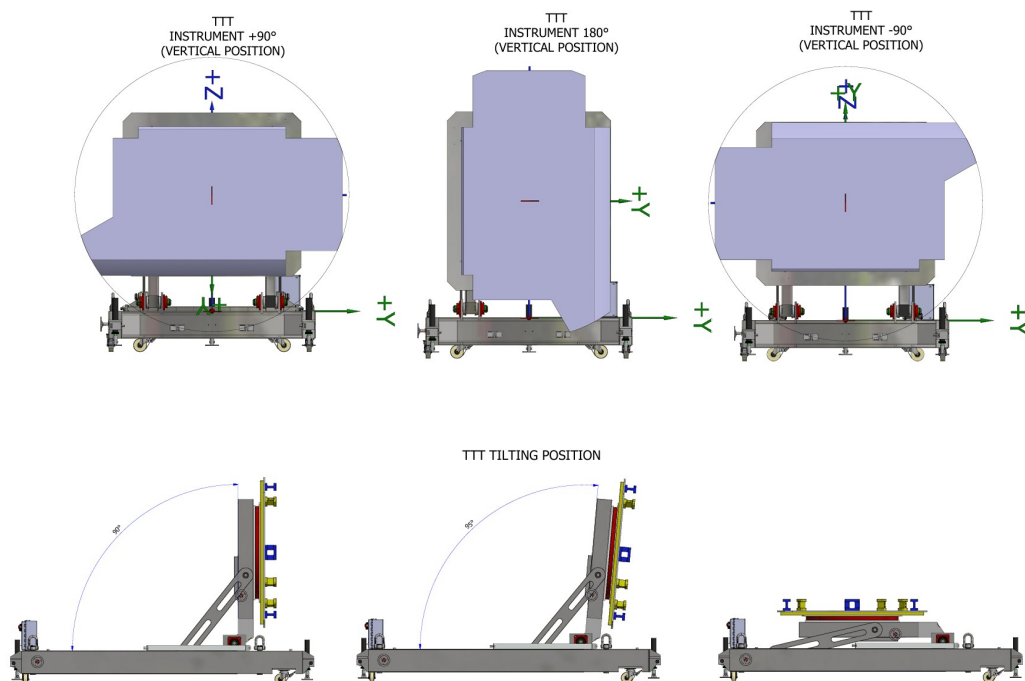
- Complete structure in stainless steel
- High standard for cleaning and cleanability
- Fully motorized for both movement;
- Tilting range for the payload: (0°;95°)
- Rotation range for the payload (-180°;+180°)
- SWL: 750 kg
- Proof tested: 1500 kg
- Iso 5 clean room level



TURN TABLE TROLLEY FOR FLIGHT INSTRUMENT

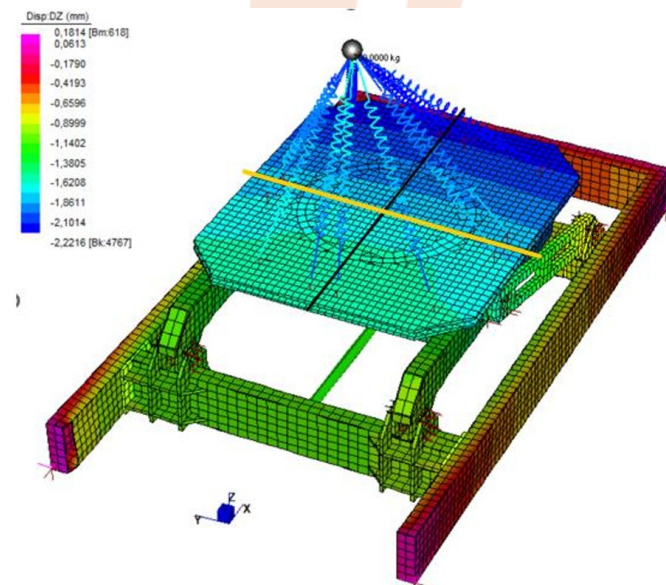
PROJECT: CHIME

CAD MODEL



CUSTOMER: OHB GERMANY

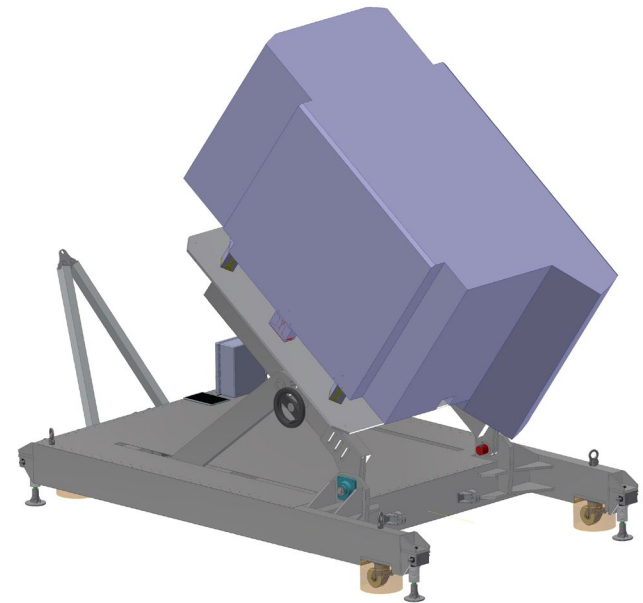
FEM MODEL



Ongoing Mechanical Ground Support Equipment contracts

CHIME Instrument MGSE

OHB-DE (Munich) – ongoing (TRB)



VERTICAL INTEGRATION STAND

PROJECT:
CRISTAL

CUSTOMER: AIRBUS GERMANY

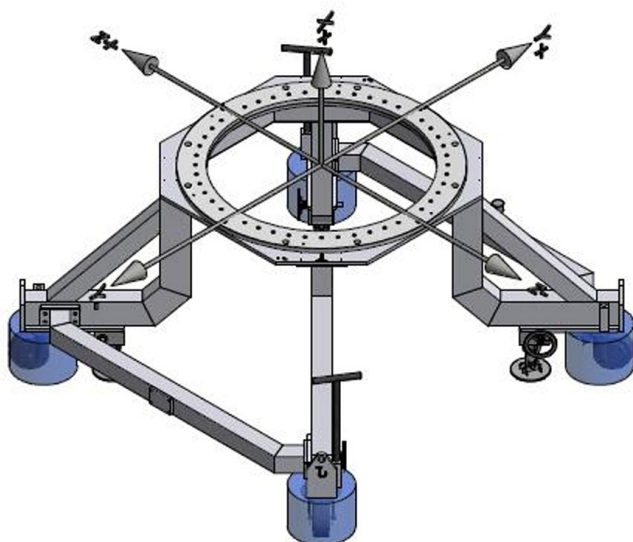
MAIN FEATURES:

- Atex compliant
- Designed to be used during the integration phases for the Cristal s/c in vertical position
- Designed to permit the charging of the propellant in the s/c on the launch site
- SWL: 2300 kg
- Proof tested: 4600 kg
- Iso 8 clean room level



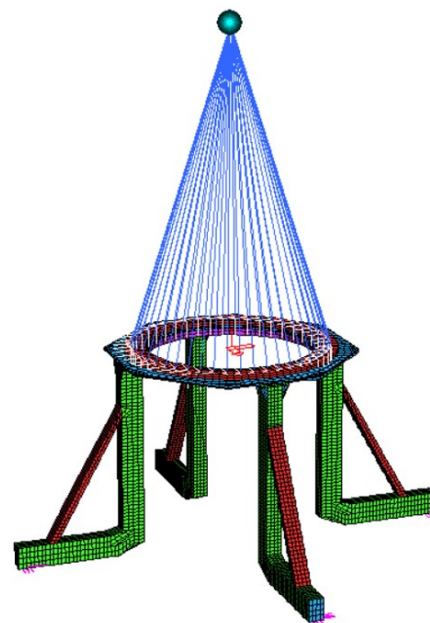
VERTICAL INTEGRATION STAND

PROJECT:
CRISTAL
CAD MODEL



CUSTOMER: AIRBUS GERMANY

FEM MODEL



LIFTING DEVICE

PROJECT:
CRISTAL



CUSTOMER: AIRBUS GERMANY

MAIN FEATURES:

