

**SCIENTIFICA**

# Development, manufacturing and commercialisation of precision equipment for science

## Equipment for science...

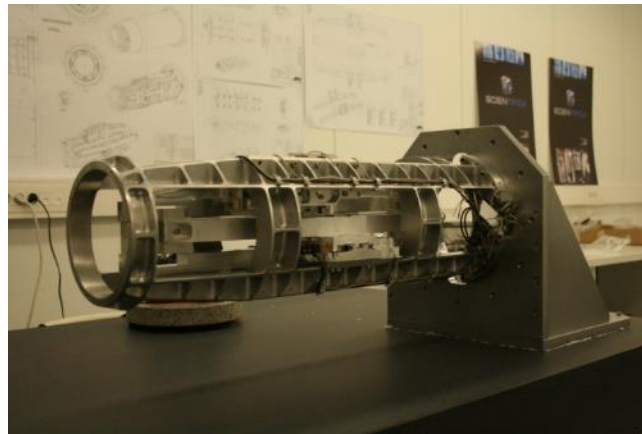
... based on three main **core technologies** in Scientifica:

### Electronics & signal processing



- Control systems & electronics
- Signal processing
- Software development

### Precision Mechanics



- High precision
- For hostile working environment (vacuum, radiation,...)

### Composite materials



- Custom structural and functional materials

## Services:

- **Outsourcing services for manufacturing and product development**
  - Detectors
  - Instrument developments or upgrades
  - Other equipment
- **Product/equipment support services:**
  - Maintenance
  - Upgrades
- **Technology Marketing /Licensing**
  - Interested in technology licensing from Scientific Facilities, to take them to the Scientific Community or Industry.

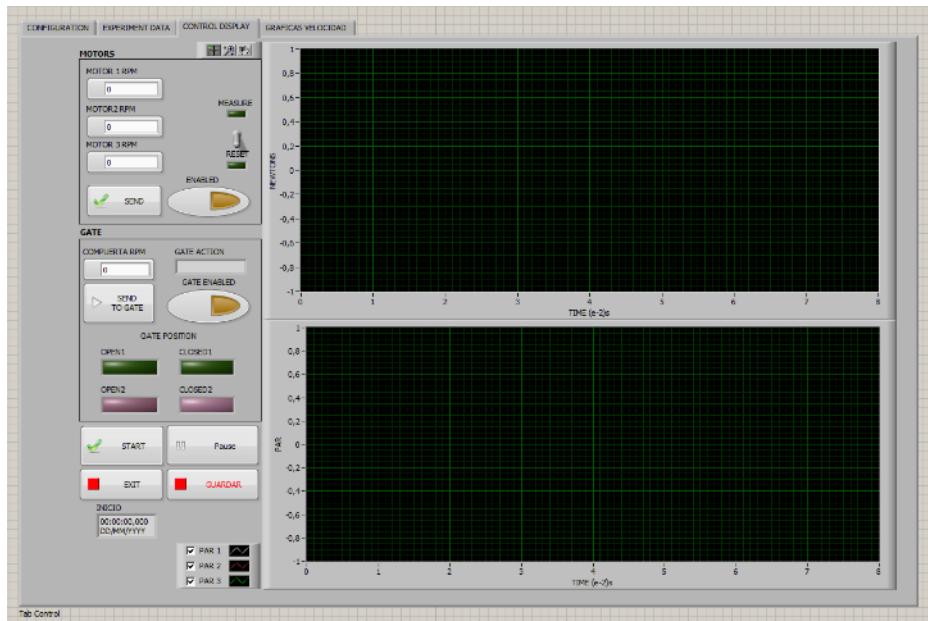
# Control and Monitoring Solutions

Design, Development,  
Programming and Maintenance of  
Control Systems and Monitoring  
Solutions



