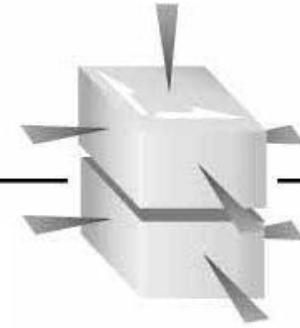


IMMG



INSTITUTE OF MECHANICS OF MATERIALS AND GEOSTRUCTURES S.A.
ΙΝΣΤΙΤΟΥΤΟ ΜΗΧΑΝΙΚΗΣ ΥΛΙΚΩΝ ΚΑΙ ΓΕΩΔΟΜΩΝ Α.Ε.



Institute of Mechanics of Materials and Geotechnics S.A.

CERN – Greece Industry day
NCSR Demokritos, 31st March 2014

IMMG S.A. operating 25 years

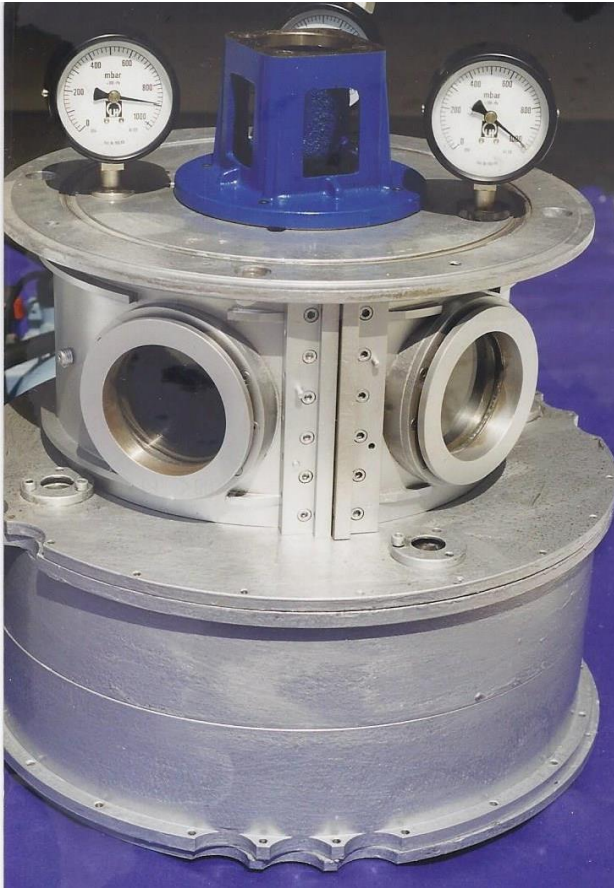


- Design, manufacturing of materials processing equipment and testing machines
- Polymer reinforcement and testing



- 29 European research projects
- 16 European industrial projects
- Many new-concept machines and devices (several patented or published)