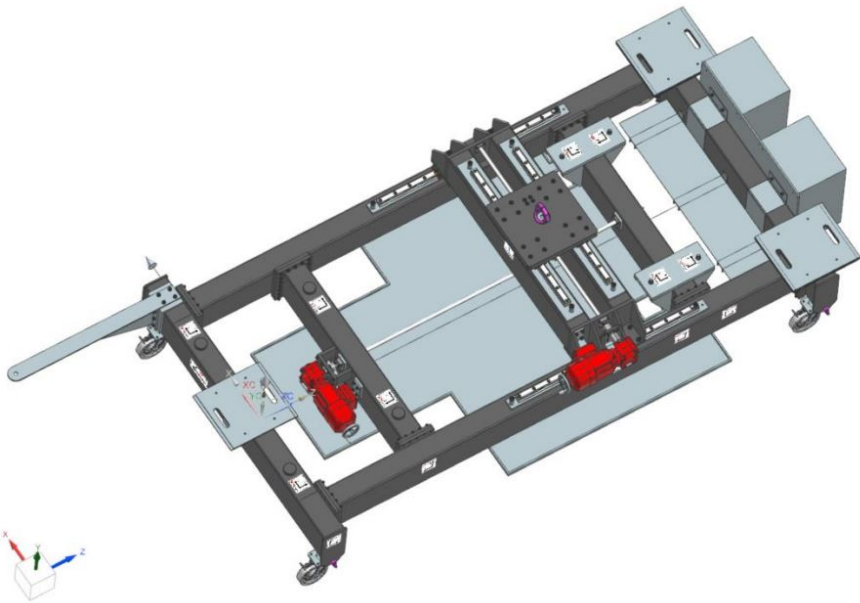
- Atex compliant
- Fully motorized along both axis
- Designed to be used during the integration phases for the Cristal s/c in vertical and horizontal position
- SWL: 2300 kg
- Proof tested: 4600 kg
- Iso 8 clean room level



Ongoing Mechanical Ground Support Equipment contracts

CRISTAL operational MGSE

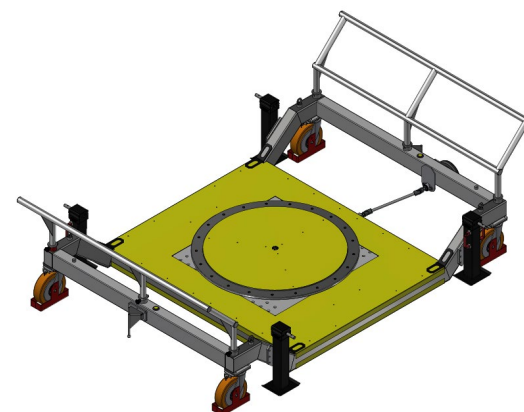
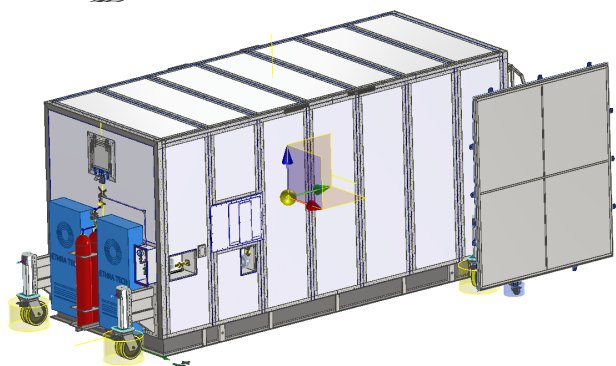
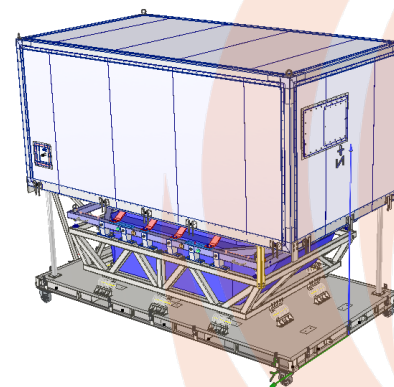
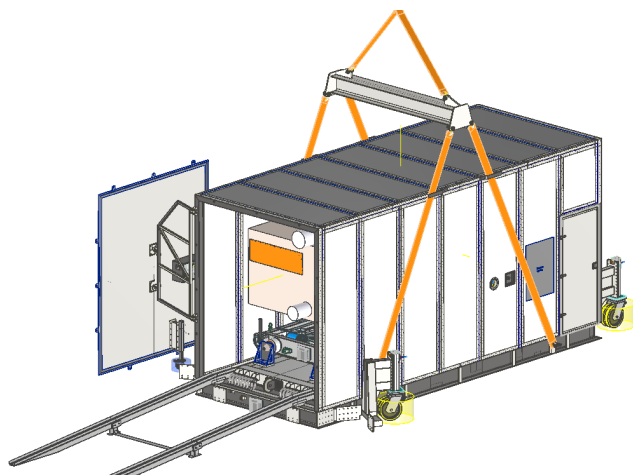
Airbus Defence & Space, DE (Friederishafen)



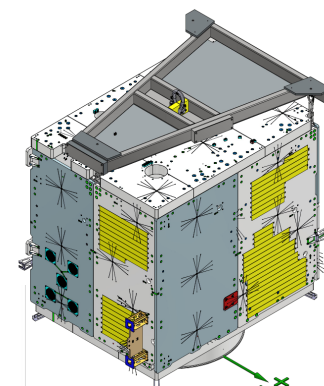
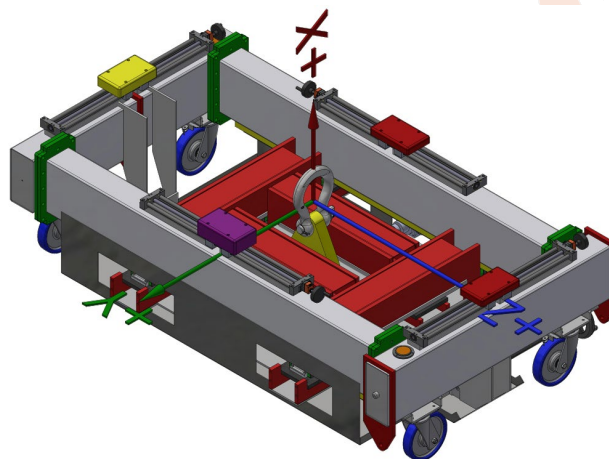
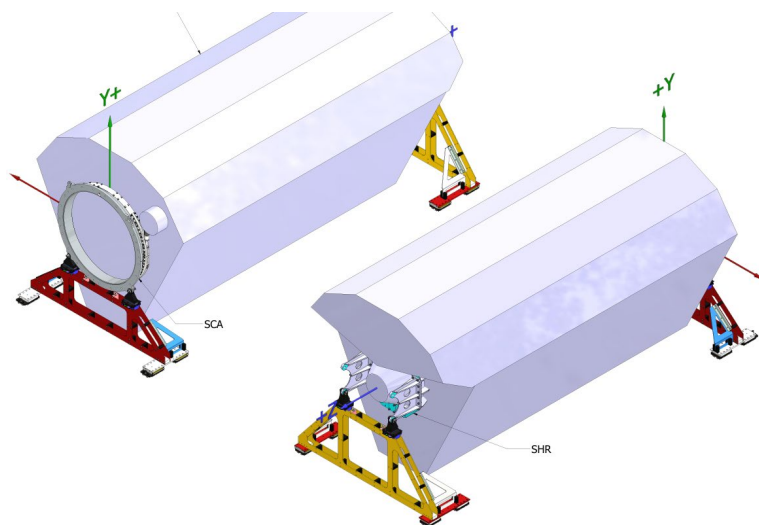
Lifting Device (motorized)



On going project...



On going project...