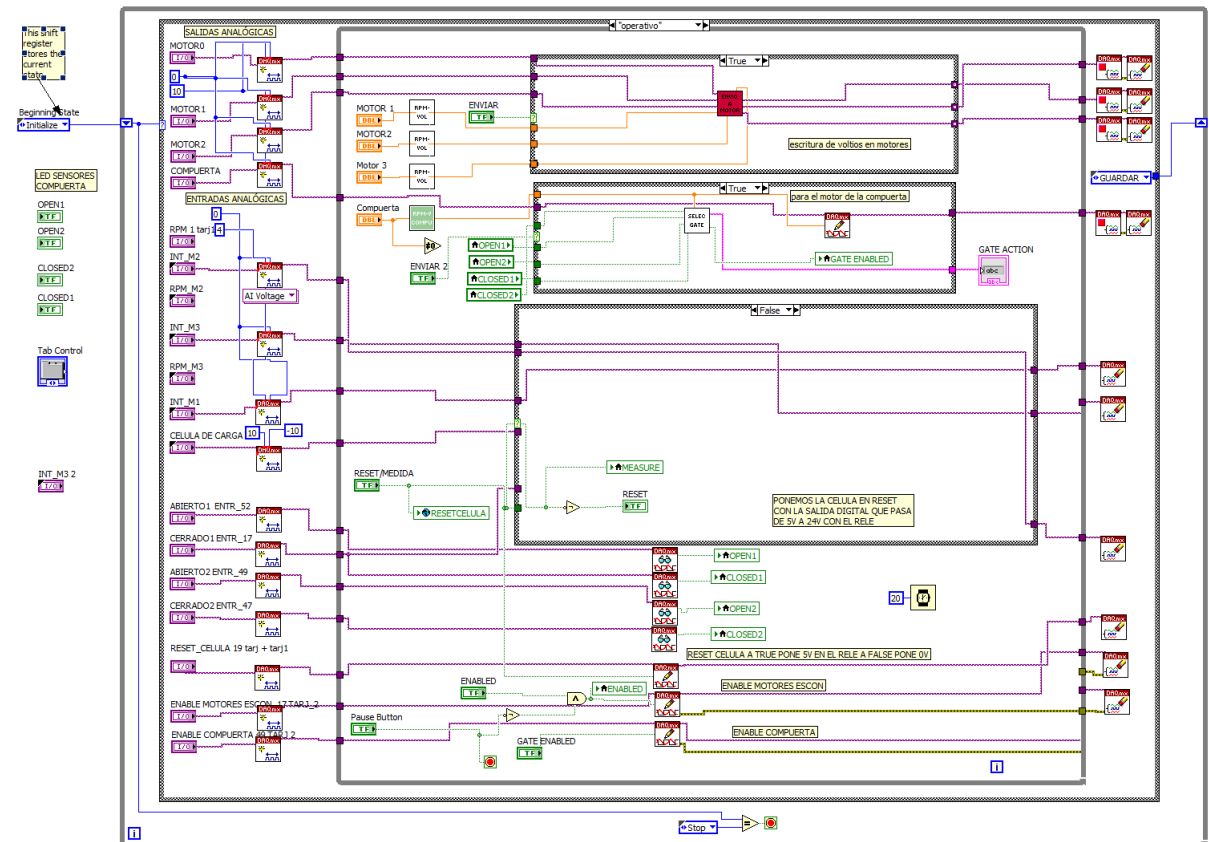
## Products: Control & Monitoring Solutions

### NI LabView:



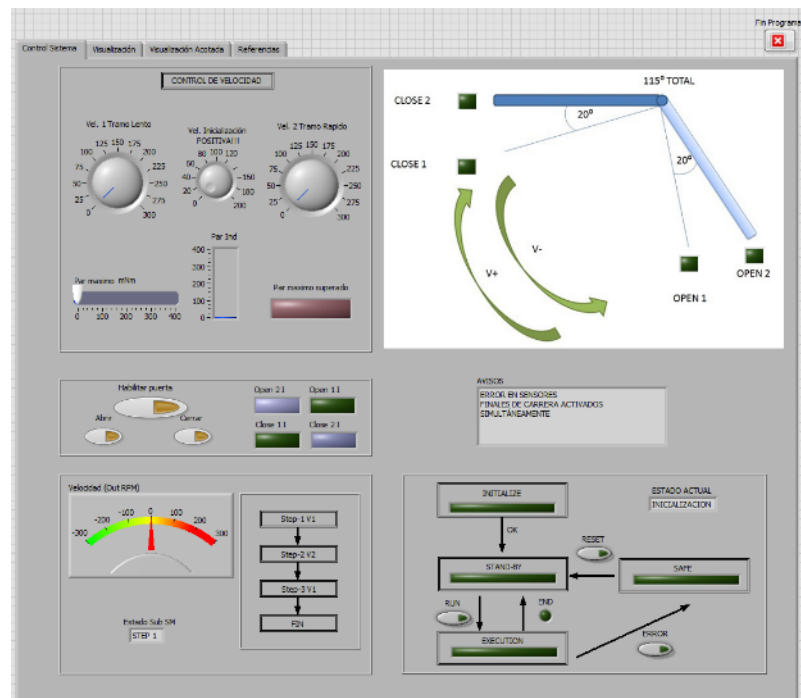
### Features:

- Space dust collector test bench control system
- Two motion axis, linear stages.
- Force monitorization and control
- Data and states monitorization



