sener

LISA Pathfinder - 10 years

Markets

Aerospace & Defence

- Space
- Defence
- Science
- Air Traffic Control

Mobility

- High speed railways
- Freight & mainline railways
- Roads & highways
- Airports
- Consultancy & New Technologies
- Architecture
- Water & environment
- Ports

Energy

- Hydrogen & carriers
- Circular economy
- Gas
- Power
- Renewables & storage
- Wind & marine energies
- Sustainable industry

Advanced Facilities

- Quark: engineering and architecture for Data Centers.

QUARK sener Group

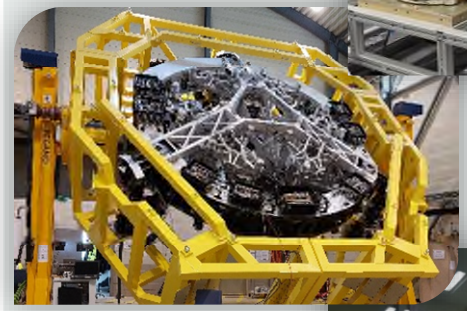
Sener Aerospace & Defence

Product Lines

Electromechanical Systems

JUICE BOOM

SCANER MTG

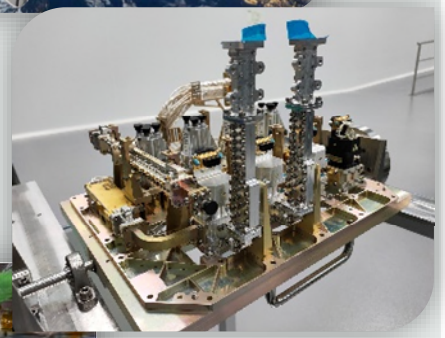


M2 ELT CELL

ACS IRIS-T SL

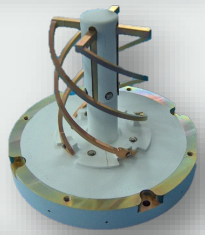
Communications

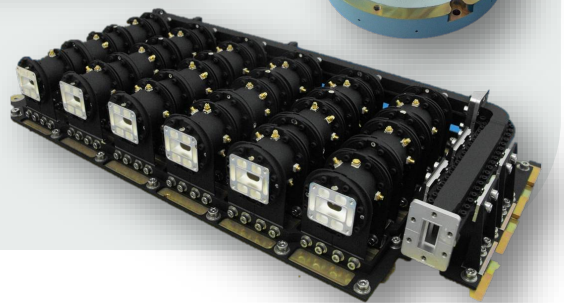
ANTENNAS KA/Q



LNAS ONESAT

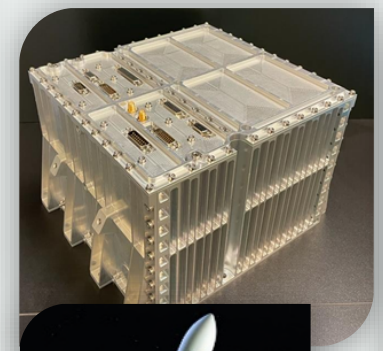
RAD. S. SPAINSAT





Navigation

SPACE RIDER



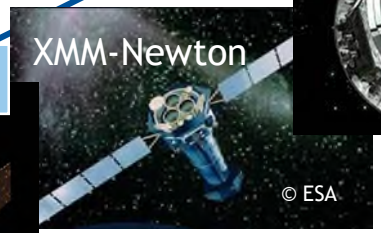
NAVIGA

EUCLID AOCS

Sener: 30 years in Science Missions

1995

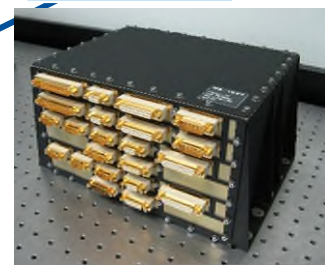
1999



2004

HERSCHEL/PLANCK

2009



LISA-PF
Data Management Unit

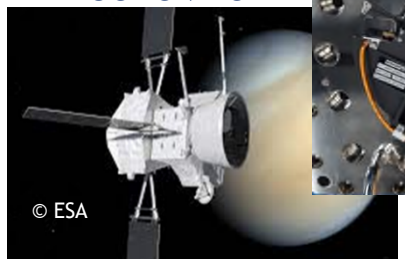
2013

2015

GAIA
Parasol Desplegable
Mecanismo M2

SOLAR ORBITER
Antenas
Electrónica Instrumentos

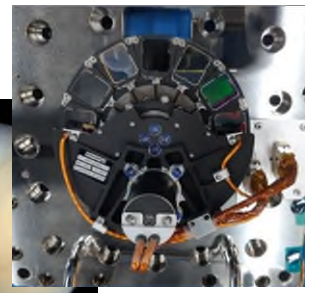
2018



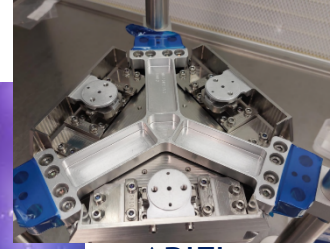