The start with CERN 1994

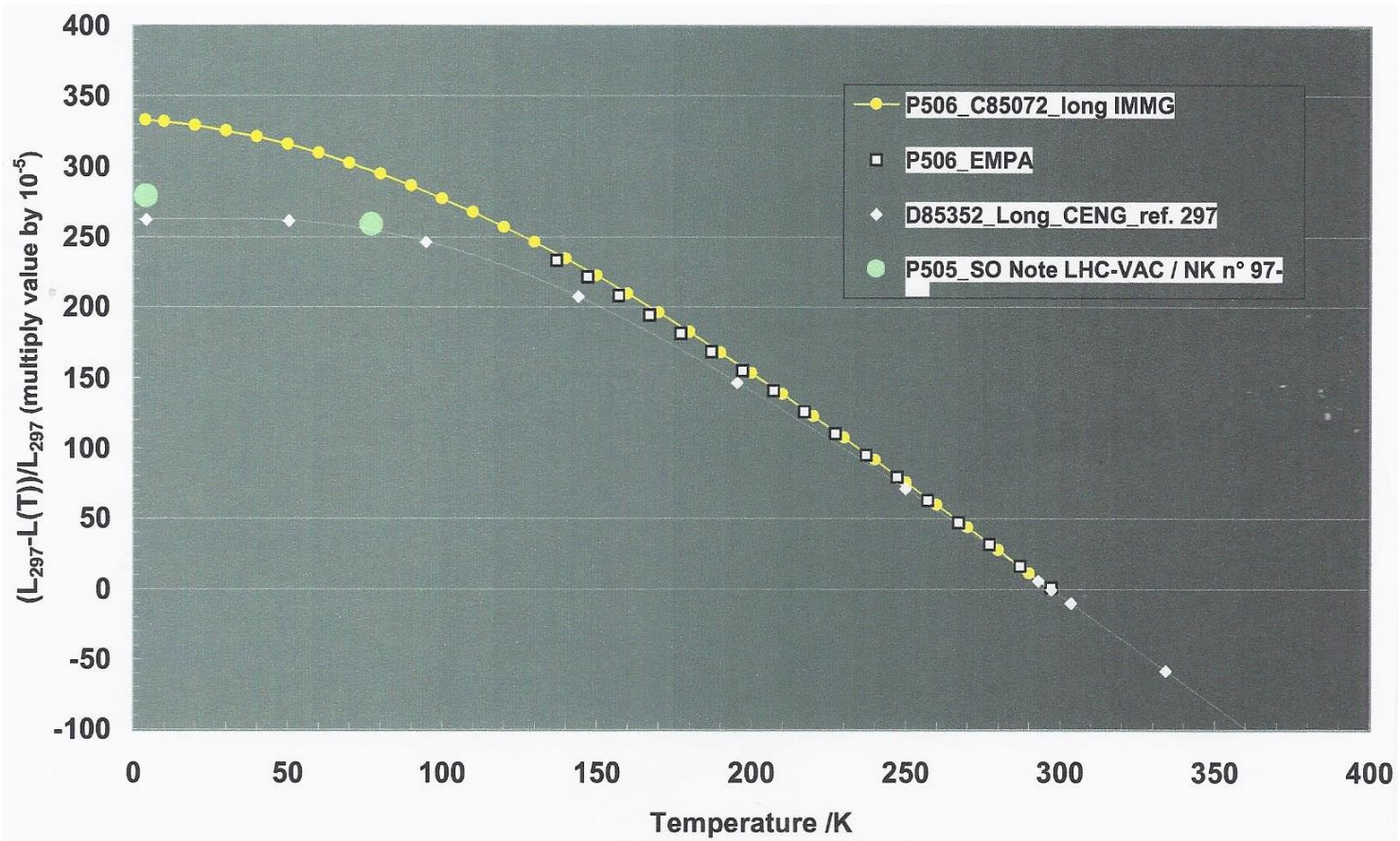


Vacuum chamber
for materials
testing (left)

50 lt liquid Helium
cryostat for
materials testing
(right)