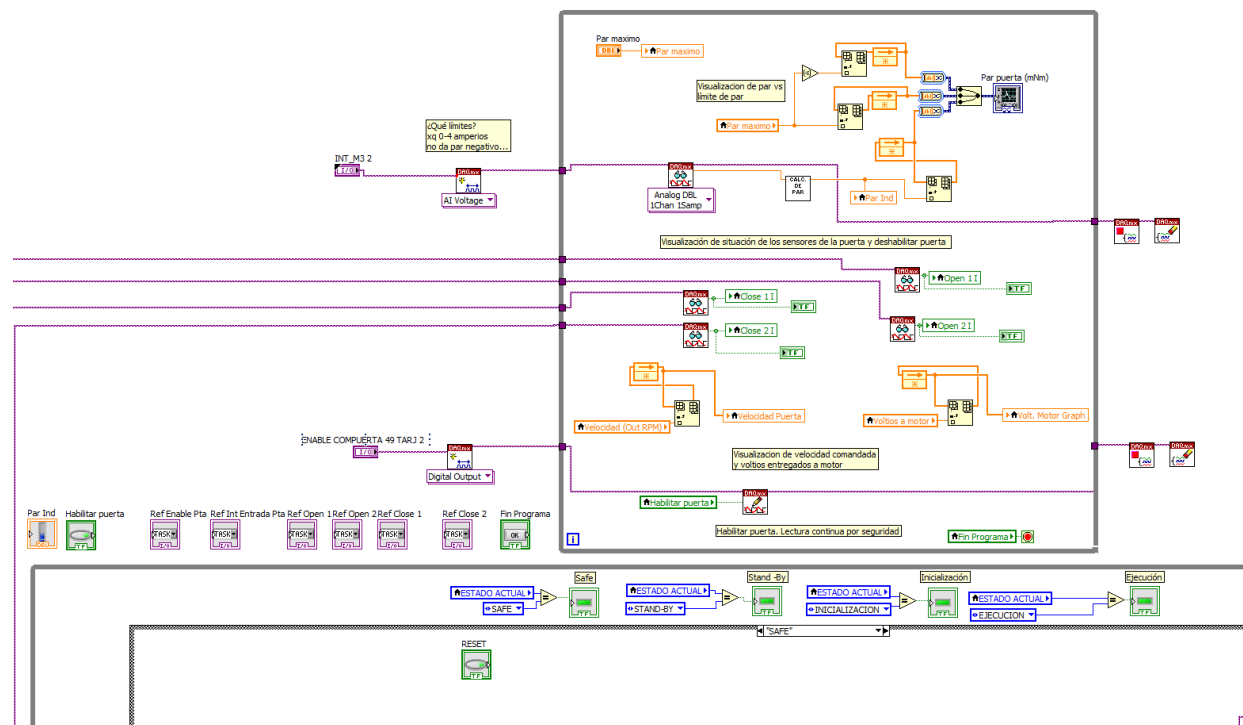
## Products: Control & Monitoring Solutions

### NI LabView:



### Features:

- Space dust collector gate control system
- Speed and force control
- Variables, states and data visualization



## Products: Control & Monitoring Solutions

### Siemens S7:



#### Features:

- Reconfigurable nuclear shielding system
- Heavy duty mechanically actuated
- Three axes motion axis control
- PLC control system (multiple channels, sensor and actuators)
  - 30 digital inputs
  - 16 digital outputs

### Delta Tau Motion Control:



#### Features:

- Positioning hexapod
- High precision six axis parallel kinematics motion control system
- Up to 1 micron accuracy