BEPICOLOMBO

2020

2023



JUICE
Deployable Boom
Janus y Gala



ARIEL
Mec. M2

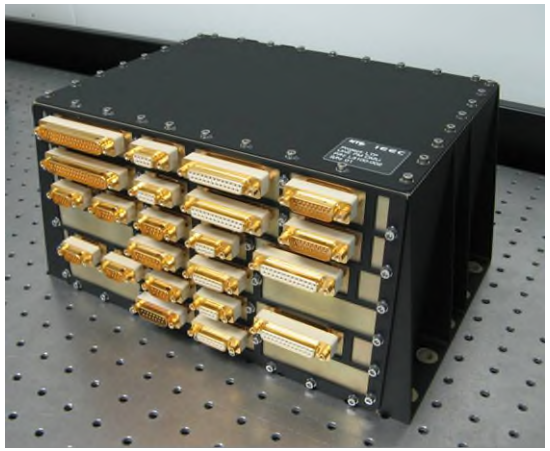
2024

COMET INTERCEPTOR
Plataforma B2
Elec. Instrumentos

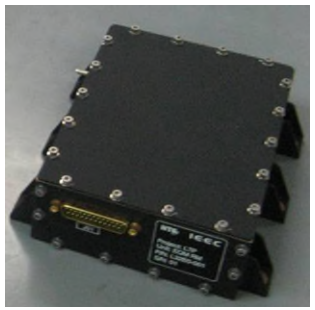
LISA
DACU, MLTS
HGA

LISA - Data & Diagnostics Subsystem (DDS)

LISA TECHNOLOGY PACKAGE

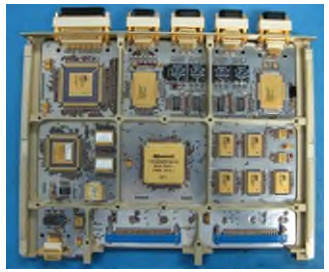


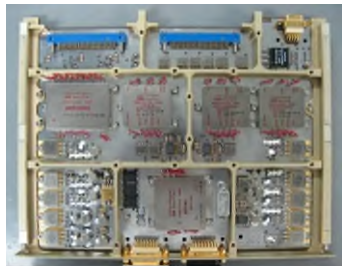
Data Management Unit (DMU)



Radiation Monitor (RM)

- Under IEEC contract and financed by Plan Nacional.
- The Data & Diagnostics Subsystem (DDS) consists of:
  - Data Management Unit (DMU) embedded equipment and software that is in charge of:
    - the control of the Interferometer stability (laser and phasemeter closed loop regulation)
    - the acquisition of the metrology science data
  - Diagnostic equipment
    - diagnostic sensors which shall monitor the LTP payload for certain physical properties during LTP operation
    - sensor drivers and control
- S/C interfaces:
  - it provides the interface to the S/C On-Board Data Handling System for the optical metrology data
  - command and control interface to the S/C with the exception of the attitude control of the test masses which is controlled by the S/C DFACS loop directly.
- In addition, the DDS takes over the role of the LTP controller for HK-TM acquisition and TC distribution within the LTP units.