Cryogenic testing results



Measurement of the thermal expansion coefficient for the Kawasaki Steel P506

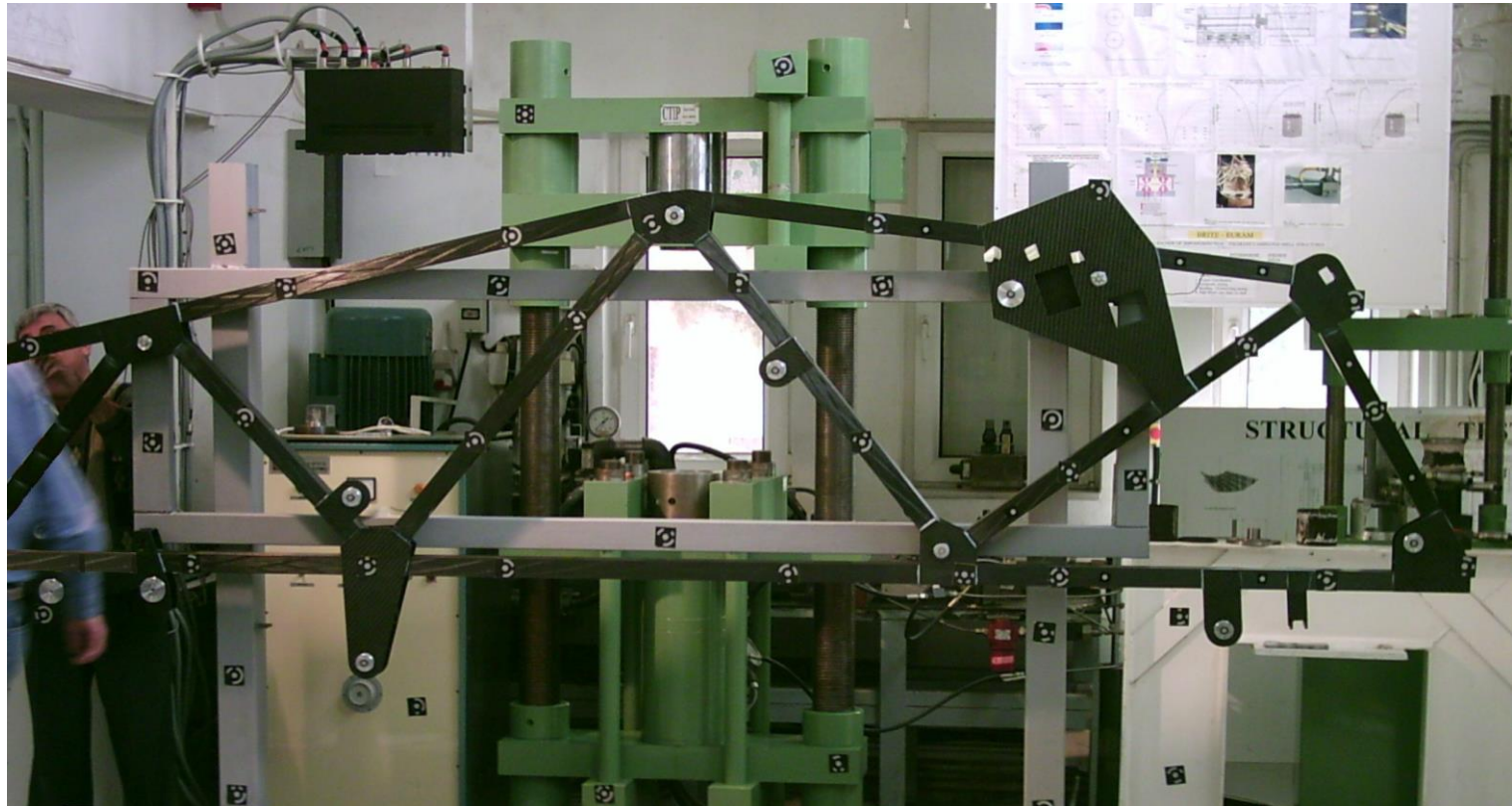
The Pole Measuring Machine



A robotic, servo-hydraulic, 5-axis machine, able to apply simultaneously high loading (480 ton) under control - through 36 pistons - on parts of a superconducting coil for LHC and also it can measure local deformation. It moves precisely over 16 meters, it generates controlled loads with the use of 45 sensors and it consists of more than 2000 high precision machined components.

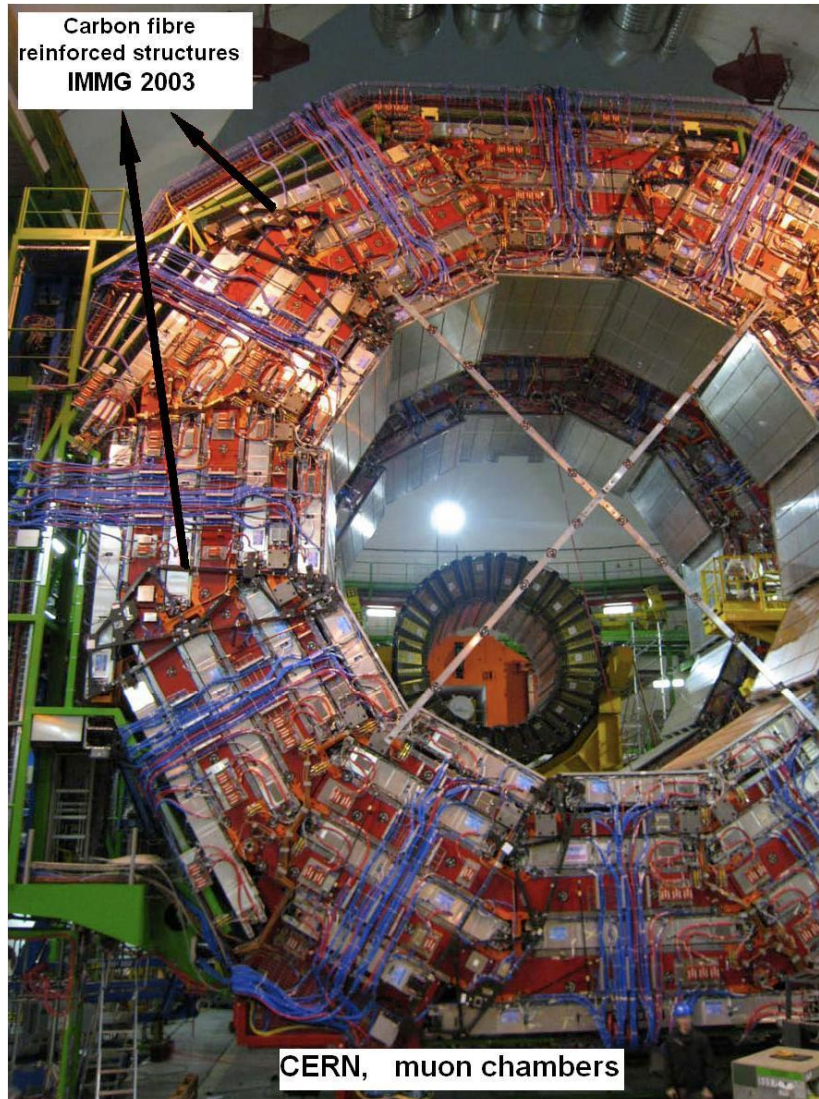
Commissioning the moving PMM at ANSALDO ENERGIA SpA in Genoa (2000)