### Elmo Motion Control:



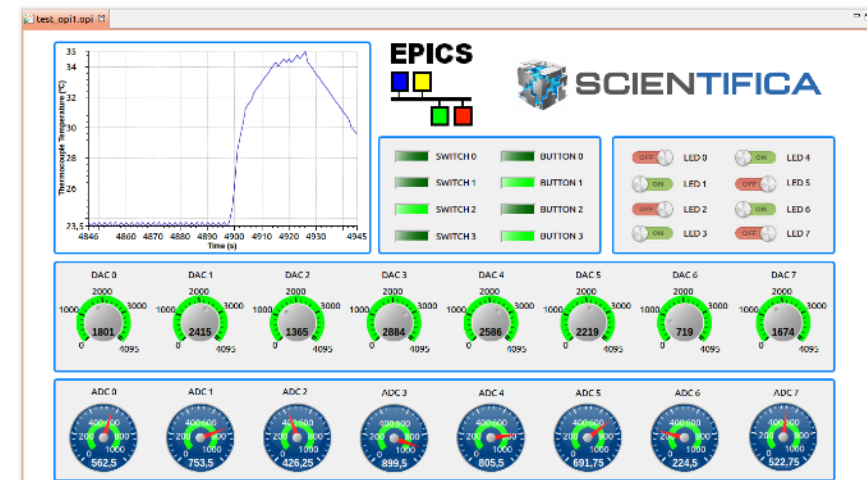
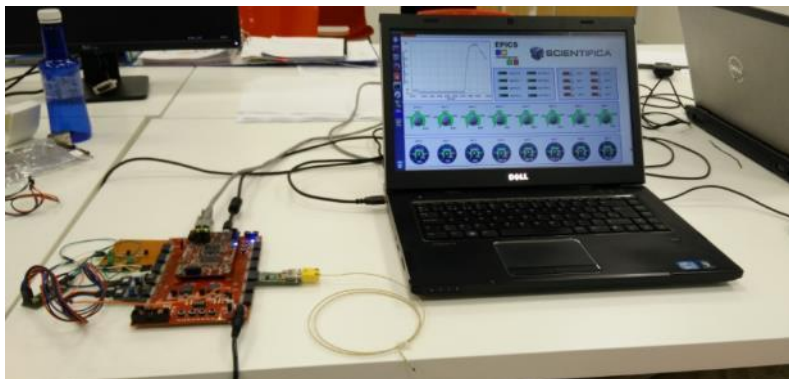
#### Features:

- High precision (1.5 micron accuracy in XY) two axis (600x710mm) motion control system
- Position and speed dual loop control system

**Allen Bradley, Kollmorgen, ...**



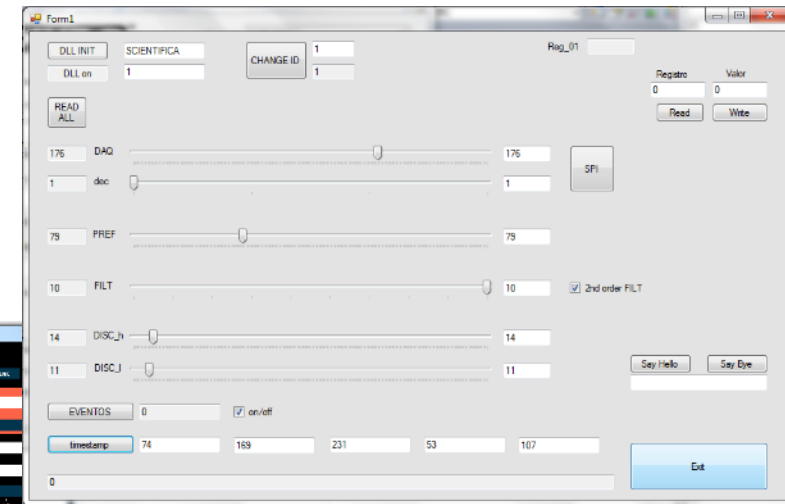
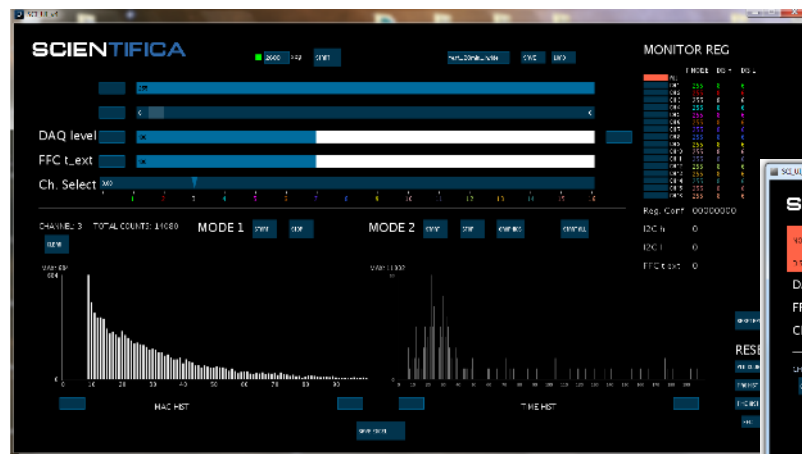
## Products: Control & Monitoring Solutions