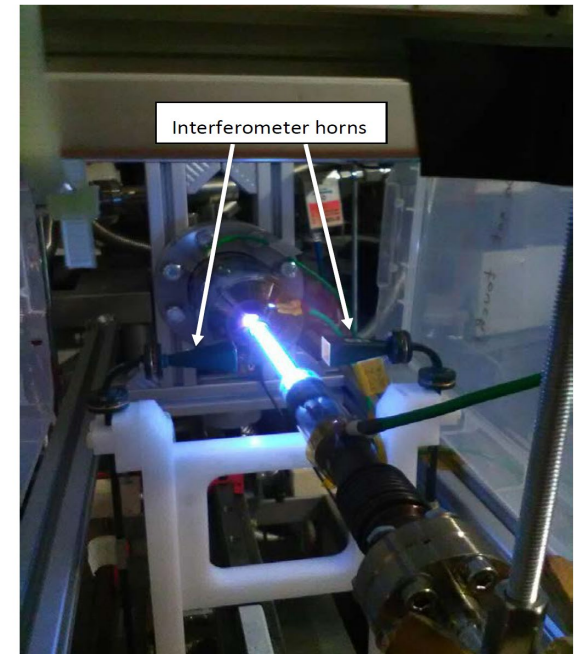
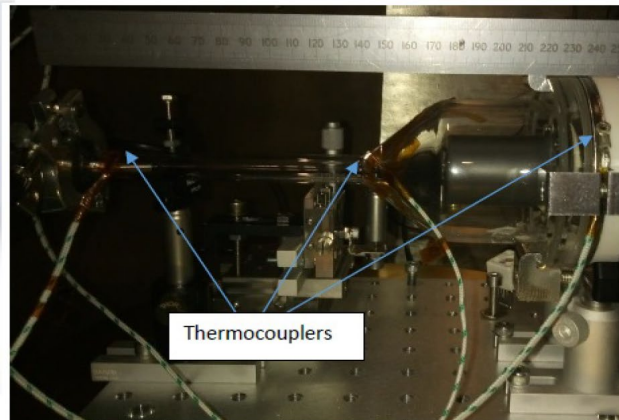
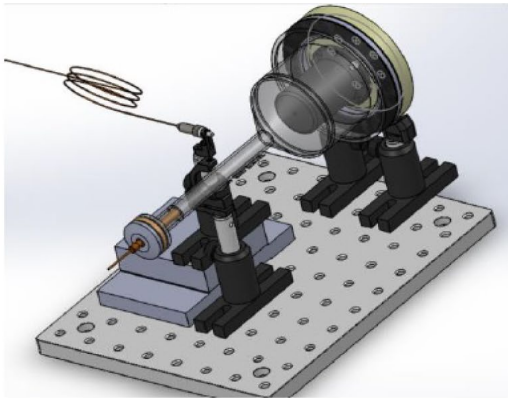
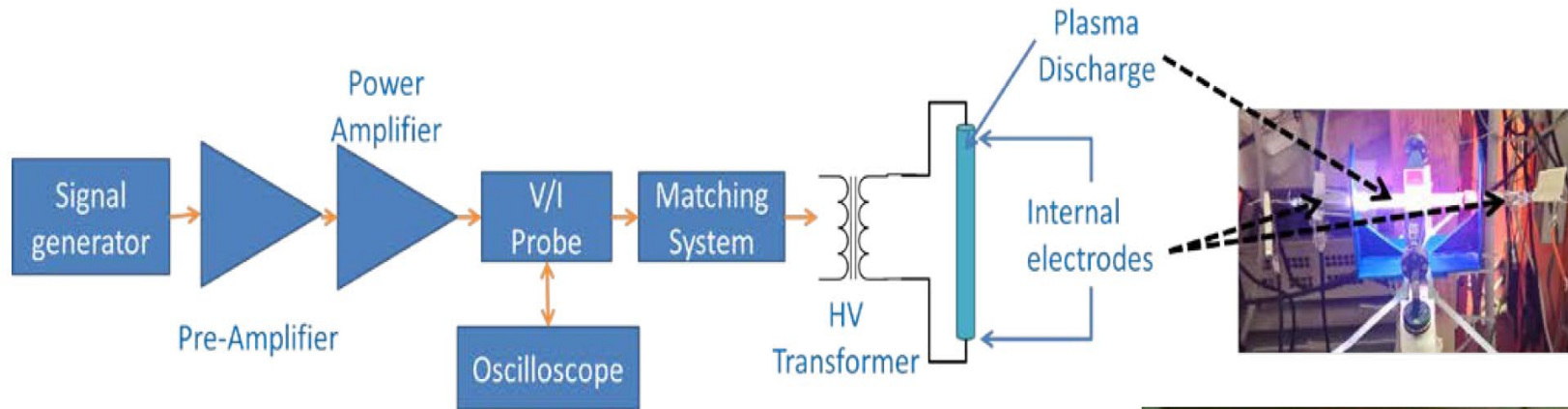
Ongoing RTD Projects

- **H2020-eUMaP** – *Development of Utilities Management Platform for the case of Quarantine and Lockdown.* (www.eumap-project.eu)
- **H2020-EYE** – *Economy bY space. Monitoring economic trend under crisis situations including the spread of Covid-19 pandemic using space assets.* (www.economy-by-space.eu)
- **HORIZON-MSCA-2021-SE-01-01-ERA4CH** – *Earthquake Risk plAtform For european cities Cultural Heritage protection.*
- **Legge 808/85 – Bando 2019 – Progetto ANEMONE** - *ANtEnna Metamateriale OriENtabile Elettronicamente – Cofunded by Italian Ministry of Economic Development (MISE)*
- **HORIZON-EIC-2022-PATHFINDEROPEN-01-01 PULSE** – *Plasma reconfigurable metasurface technologies.* (www.pulse-pathfinder.eu)
- **METEORITE (PNRR)** – X-band metamaterial lens.
- **SMART (PNRR)** – Ku band metamaterial lens.

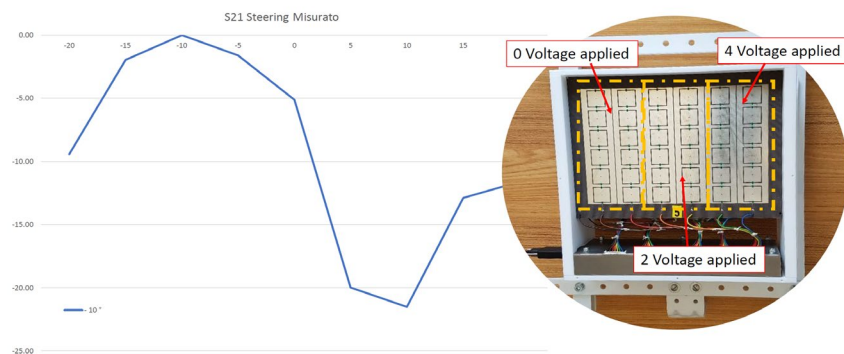
New RTD & engineering Projects

- **Horizont Europe - DETECTOR** – *Development and demonstration of scientific instrumentation for Geology and Archaeology. GAP phase, 12 partners from Italy, Greece, Cyprus, Spain, Argentina, USA. KO 1st September 2025.*
- **ASI – MERLIN** – *Metamaterial lens and reflector for Ka/Ku bands in cooperation with University Roma3 and CNR-IMM Istituto per la Microelettronica e Microsistemi,. Contract signature. KO planned Mid July 2025.*
- **Telespazio – Lunar Communication and Navigation System (LCNS)** *Engineering support for on board software, EGSE and TT&C PDR data package documents. Order signed, KO planned June 2025.*
- **Elettronica – CORAL Steering Turret** – *Design and verification of a test system for missile air-to-air and ground-to-air aerial countermeasures. Order signed, KO planned in June 2025.*