CFRP platforms for the CMS Muon Barrel Alignment system



One of the 36 4m long CFRP platforms assembled from machined CFRP tubes and plates undergoing acceptance testing at IMMG (2003)

CFRP platforms for the CMS Muon Barrel Alignment system



The CFRP platforms
installed on the CMS

CFRP platforms for the CMS Muon Barrel Alignment system



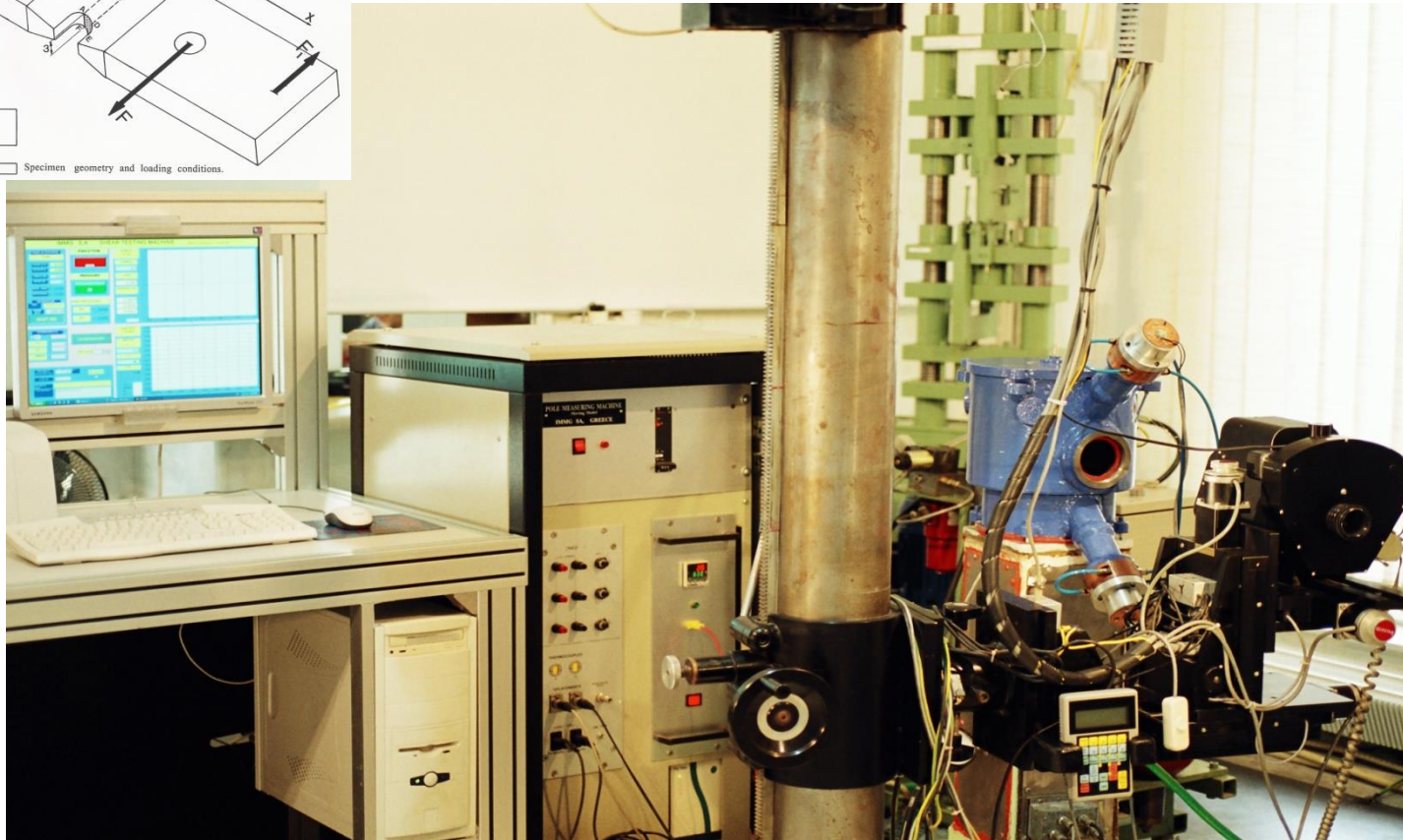
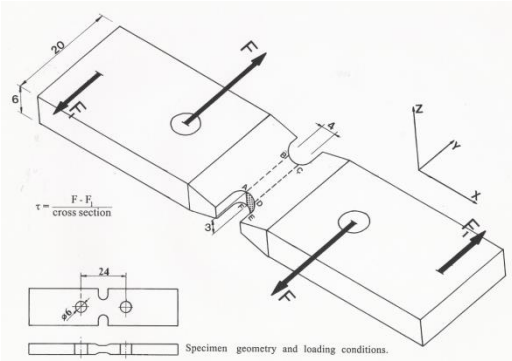
Close-up view of one of the platforms equipped with sensors and electronics