### New Control Architecture (Zynq + EPICs) :

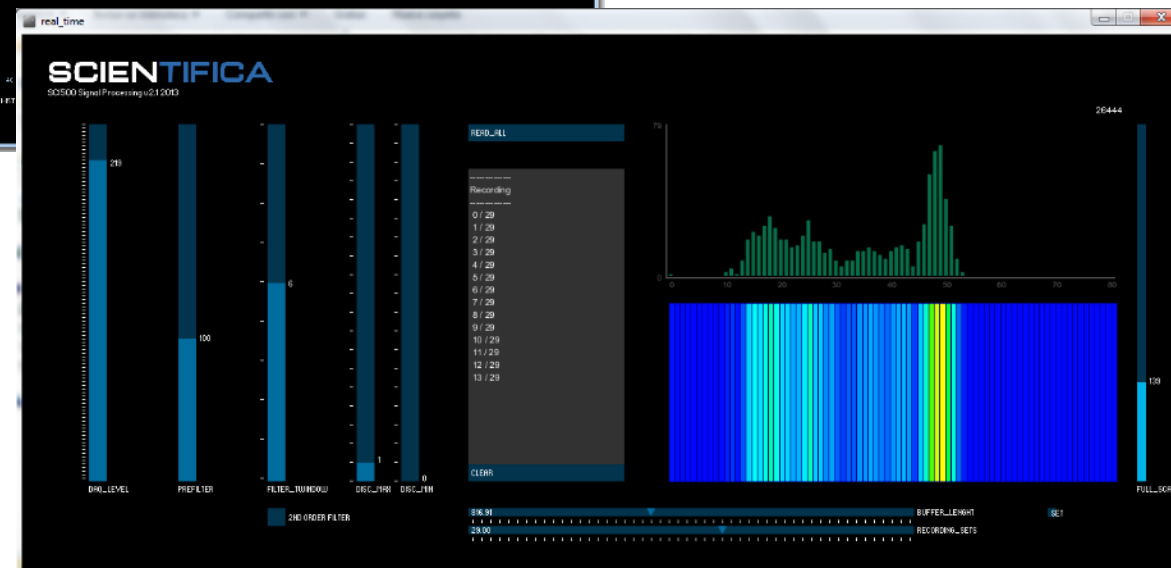
- FPGA / Microprocessor dual architecture
- Linux RT O.S.
- EPICs control & monitorization system integrated
- Inhouse development. Open Source and customizable platform

## Products: Control & Monitoring Solutions



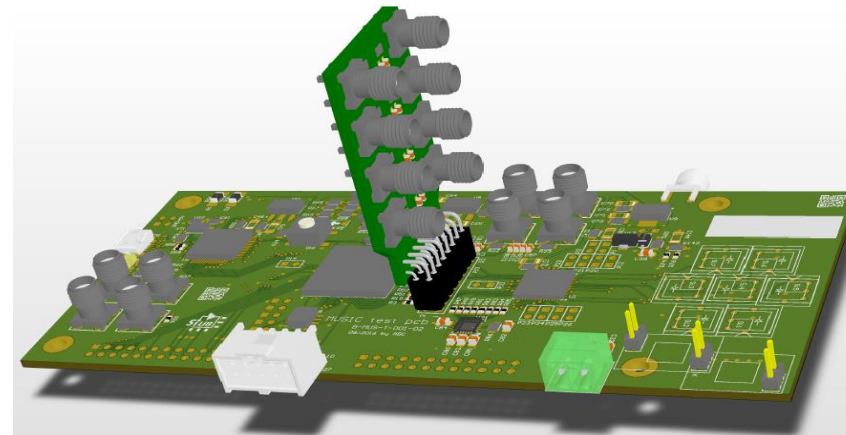
## FPGA + Processing + Visual C :

- Neutron detector control system
- Detector configuration
- Real time event collection, processing and visualization.
- Configurable number of channels.



## Products: SiPM readout chip and evaluation board

### Evaluation Board:



### 8 channel SiPM anode readout ASIC based on a novel low input impedance current conveyor

#### Features:

- Three operation modes:
  - (1) SiPM pixel summing in differential mode;
  - (2) individual analog single ended (SE) channels and;
  - (3) digital outputs (one A/D is selectable per channel) 8 Channels
- A trigger pulse is provided by performing an OR between any binary signal and an output current for an external slow integrator



## Products: Other solutions

FPGA based systems, analogic discret component systems, SMD components systems, integrated circuits, ASICS, ...:



### FPGA based neutrón Detector Signal Processing And DAE:

- 16 channel module



### Multichannel TIA for Fusion Diagnostic Application.

- 4 channel modules
- Up to 4 module in enrackable case.