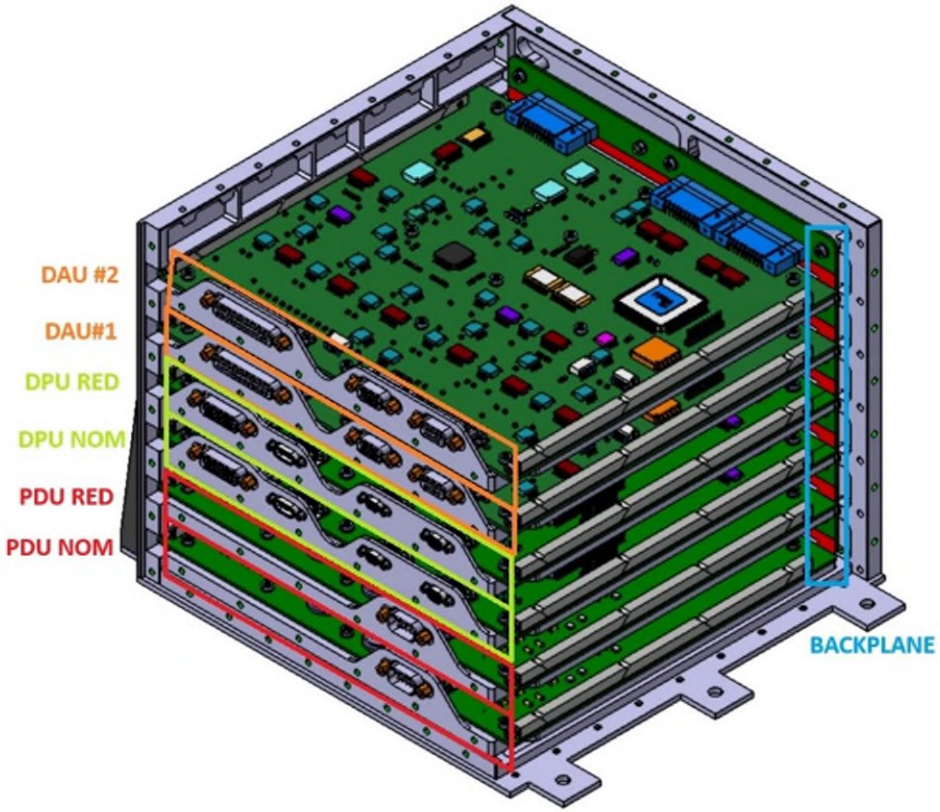
LISA - Data Acquisition and Control Unit - DACU

Following the heritage of LISA-PF DMU, in collaboration with IEEC and financed by AEE via PRODEX as part of national contribution to LISA.

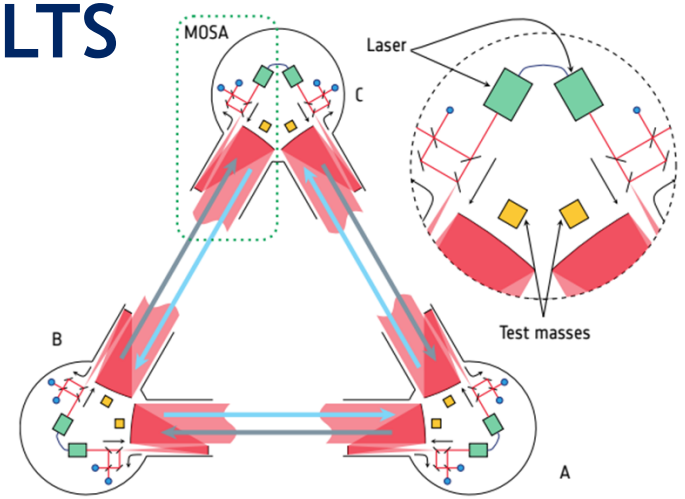
SENER Role:

