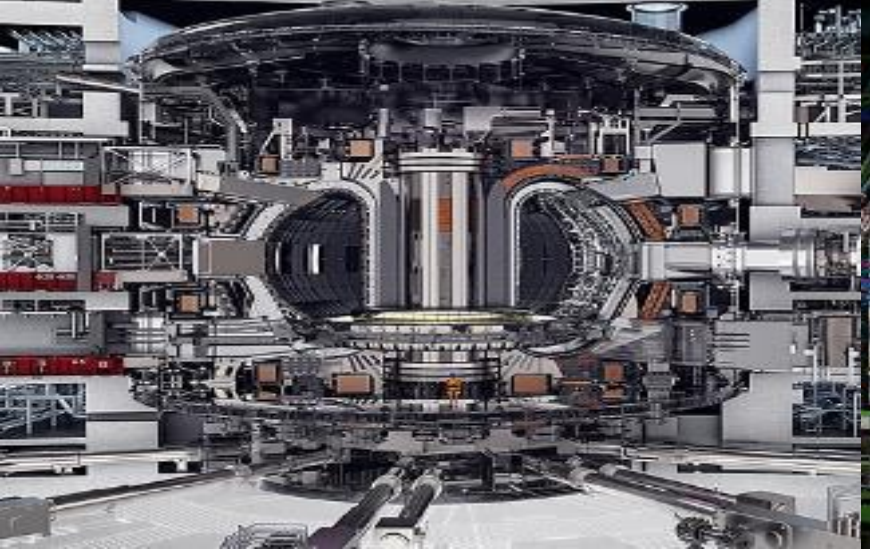


ALTER TECHNOLOGY group

Big Science

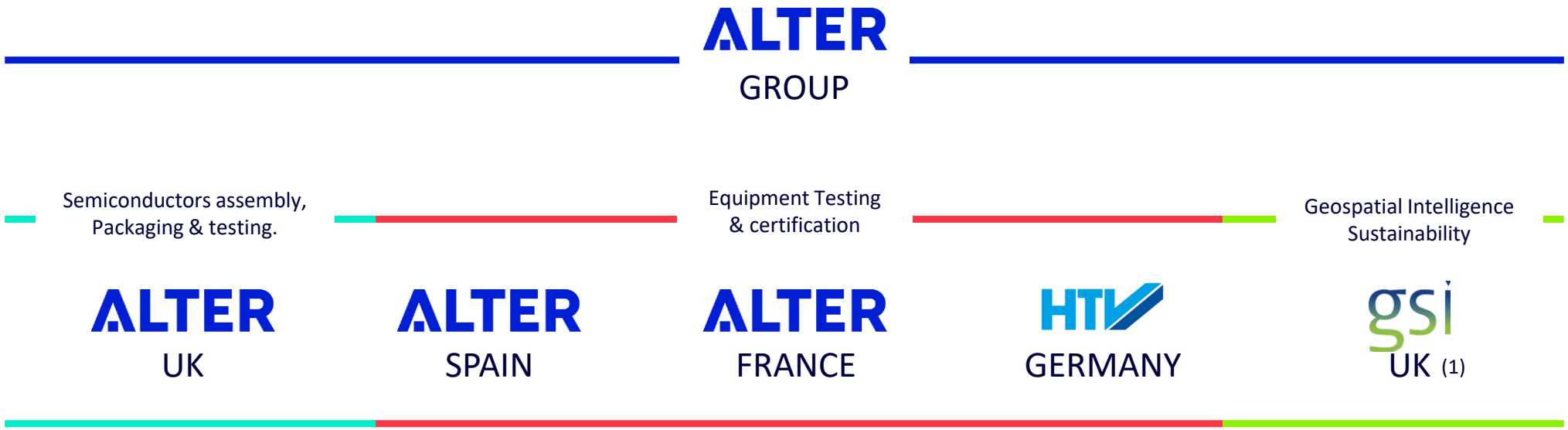
Eladio Montoya, eladio.montoya@altertechnology.com

May 2023

ALTER

TÜV NORD GROUP

Business Unit Aerospace



(1) Non majority stake

ALTER

ALTER TECHNOLOGY FIGURES

48

million
Revenues

4

years
growing

250

Staff

+30

experience

Internationally
focused

5

sites

+6000

m2
laboratories

+10

projects
per year

ALTER

OUR OFFER FOR BIG SCIENCE

Design

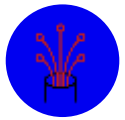
Quality and Engineering Services for Complex Systems