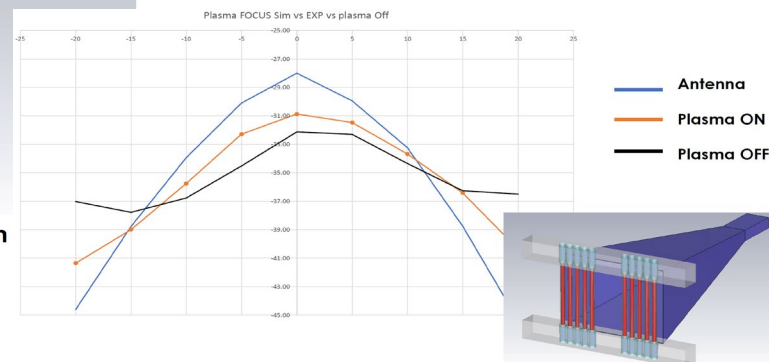
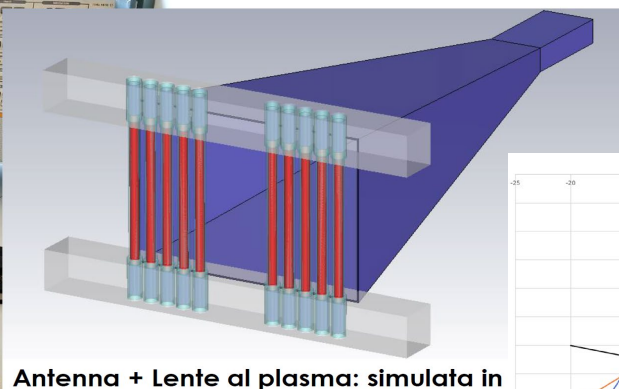
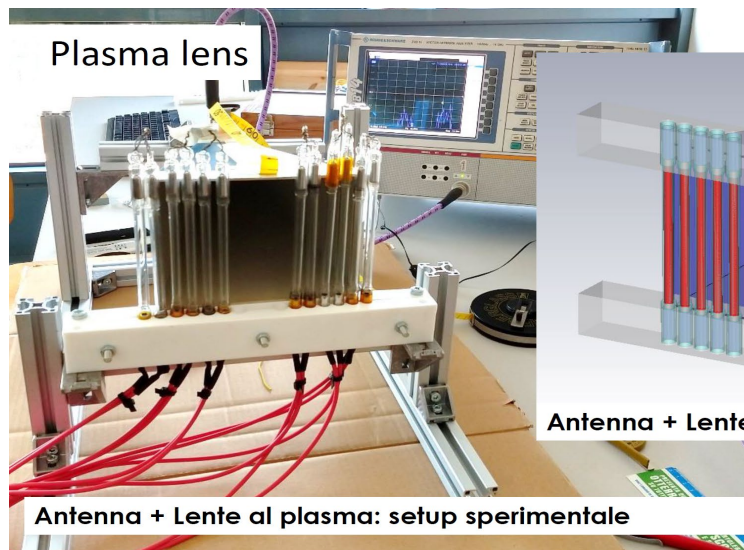
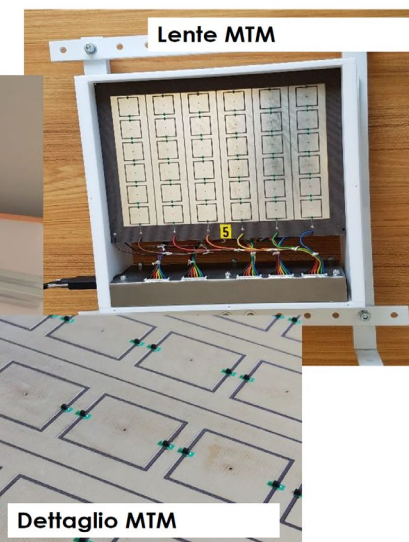
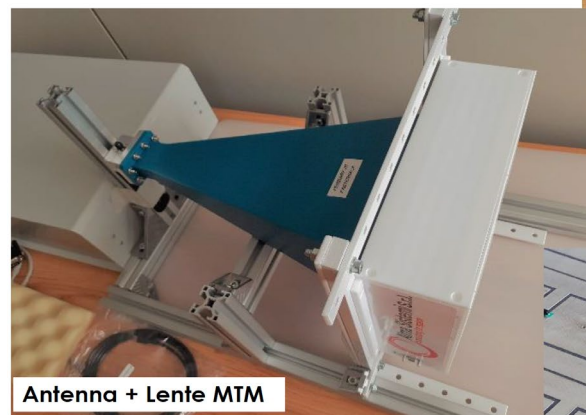
RTD Projects: PATH



RTD Projects: Metamaterial & Plasma Antenna

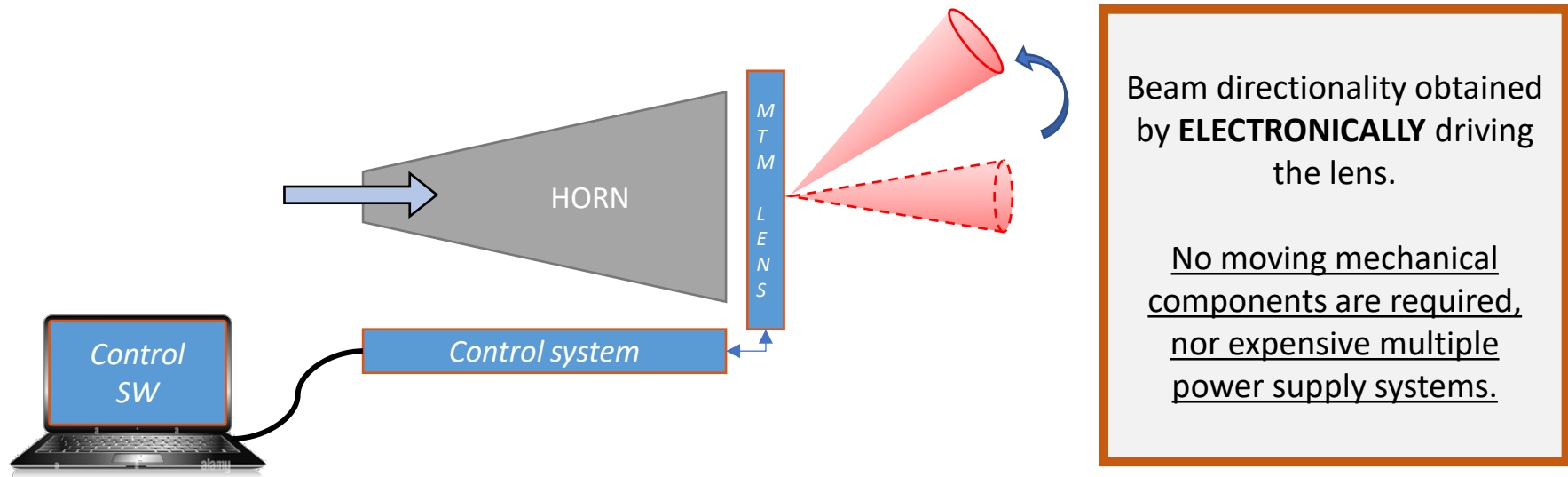


Metamaterials lens



Directive Antennas based on metasurface lens

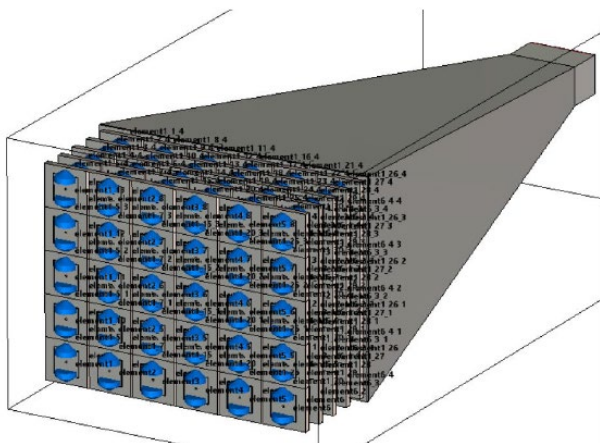
The goal of this R&D activity is to **design, manufacture** and **test MTM/MTS lens** capable of both transmitting and receiving in the Ku/K/Ka band. **Electronically controlled metasurface technology** is used to create the lens.



- Projects:
 - ANEMONE (L 808/85 – MISE) (Ku band: 12-18 GHz), technology varactor
 - METEORITE (PNRR) (X band: 7-12 GHz), technology pin-diodes
 - SMART (PNRR) (Ka band: 24-26 GHz), mixed technology varactor & pin-diodes
 - PULSE (Horizon Europe), (8-12 GHz) technology plasma elements and metasurfaces

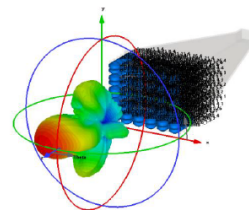
Ongoing RTD Projects: ANEMONE

ANEMONE (12.4 – 18 GHz)



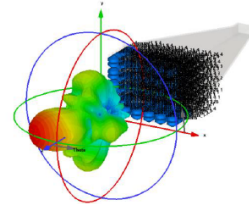
3D printed support

Diagramma di radiazione 3D 14.0 GHz
(steering 12°)