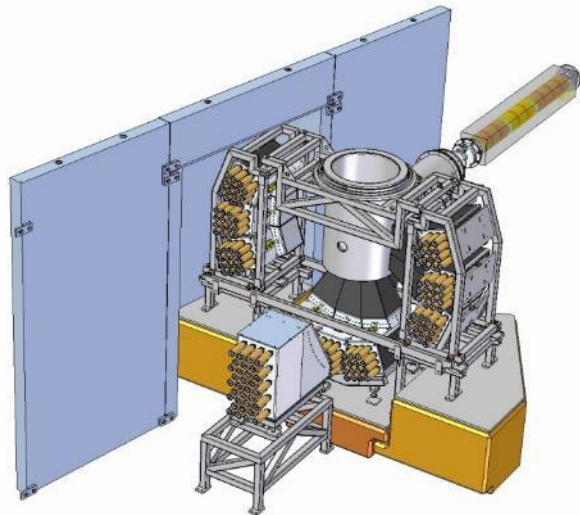


# Neutron detectors

Mechanical Design and Manufacturing,  
Electronic Chain, Control System and  
Software Development

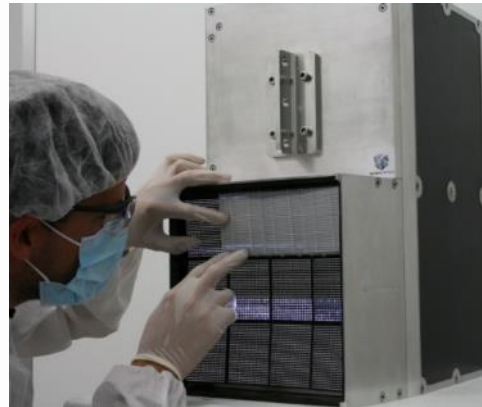
**We cover the whole value chain...  
... in the development of neutron detectors for  
multiple Scientific applications:**

**Design**



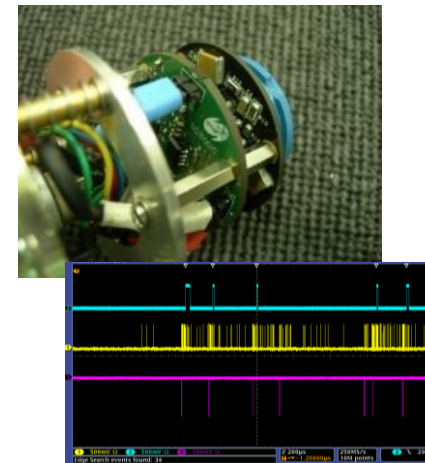
- Mechanical Design
- FEM & FEA
- McStas, MCNPX, GEANT4

**Manufacturing**



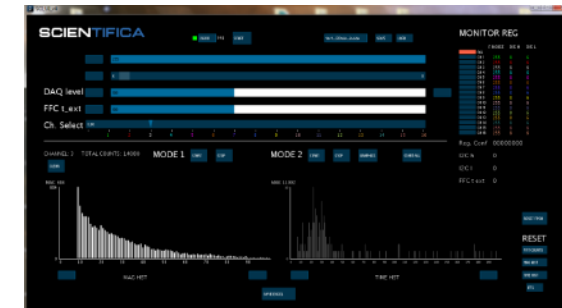
- Mechanical & optical assembly.
- Functional materials definition and production

**Signal processing**



- Signal conditioning
- N/γ Discrimination electronics
- HV power supply

**Control System and Data management**



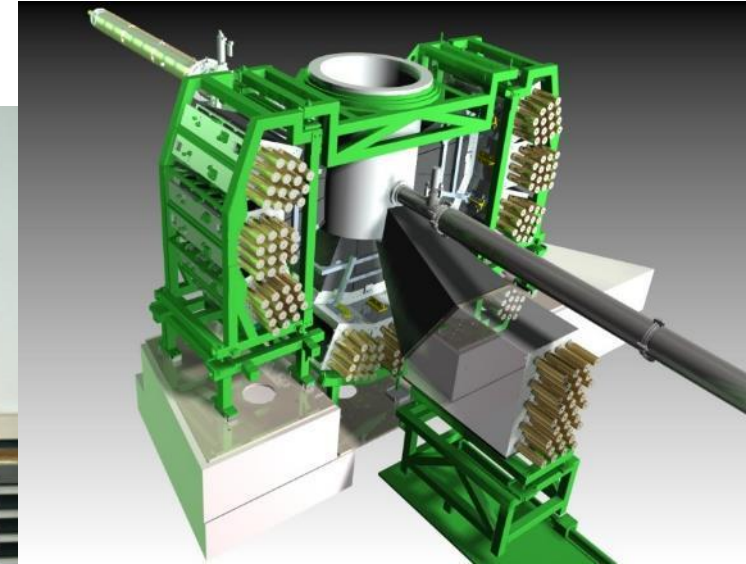
- Detector control system
- Calibration toolkit
- Data management