Testing and Certification

CE Marking Support

Industrialisation

Functional Safety



Electronic Components: Engineering, Testing and Optoelectronics

Radiation Harness Assurance and Testing

Custom electronic devices and packaging for harsh environment

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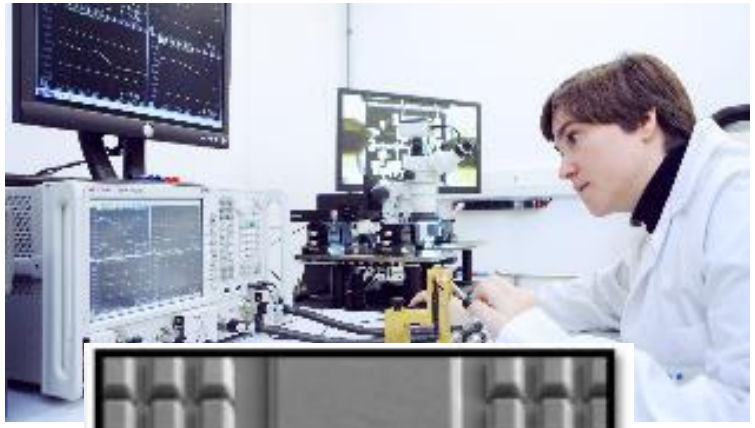
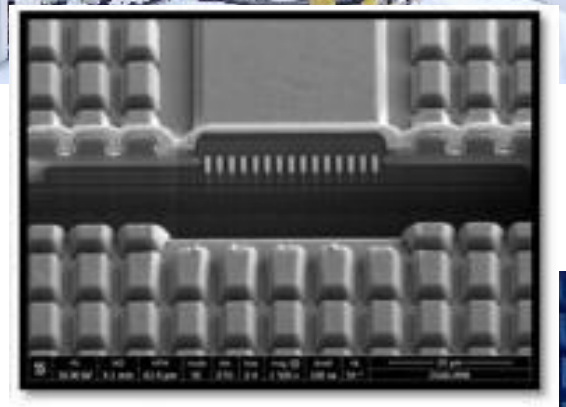
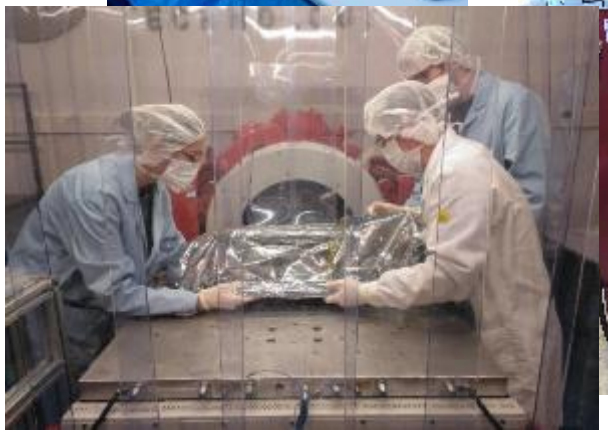
Capabilities

Testing of harsh environment electronics







ALTER

EXPERIENCE IN BIG SCIENCE

As prime contractor

- Start-up Monitoring Module (STUMM) prototyoe for DONES (2022-23)
- Neutron Irradiation of bolometers (2021)
- Bespoke electronics for CODAC (2021)
- Project Management support services in the area of CE Marking I (2012- 2020) and II (2021-2026)
- Industrialization and procurement of the ITER Interlock Discharge Loop Interface Box (DLIB) (2015- 2018)
- Provision of Dual Use Export Control Compliance Support (2015-2016)
- EMC and safety tests on CERN power converters (2019-2023)

As subcontractor:

- Functional, EMC, SMF tests on Leak Detection System instrumentation (IDOM, 2022)
- Functional, EMC, SMF tests on CODAC instrumentation (GTD, 2020)
- Gamma radiation tests on thermocouples, electrical and optical strain gauges from ITER vacuum Vessel (HBM)
- VIB, SMF and environmental tests on commercial components belonging to the Safety Important Components Signal Conditioning Cubicles (SIC SCC)