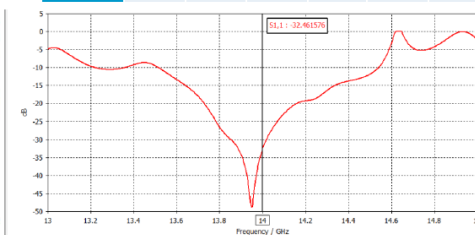
Radfield (2-140) [1]
Type: Radfield
Approximation: analytical (N x 1)
Component: dB
Output: Directivity
Frequency: 14.0 GHz
Rad. Eff.: 0.210 dB
Tot. Eff.: 0.222 dB
Gain: 17.22 dB

Diagramma di radiazione 3D 14.0 GHz
(steering 22°)

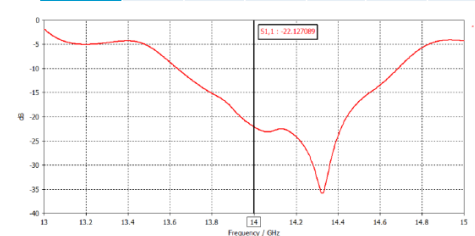


Radfield (2-140) [1]
Type: Radfield
Approximation: analytical (N x 1)
Component: dB
Output: Directivity
Frequency: 14.0 GHz
Rad. Eff.: 0.210 dB
Tot. Eff.: 0.222 dB
Gain: 17.22 dB

	1	2	3	4	5	6
Steering 10°	2.37	2.62	2.40	0.86	0.51	0.35
Steering 20°	2.08	1.45	0.66	0.45	0.41	2.49

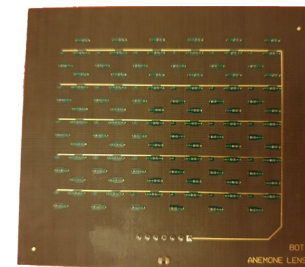
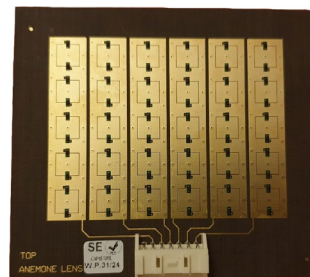
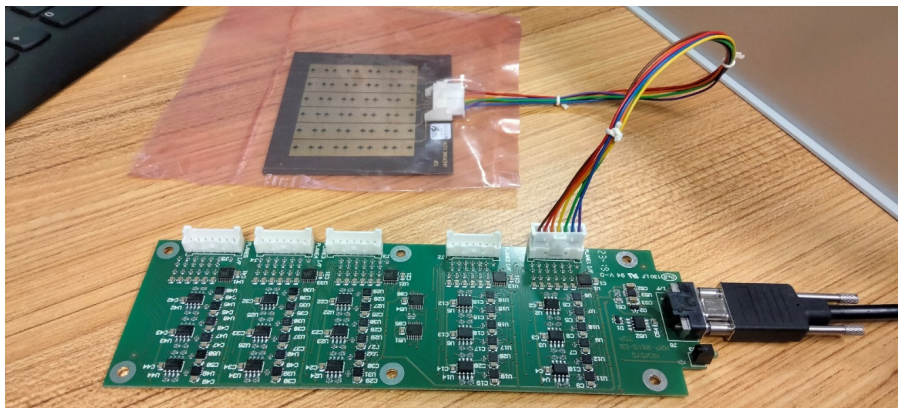


	1	2	3	4	5	6
Steering 10°	2.37	2.62	2.40	0.86	0.51	0.35
Steering 20°	2.08	1.45	0.66	0.45	0.41	2.49

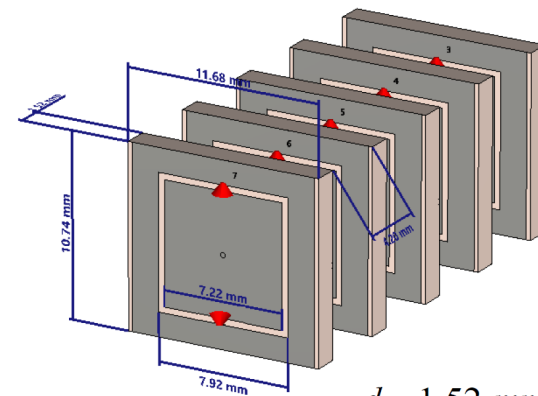
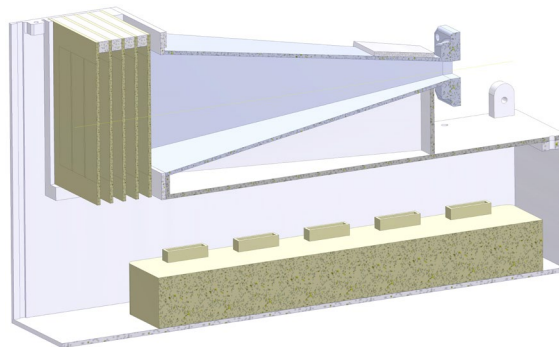
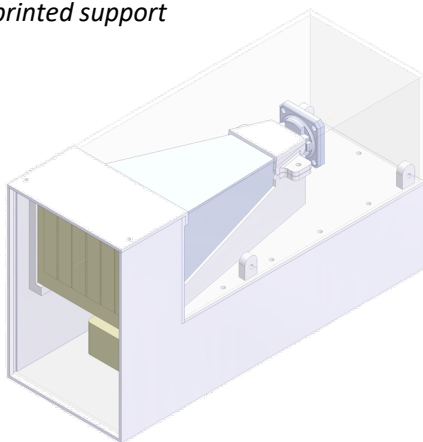


Ongoing RTD Projects: ANEMONE

ANEMONE (12.4 – 18 GHz)



3D printed support

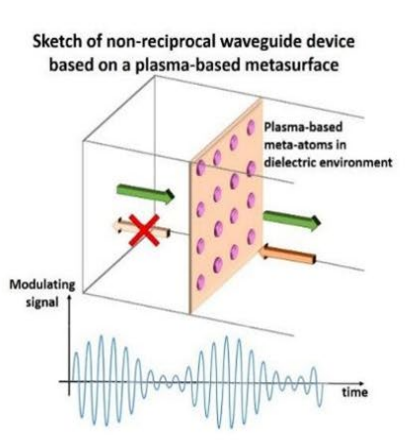


$$d = 1.52 \text{ mm}$$

Ongoing RTD Projects: PULSE

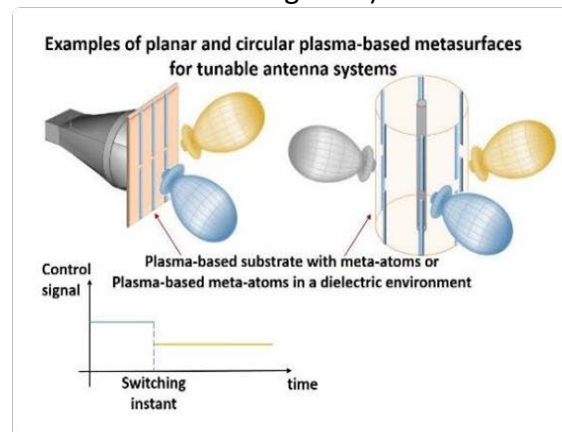
PULSE (8.2 – 12.4 GHz)

Application 1: Tunable lenses for antennas



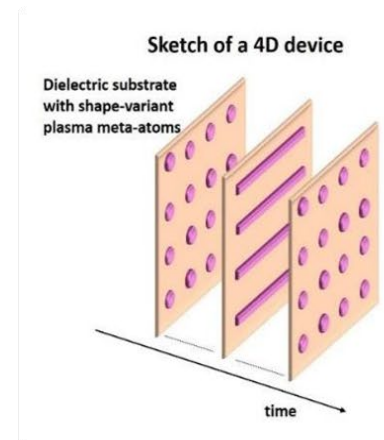
Approach: Plasma meta-atoms in dielectric environment/
plasma substrates with conventional meta-atoms
TRL: 2 to 4

Application 2: Non-reciprocal devices (magnet-less isolator for waveguides)