Tension-compression-internal pressurization testing machines



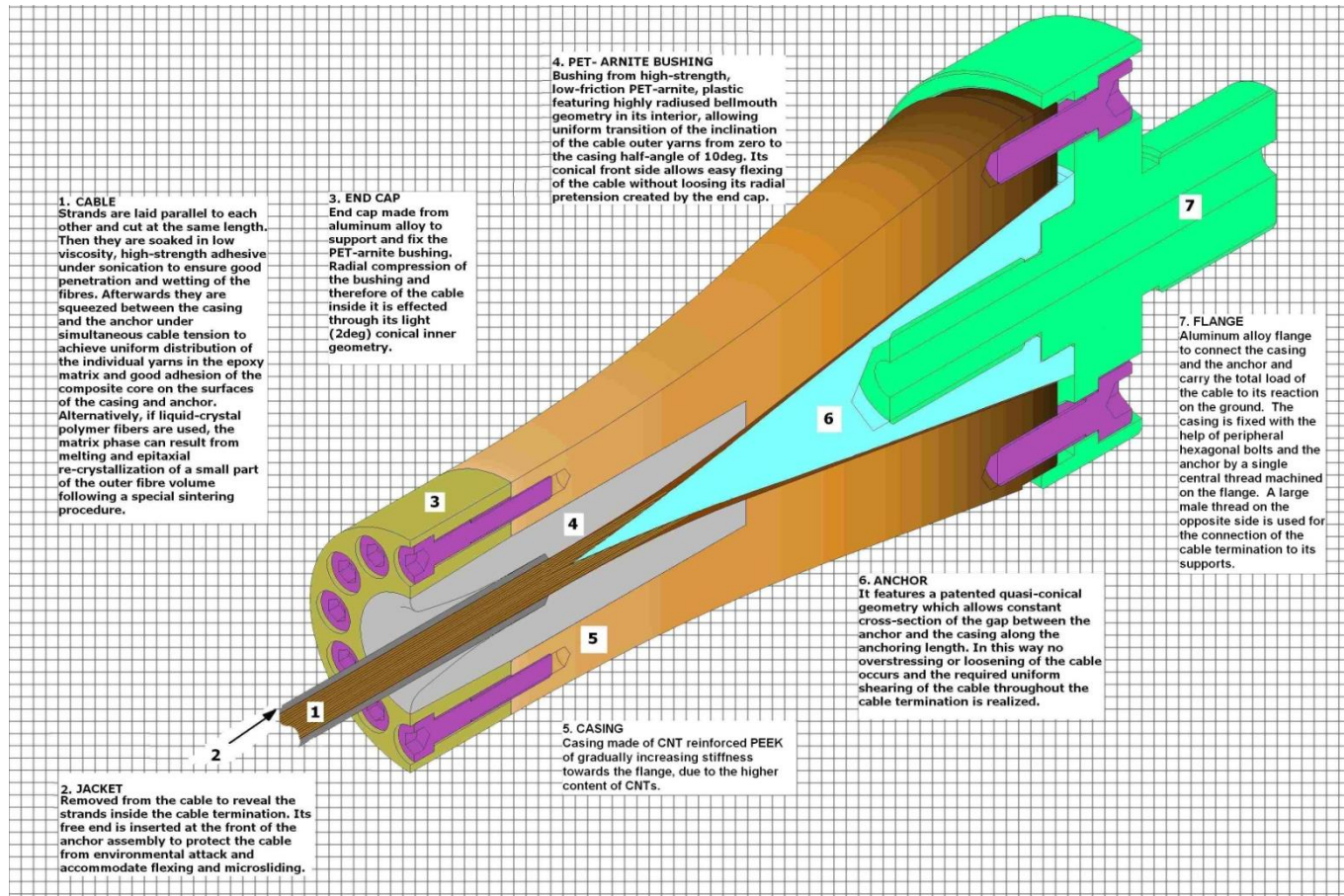
Prototype testing machine with patented internal pressurization system for hollow cylindrical specimens at high temperature ($>1000^{\circ}\text{C}$)