STUMM-PROTO

STUMM: Start-Up Monitoring Module

Feasibility study for **IFMIF-DONES**

Design, manufacturing and testing of STUMM-PROTO

STUMM is a sensorized matrix of 5 x 8 locations simulating sample holders to allow characterizing the neutrons & gamma generated by spallation

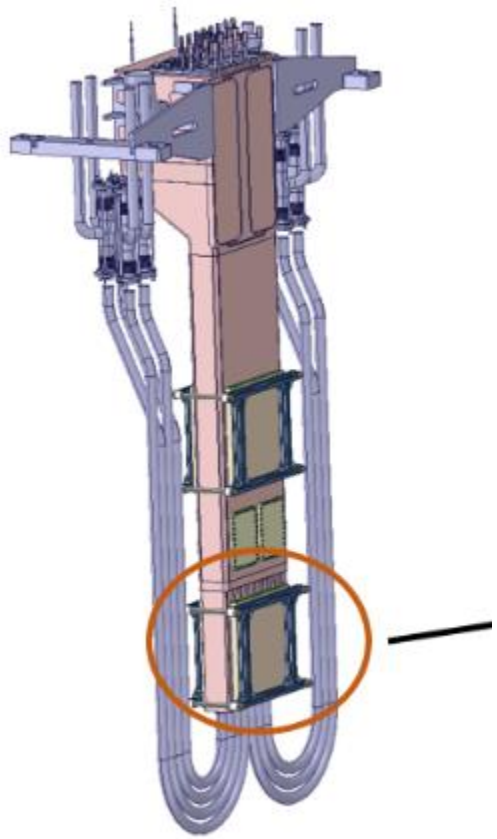
STUMM-PROTO is the prototype of STUMM, Equipped with sensors (T, neutron, gamma, …)

Parts:

- Container : 8 vertical rigs
- Support trussers (extension)
- Attachment adapter
- Heating / cooling system

Scope:

- Mechanics, thermal control, fast electronics



STUMM-PROTO

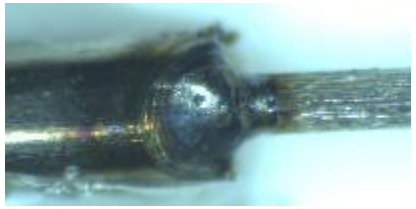
Neutron irradiation of bolometers

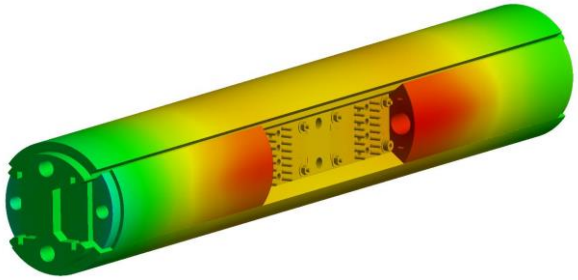
Consortium led by ATN with SCK-CEN, ESS Bilbao and Thune Eureka

Goal: to test ITER bolometers under high flux of neutrons in a fission reactor (SCK)

Online monitoring and thermal cycling

Capabilities involved: thermomechanical design, fluid dynamics, materials science, electrical measurements, signal acquisition and treatment,…