Approach: time-modulated plasma meta-atoms in dielectric environment
TRL: 2 to 4

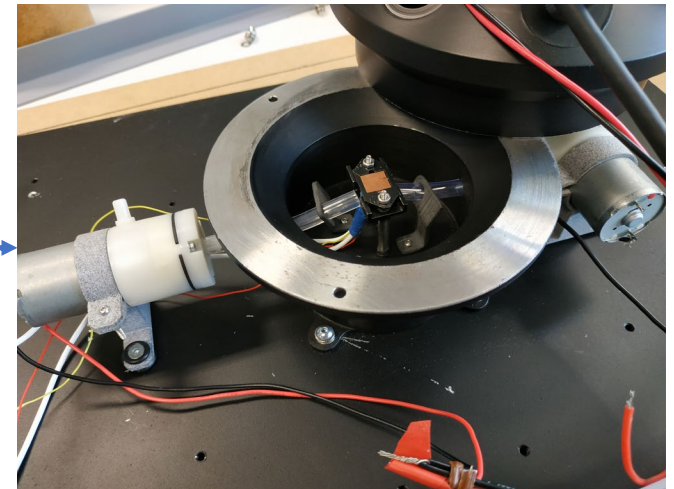
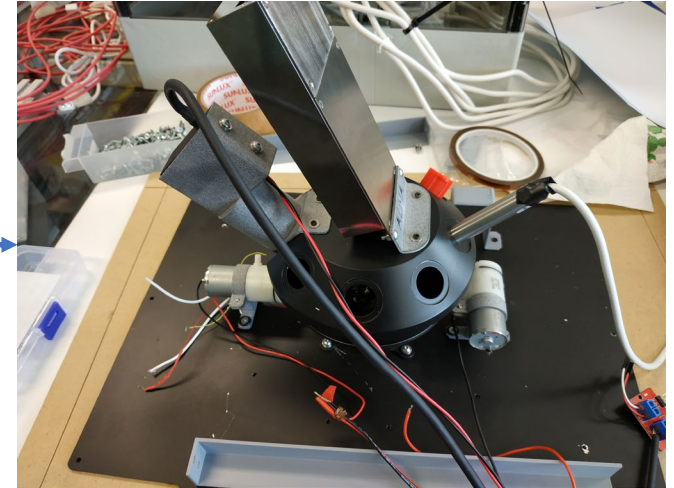
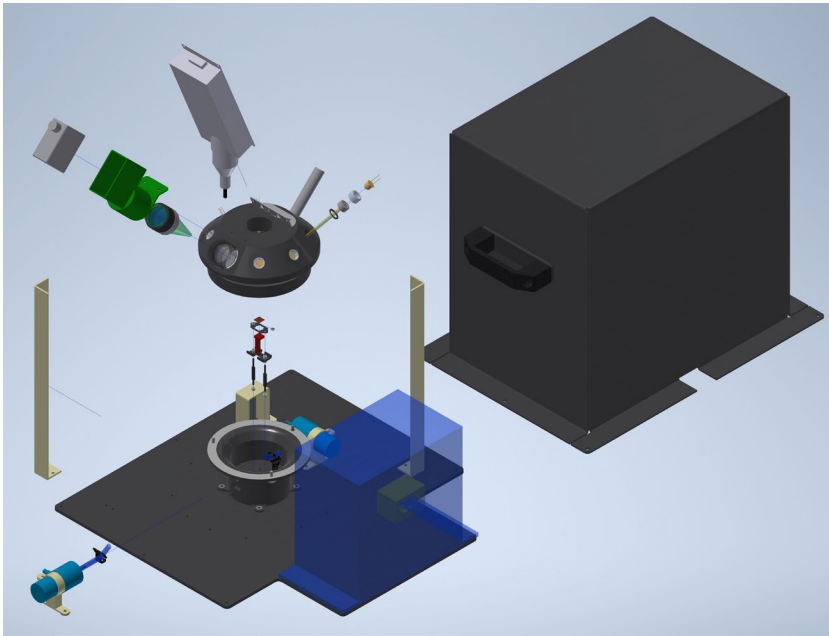
Application 3: 4D devices (multi/wideband device)



Approach: single time-variant meta-atom in dielectric environment with plasma shape-variant meta-atoms
TRL: 1 to 3

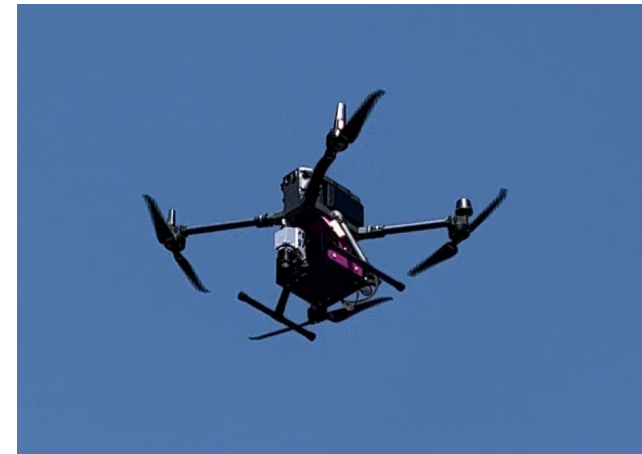
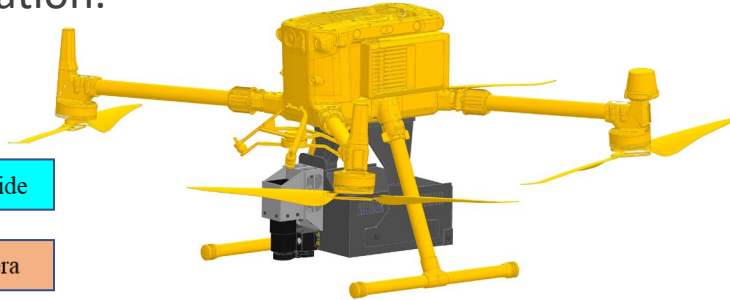
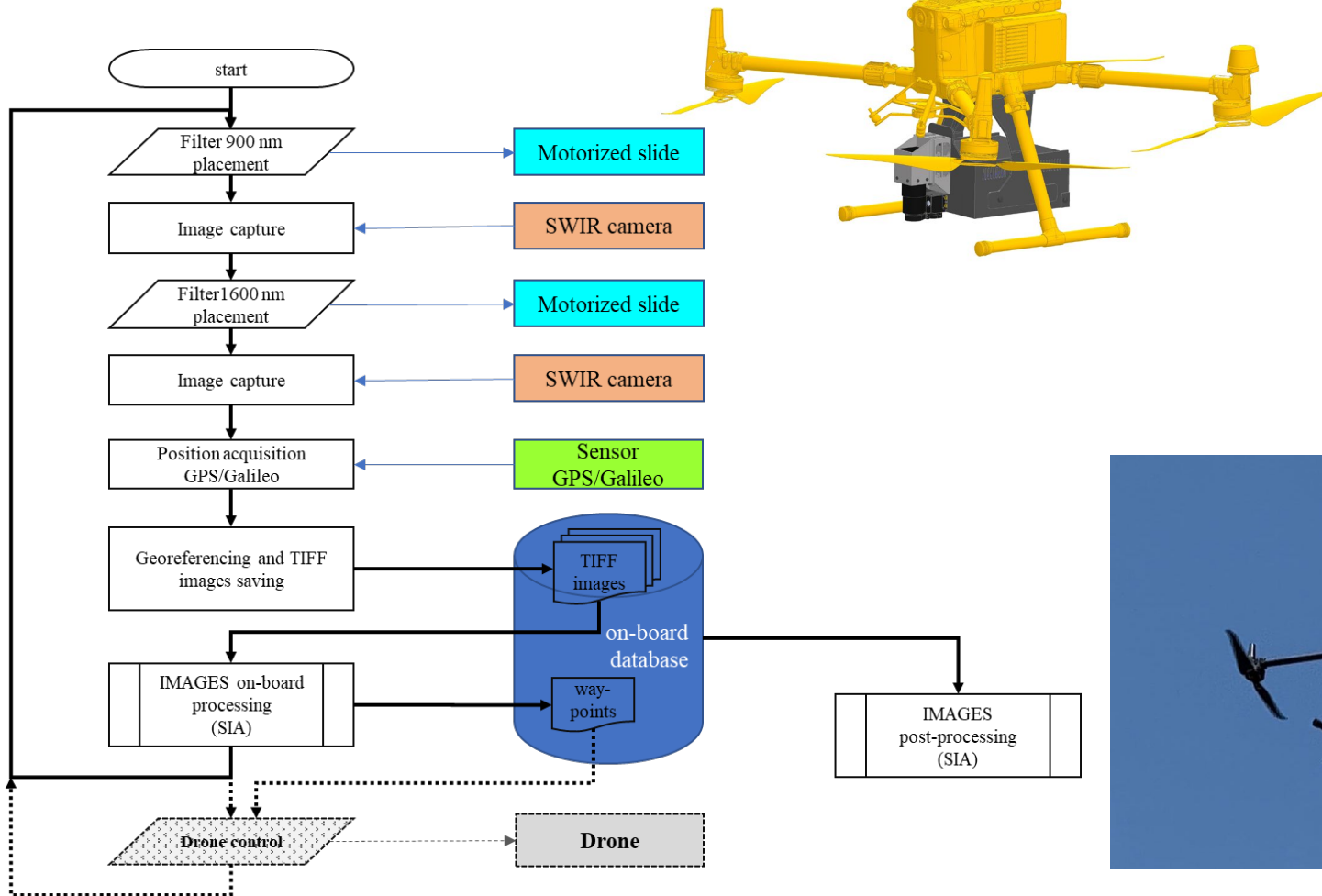
RTD Projects: IN TIME

Miniaturized luminescence dating instrument for Mars and Earth dating applications.