## Neutron detectors: PEARL (ISIS. UK)

### Main features:

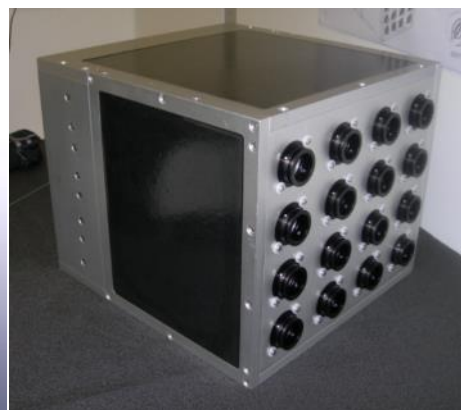
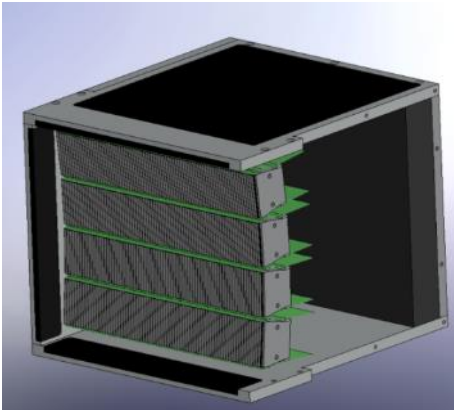
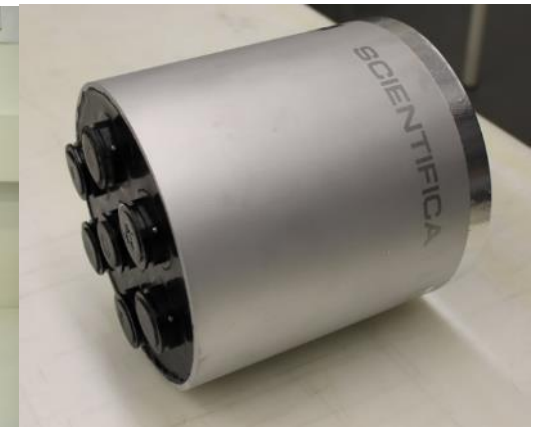
- Solid scintillator technology (ZnS) +  $^6\text{Li}$ .
- Plastic Optical Fiber
- Pixel size: 3x(60x3) mm. Total: 1056.
- Area: Aprox. 1 m<sup>2</sup>
- Channels: 224



## Neutron detectors: **prototypes**

### Main features:

- Solid scintillator technology (ZnS) +  $^6\text{Li}$ .
- POF/WLS Fiber
- Different Pixel concepts & sizes





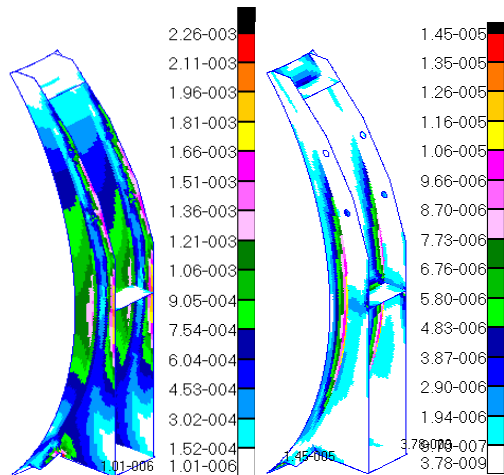
# Composite Materials

Design, Development & Manufacturing  
of functional and structural parts

**For Science and Space**

**We cover the whole value chain...**  
**... in the development of high added value applications in**  
**composite materials for Science and Space:**

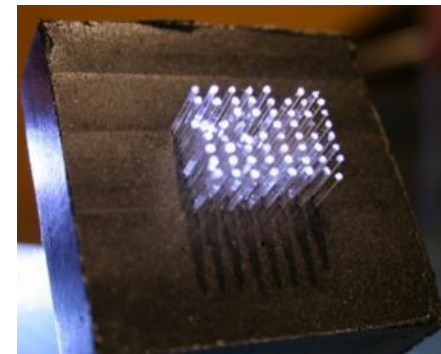
**Design**



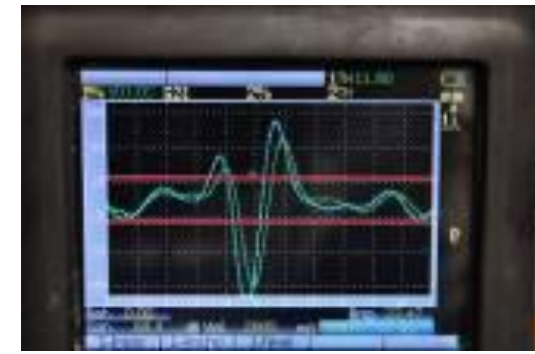
**Materials & Formulation**



**Manufacturing**



**Testing**



- Mechanical Design
- FEM & FEA

- Material definition & election
- Resin formulation

- Custom structural and functional materials
- Process definition & implementation