The patented shear testing machine and specimen



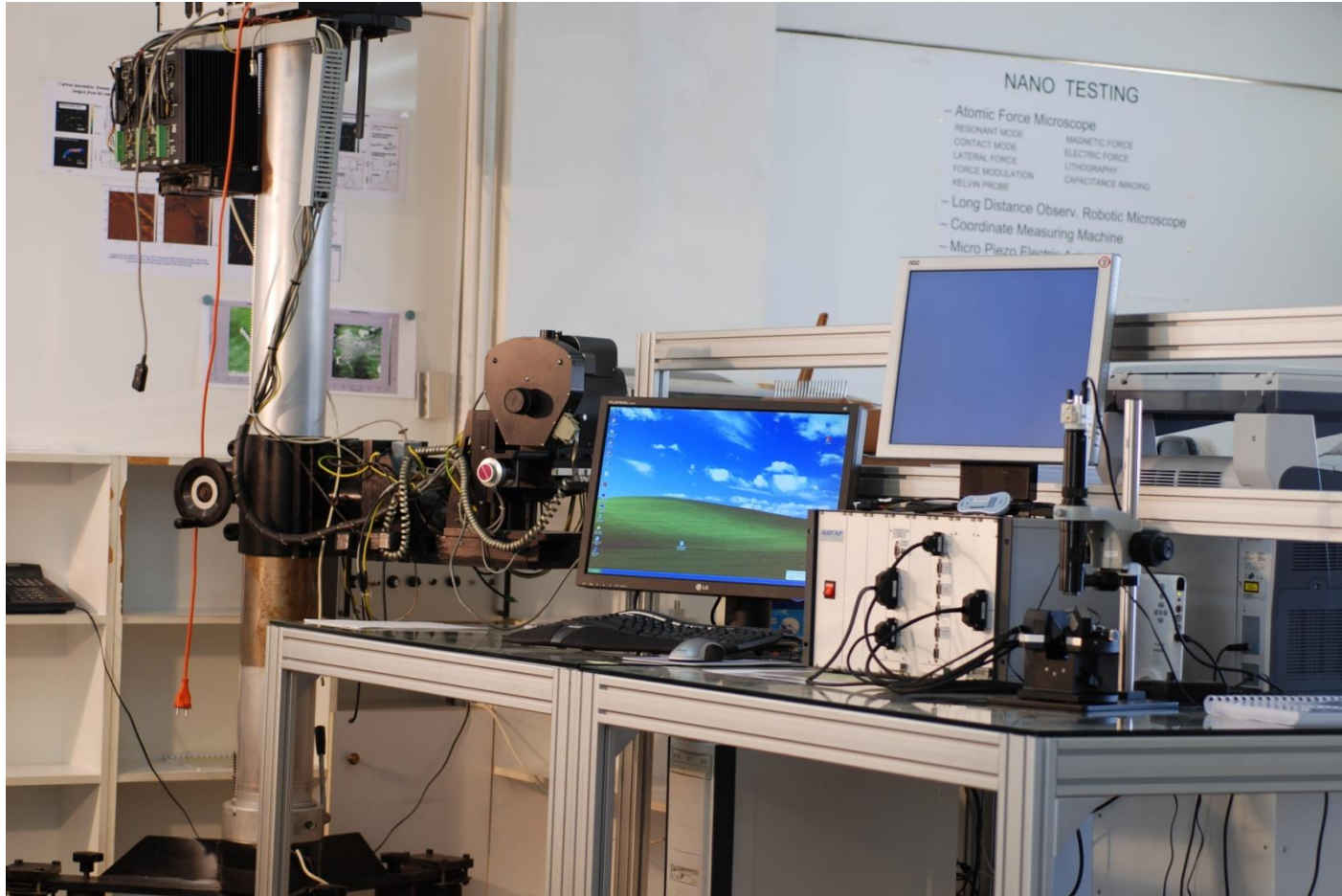
The shear testing machine and patented specimen (upper left) has been used in 11 completed EC-funded research projects with over 60 new materials tested