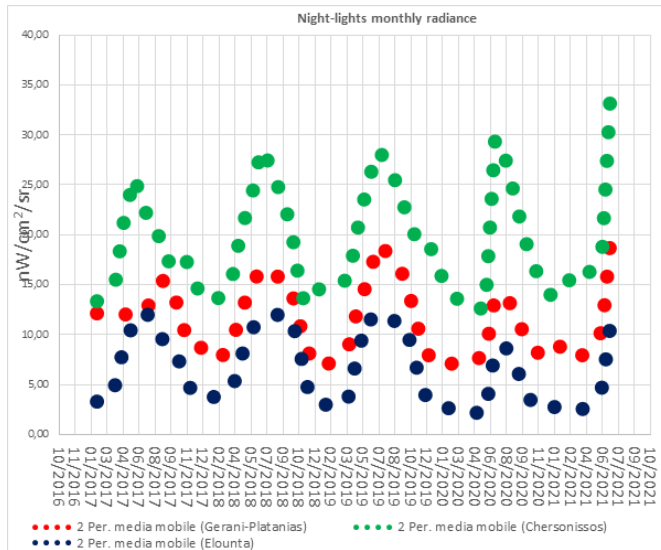


RTD Projects: PEDROS

Drone Sensor for forest fire investigation.



RTD Projects: EYE

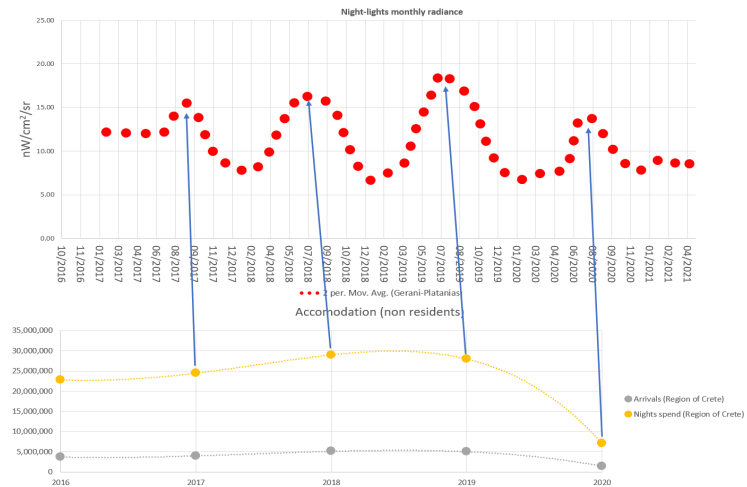


Night light recorded in different sites in Crete 2016-21.



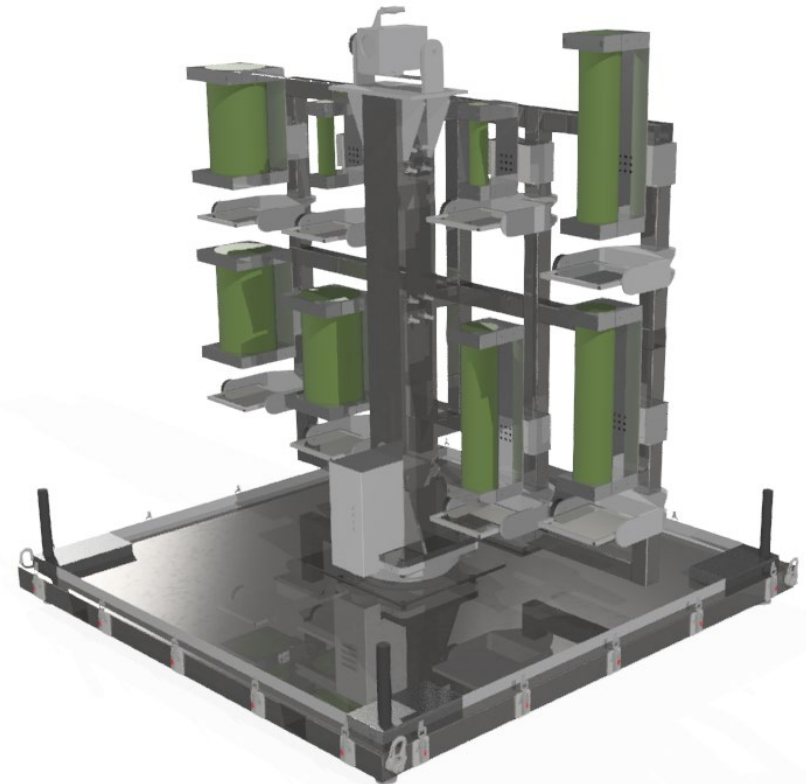
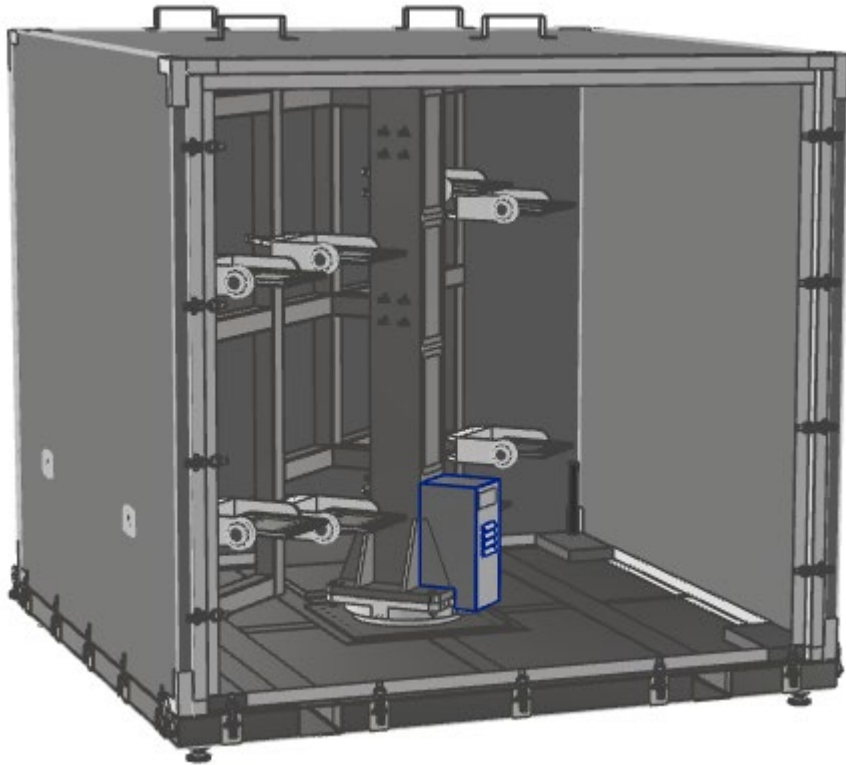
Example of a nightlights monthly composite raster for the city of Heraklion in Crete island.

Automate image processing supported by artificial intelligence algorithms and forecasting models to assess the impact on the economy of the Covid-19 epidemic at different scale.

