

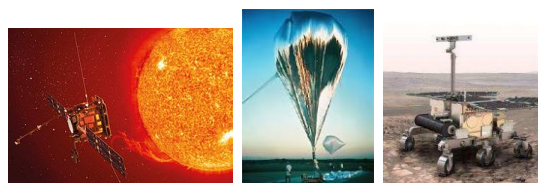
CRYOGENIC SYSTEMS ENGINEERING

EPSILON and **IRELEC** two subsidiaries of **ALCEN** group and a **Senior International Expert from CEA** joined their skills to design **tailor-made cryogenics systems** for ground or space applications.

Key strengths of the consortium: **Thermal Engineering, System Integration** and **Cryogenics Strong Skills**

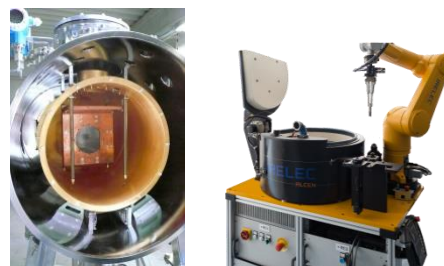
[EPSILON-ALCEN Group: 25-year in thermal engineering for space applications](#)

The company has collaborated with major actors of cutting-edge industry to design, improve and test the **thermal architecture** of their subsystems or systems faced with **extreme environments** (extra-terrestrial, solar, very low temperatures).



[IRELEC-ALCEN Group: 30-year in design and integration of precision instruments and robotics in cryogenics conditions](#)

IRELEC designs and produces complete systems including **precision mechanisms** that operate at **very low temperatures**, with dedicated control electronics and software.

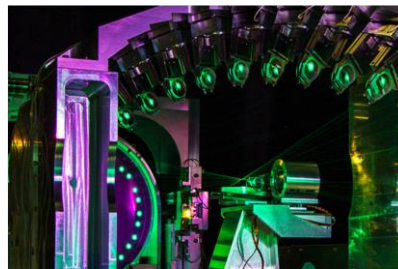


[J-P.PERIN, International Expert in Cryogenic Engineering](#)

J-P.PERIN was Head of the **Cryogenic Engineering Department** of the Atomic Energy and Alternative Energies Authority (CEA). For 23 years he has contributed to the **development** of **cryogenic technologies** for **space and large scientific instruments**.

ALCEN group

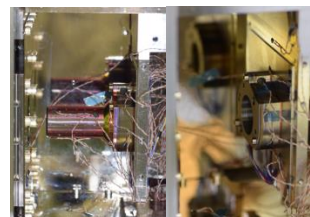
ALCEN is a supplier and/or partner of **scientific equipment**. The Group develops and supplies **mechanical components** and **complex multi-technology systems** integrated into particle accelerators, high power lasers, experimental nuclear reactors and telescopes.



SOME REFERENCES

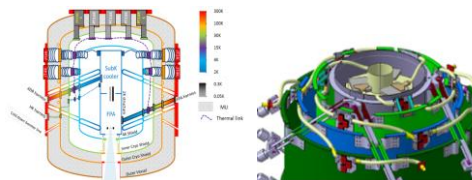
MTG Colds Optics

- Thermal Modelling and analyses
- Cryogenics tests and heat flux measurement at cryogenic temperature (90K)



ATHENA - X-IFU

Precise thermal model to build to validate technologies, influent parameters and performances



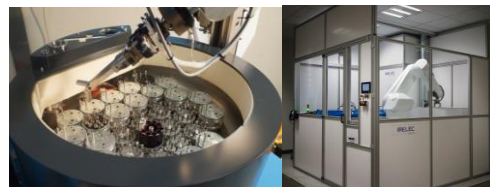
Credit: ESA

Credit : CNES, INTA

Robotics in extreme conditions

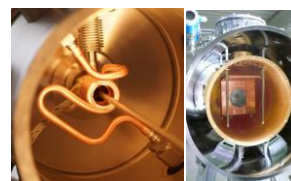
Manipulation of biological samples in liquid nitrogen

- Robotic sample changer for Protein structure determination at Synchrotrons beamlines
- Full-Automated cryogenic biorepositories



Test Cryostats

- Characterization of cryogenic targets (4K)
- Automatic generation of solid ice pellets (150K)
- Determination of hydrogen deformation laws at solid state (10K)



Water- and cryo-cooled Synchrotron mirrors operating in UHV environment



Precision goniometer for cryomagnets

In-situ alignment of samples

- at temperature down to 1.5K
- under magnetic field up to 12T