- Design and Development of the Diagnostics Aquistion and Control Unit (DACU), key part of the Science Diagnostics System (SDS).
- The DACU must acquire and process the diagnostics sensors with micro-Kelvin and nano-Tesla resolution in the ultra-stable measuring bandwidth of the milli-Hertz.
- Sener is designing an extreme precision and sensitivity acquisition chain that goes beyond the state-of-the art of diagnostics systems in space missions.

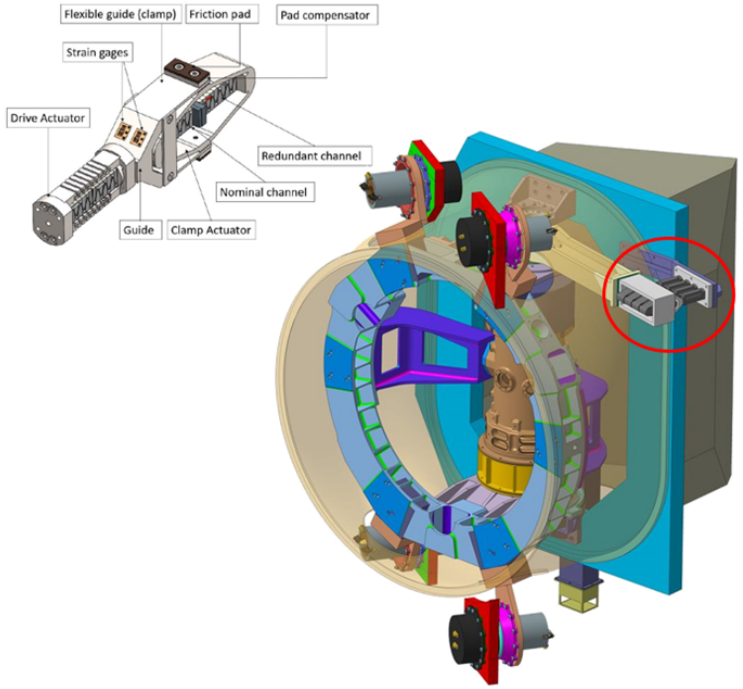
Now in Phase B and PDR to be completed beginning 2026.