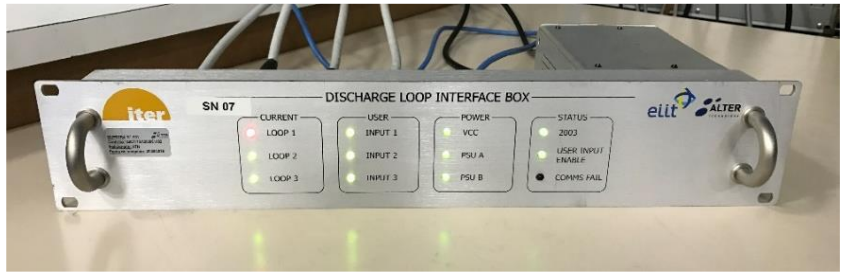


BESPOKE ELECTRONICS

- 4-year framework contract
- Consortium led by ATN with GTD
- **Task Order 1 MAGNETICS DESIGN**
  - Redesign, test and industrialize magnetic field sensor electronics (>2000 integrators + >100 aggregators)
  - Capabilities: electronic design, functional testing, EMC testing, mechanical design, integration of electronics
- **Task order 2: TECHNICAL SPECIFICATION FOR A PORTABLE MAGNETICS DIAGNOSTIC BESPOKE INSTRUMENTATION SYSTEM**
  - Content: Manufacturing of 24 digital Integrators and 7 Main FPGA Boards
  - Capabilities: project management, manufacturing process quality
- **Task order 3: TECHNICAL SPECIFICATION FOR THE BOLOMETERS DIAGNOSTIC BESPOKE INSTRUMENTATION HARDWARE PRELIMINARY DESIGN**
  - Content: preliminary design of electronic instrumentation for bolometers diagnostics. Prototype test and procurement
- **Task order 4: Assembly services for the magnetics diagnostics instrumentation and Control cubicles**
  - Content: technical support to subco in charge of cubicles assembly (GTD). Main FPGA Board new generation design (Alter)

IO/CT/15/4300001192 Industrialization and procurement of the ITER Interlock Discharge Loop Interface Box (DLIB)

- SIL-3 equipment: Dependability study and integrity assessment (IEC 61508)
- High Magnetic Field and radiation requirements → Tailored testing plan
- DLIB models strategy ↔ V&V stages
- Reliability tests: Environmental stress screening and ageing tests
- On-site performance tests
- Obsolescence plan and long-term storage strategy
- Emulation of DLIB clients



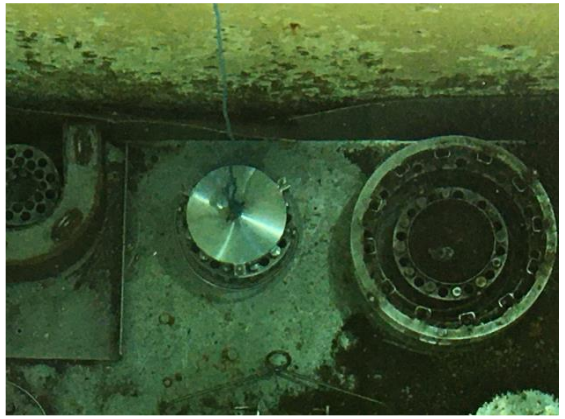
CE MARKING SUPPORT

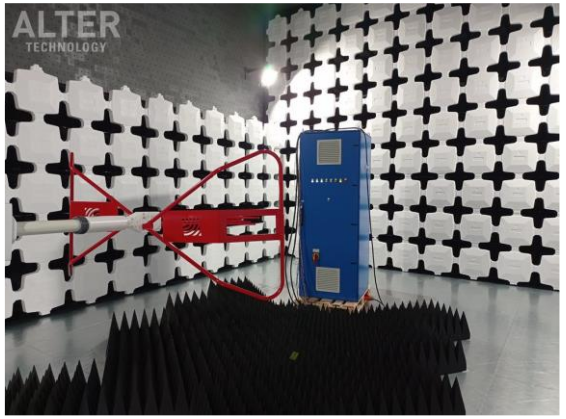
F4E-OMF-436 LOT5 Project Management Support Services and F4E-OMF-1106-01-01 Support Services in the Fields of CE Marking and Regulatory Compliance

- Assembly, integration and verification compliance assessment
- CE marking directives and European harmonised standards (PED, ATEX, Machines, EMC, Radio, Low Voltage)
- Technical specifications and handbooks compliance verification
- Suppliers' strategy compliance evaluation
- Suppliers' declarations of conformity verification
- Hazop review
- Test reports assessment
- Equipment:
  - Upper and Equatorial Port: diagnostics integration
  - Remote Handling Cask transport system
  - Coating machine
  - Centrifuge accelerator

Qualification tests Front End Cryogenics Distribution System (FECDS) (2020-2021)