Design – Construction of a socket-type termination for polymeric fibre cables



1-2 Cable with jacket /3. End cap /4. PET bushing /5. Casing /6. Anchor /7. Flange

AFM and optical testing facilities



The AIST and the long-distance optical microscope at IMM

Fully equipped workshop with CNC machining capabilities



GILDEMEISTER CTX 400-2
Turning centre

DECKEL MAHO DMU 50
Machining centre



Fully equipped workshop with CNC machining capabilities



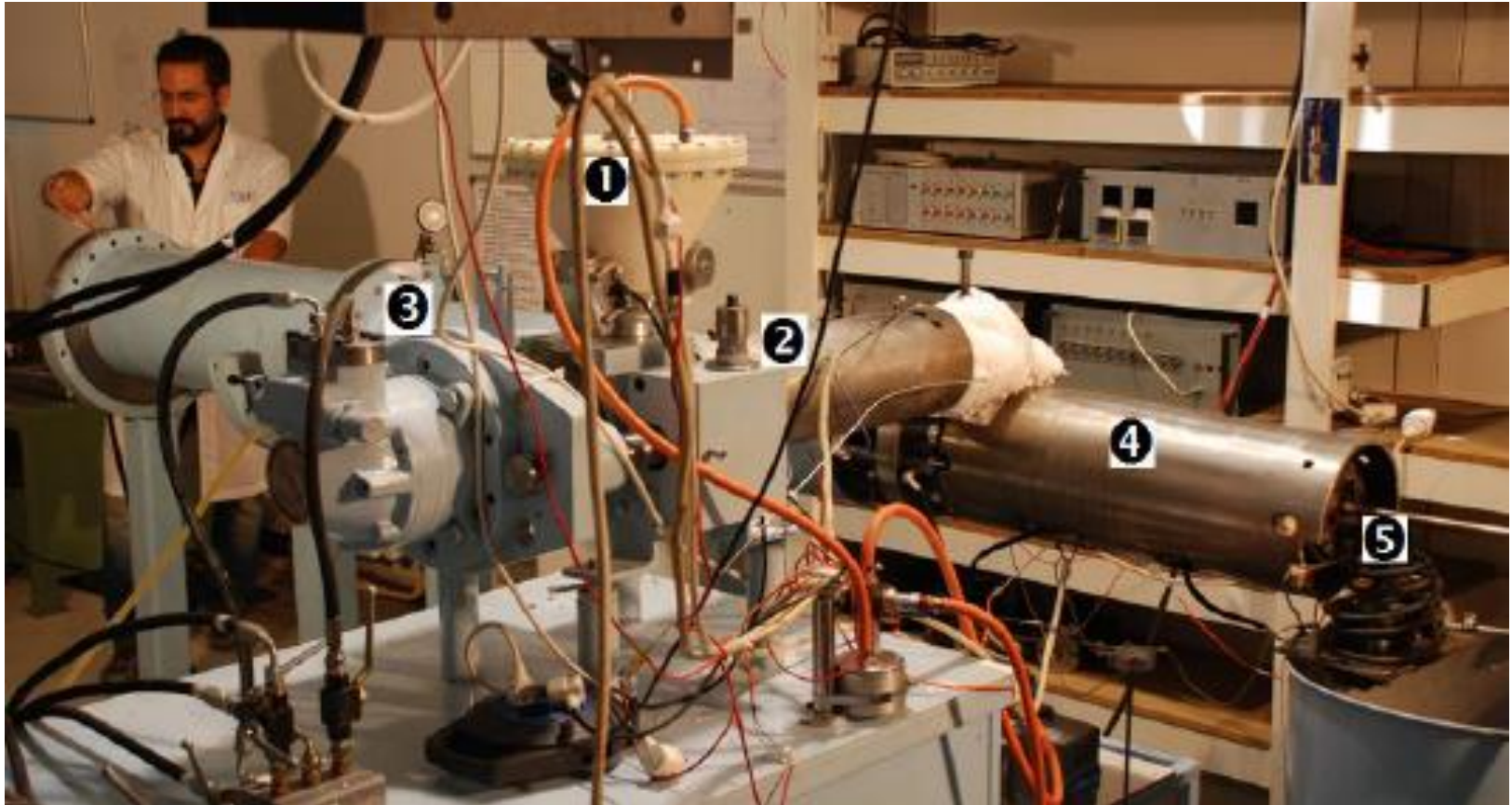
Machining one of the 320 optical systems housings for Leopard II MBT on the OKUMA MX45 VAE machining centre (2007)