LISA - MOSA Locking and Tracking System - MLTS

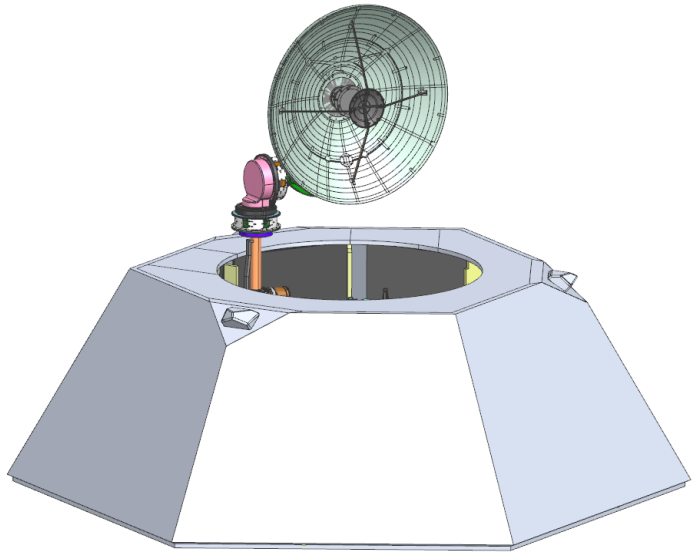


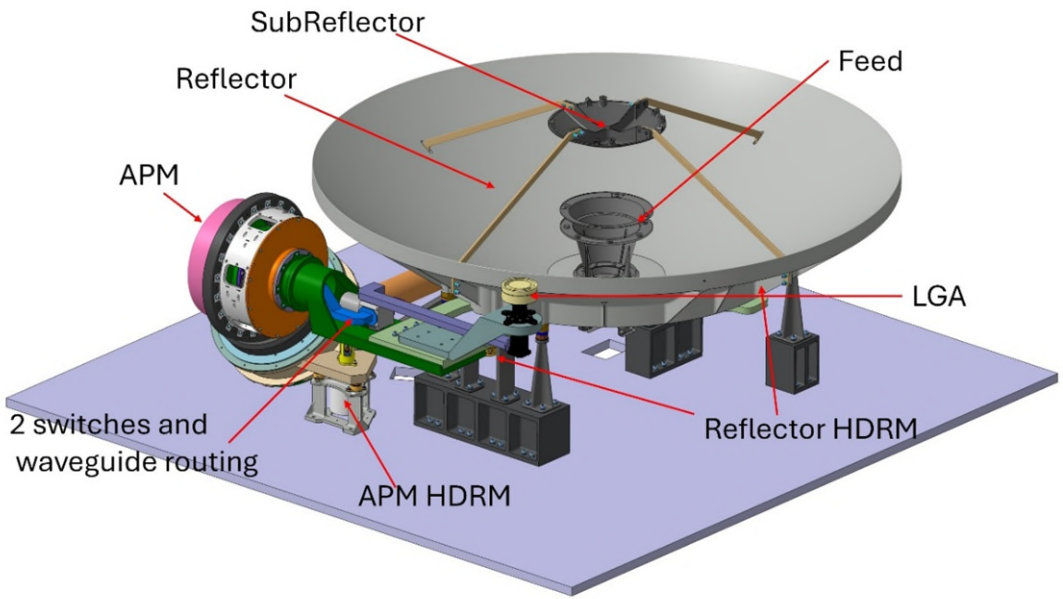
- Under contract of OHB and part of the Industrial Core Team
- MTLS is a subsystem consisting of two main equipment:
  - Launch Lock devices, responsible for isolating the launch loads from the telescope.
  - Optical Assembly Tracking Mechanism (OATM) responsible for angular positioning of the telescope (one axis) with precision of 1 nrad with low induced forces to the spacecrafts.
- Other main challenge for the subsystem is that the magnetic fields are not allowed- this excludes using any DC or stepper motor
- The OATM is comprised by the following elements:
  - Actuation device: A piezoelectric inchworm linear motor as motion generator device.
  - Hinges: flexure pivots.
  - Encoder
  - Electronic Units



LISA - High Gain Antenna- HGA

- Under contract of TASI and part of the Industrial Core Team
- The HGA provides communication to the SpaceCraft in Band X using a reflector of 1,25m with 40 kg per each satellite.
- It is composed by the following elements:
  - Deployment mechanisms in charge of positioning the HGA from stowed to deployed position.
  - Antenna Pointing Mechanism using apiezoelectric inchworm motor and reduce magnetic fields.
  - X-Band Radio frequency system composed by:
    - Antenna reflector assembly: Directivity radiation pattern: How the RF power is spread to the free space.
    - Feed; feeding network + horn: Provide efficient illumination for the prescribed frequency and polarization
    - Waveguides: Rectangular waveguide section propagating the fundamental TE10 mode.
    - Rotary Joints: Contact-less device to route the RF waves through the rotary actuators.
  - Antenna Pointing Electronics
  - Hold down and release





Contacts:
Xavi Llamas
Xavi.llamas@aeroespacial.sener

Joan-Manel Casalta
joanmanel.casalta@aeroespacial.sener

sener

www.group.sener

www.linkedin.com/company/sener

www.youtube.com/@SENERGroup