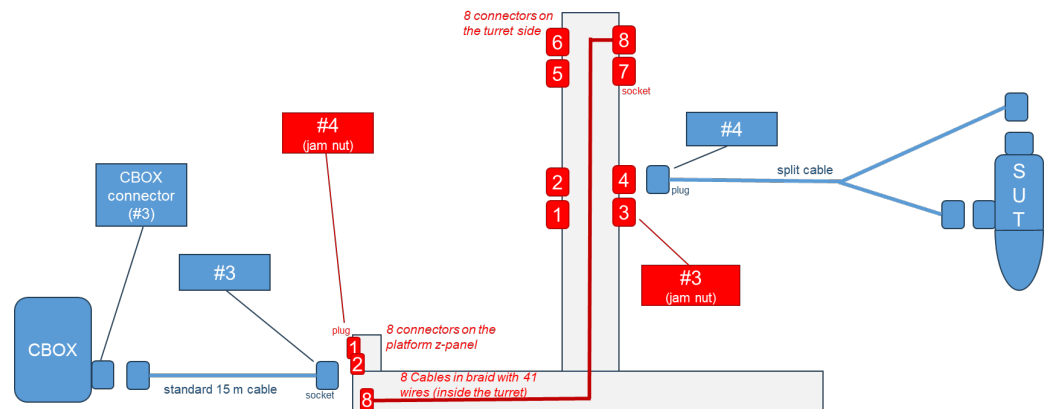
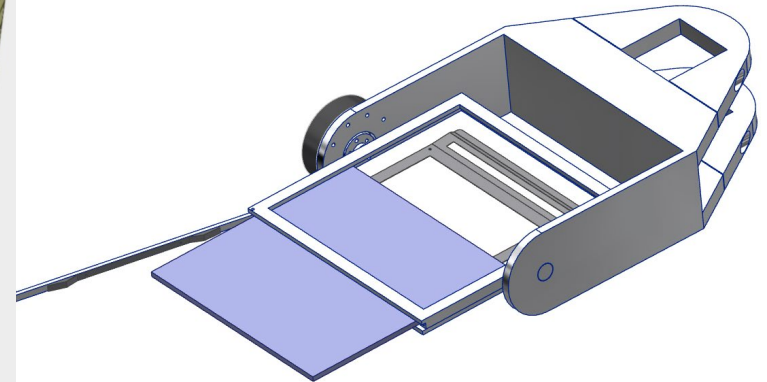
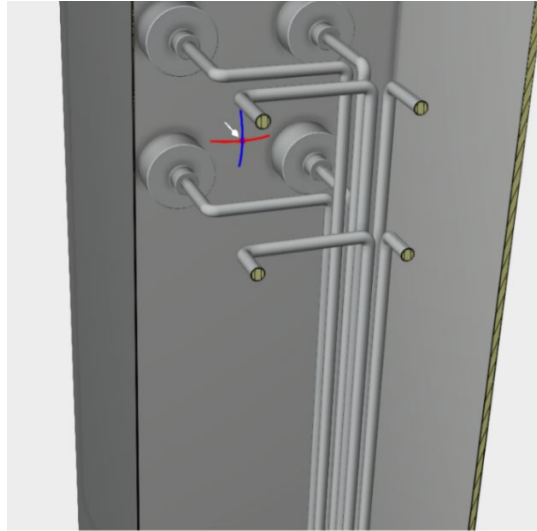
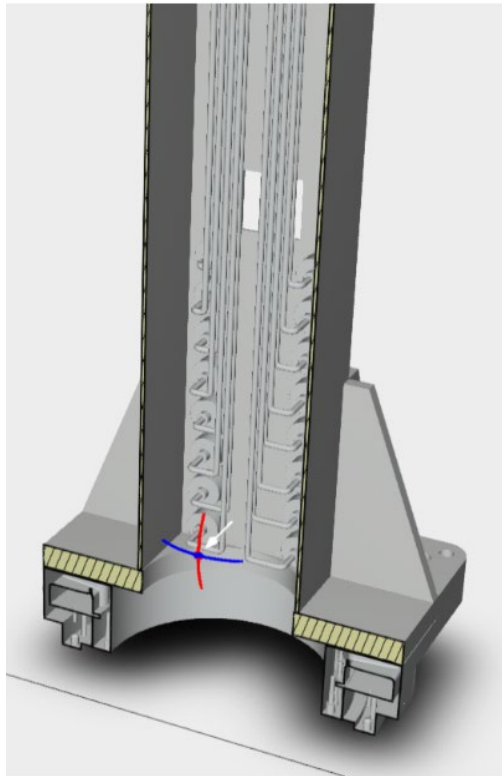


Yearly aggregated economic data related to accommodation and arrivals of non-residents for Crete compared with Night Light indicator of the same period.

Defence project: steering turret Coral



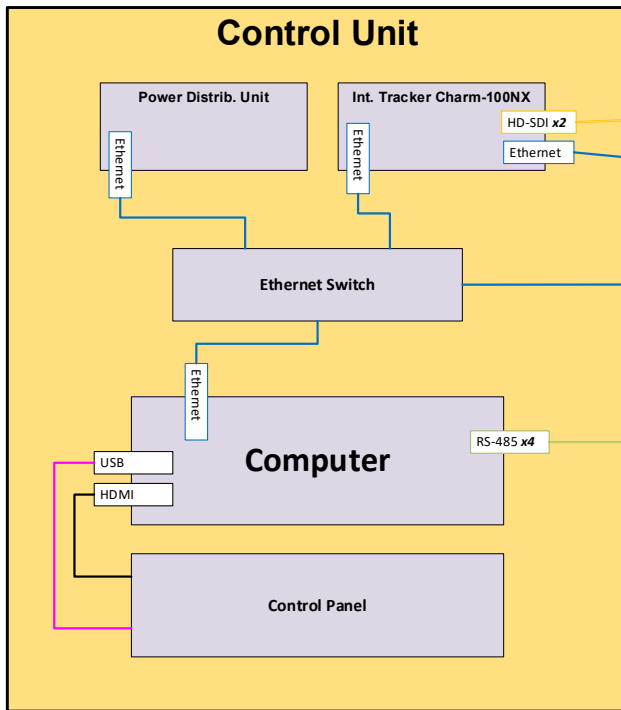
Defence project: steering turret Coral



#3_{in} - Souriau Series 851 07EC 20-41S 50

#4_{in} - Souriau Series 851 07EC 20-41P 50

Defence project: steering turret Coral



- HD-SDI Connections**
- Aiming Camera
- GigE Connections**
- Aiming Camera
- Ethernet Connections**
- Coral Mainframe (x12)
 - Ext. Pc
 - Ext. Track. Source 1
 - Turret controller
 - Aiming Camera GigE
- RS-485 connections**
- Aiming Camera HD-SDI
 - Ext. Pc
 - Ext. Track. Source 2

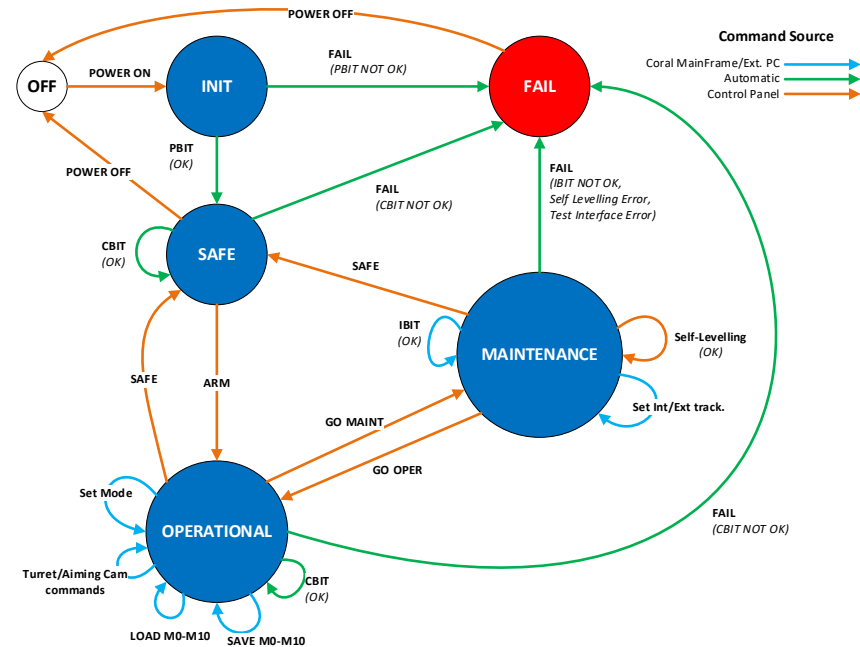
Ethernet ————

HD-SDI ————

RS-485 ————

USB ————

HDMI ————



Customers



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