- Quality control
- Integrity testing

## Technologies / functionalities:

### Vacuum

- Vacuum compatible
- Vacuum tight
- Controlled outgassing

### Radiation Hardness

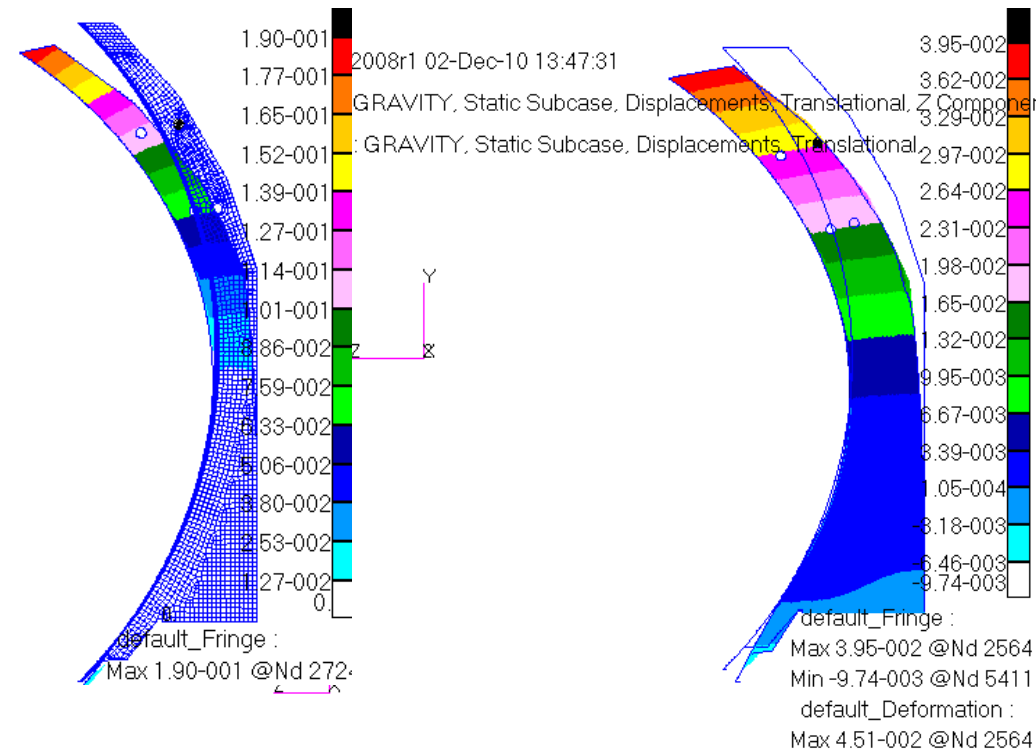
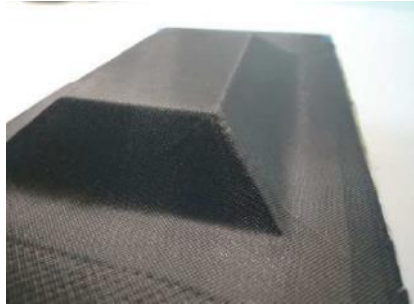
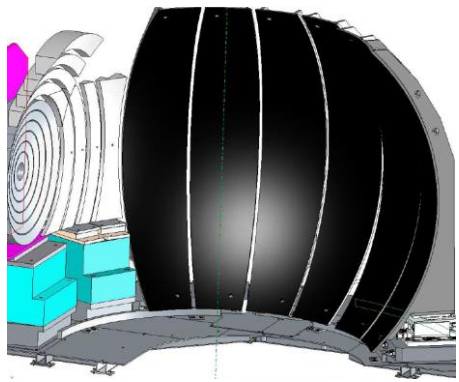
- Rad hard materials
- Shielding materials
- Custom radiation protection solutions.

### Sensorization

- Dimensional
- Optical
- Electrical
- Other physical effects



## Applications: Functionalized Composite structures



### Structural and geometrical tight specs:

- $\pm 0.1$  mm deviation in sphere radius (2,000 mm).

### Thermal & mechanical stability:

- within geometrical specs in 20°C T gradient

### Surface quality: Ra = 0.8

### Radiation absorption. Thermal neutron absorption.



## General view



## Facilities: Composites Room



## Clean Room



## Machining workshop



## Assembly workshop

**ANY QUESTION?**

**THANK YOU**