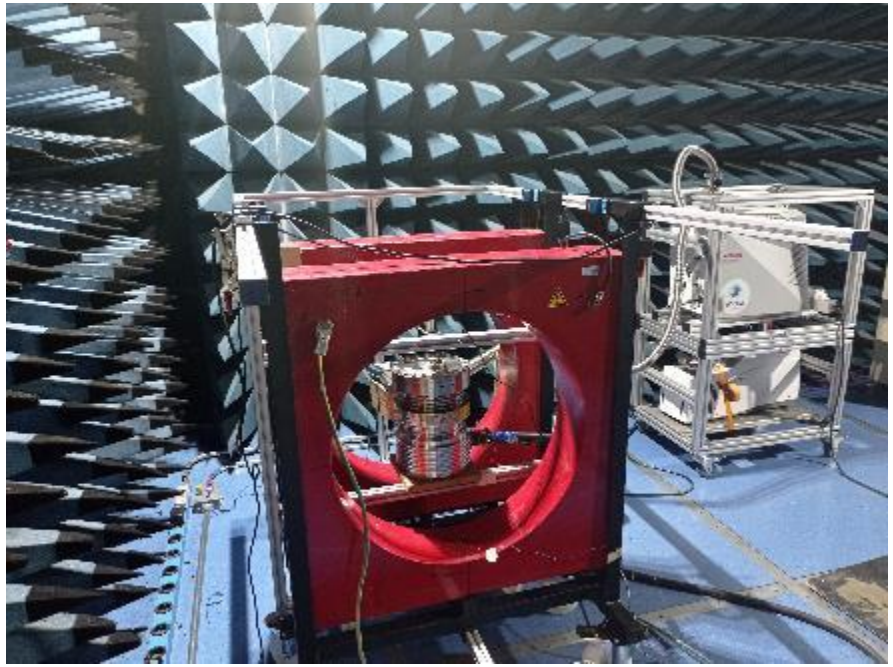
- EMC (CE Marking + ITER Requirements EDH Part 4)
- Static Magnetic Field (SMF)
- Radiation TID





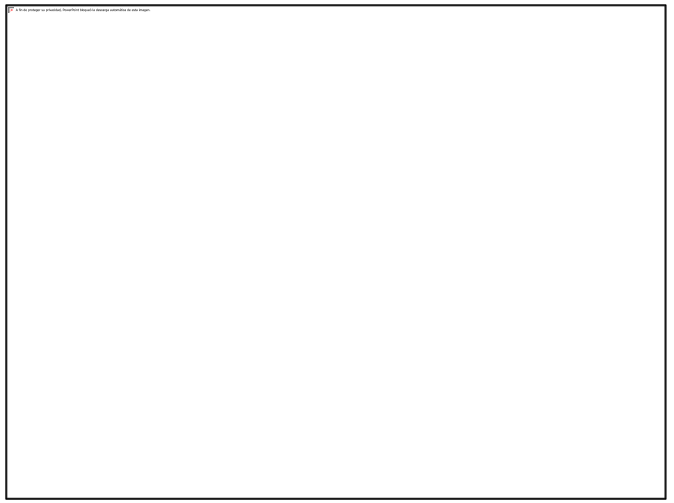
IDOM – Leak Detection Systems Qualification TESTS

- ALTER is performing SMF and EMC qualification tests of the Leak Detection System (LDS) that IG4 (IDOM, 40-30, GUTMAR) is providing tor F4E.
- The ITER LDS aims to provide the leak detection capabilities for the primary vacuum systems comprising Torus vacuum vessel, Neutral Beam vacuum systems and, in addition, for the Cryostat vacuum system of the ITER machine. It is divided in 9 subsystems.
- We are testing many different types of equipment: Turbomolecular pumps, controllers, pilot valves, switches, sensors…



Safety Important Components Signal Conditioning Cubicles (SIC SCC) Empresarios Agrupados

- VIB, SMF and environmental tests on commercial components belonging to the Safety Important Components Signal Conditioning Cubicles (SIC SCC)



Profiles we look for

- Degrees in:
  - Engineers: telecom, materials, electronics, industrial
  - Physicist: materials, electronics, optics,
- But more important: SKILLS
  - Testing of electronics (EMC, calibrations)
  - Automation (Labview, Python) and programming
  - Nuclear physics
  - Vacuum and cryogenics
  - Fusion
  - Analytical techniques (SEM, TEM, XRD, …)
  - ENGLISH!!

ALTER

What we propose

- Permanent contract
- Attractive salary + benefit package
- Joining an international company with 5 sites in Europe
- Possibility of moving abroad
- International working environment
- But most important… an interesting job

THANK YOU!

www.altertechnology-group.com

Eladio Montoya Redondo
Equipment and Certification
Business Development
+34 637 495 267
eladio.montoya@altertechnology.com

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