Novel CNT – GO mixer-reactor



The mixer-reactor for CNT disentanglement-dispersion-functionalisation and joining with PEK grains (*Journal of Chemical Engineering Science*, **90**, (2013), 10-16)

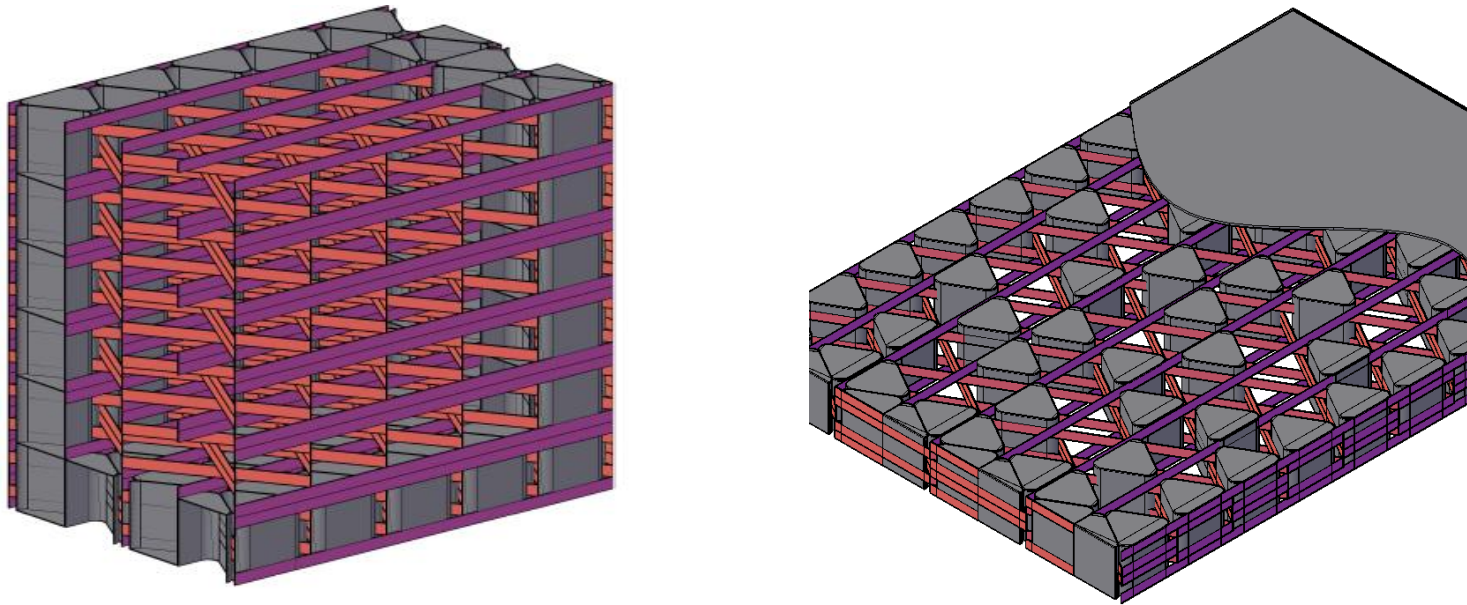
CNT-PEEK nano-composite production



Laboratory –scale CNT-PEEK production line comprising:

1. Powder vacuum feeder
2. Servo-controlled hydraulic extruder
3. 100 ton hydraulic actuator
4. Micro-splitting void reduction and homogenisation chamber
5. Die

The patented DIRIS architecture



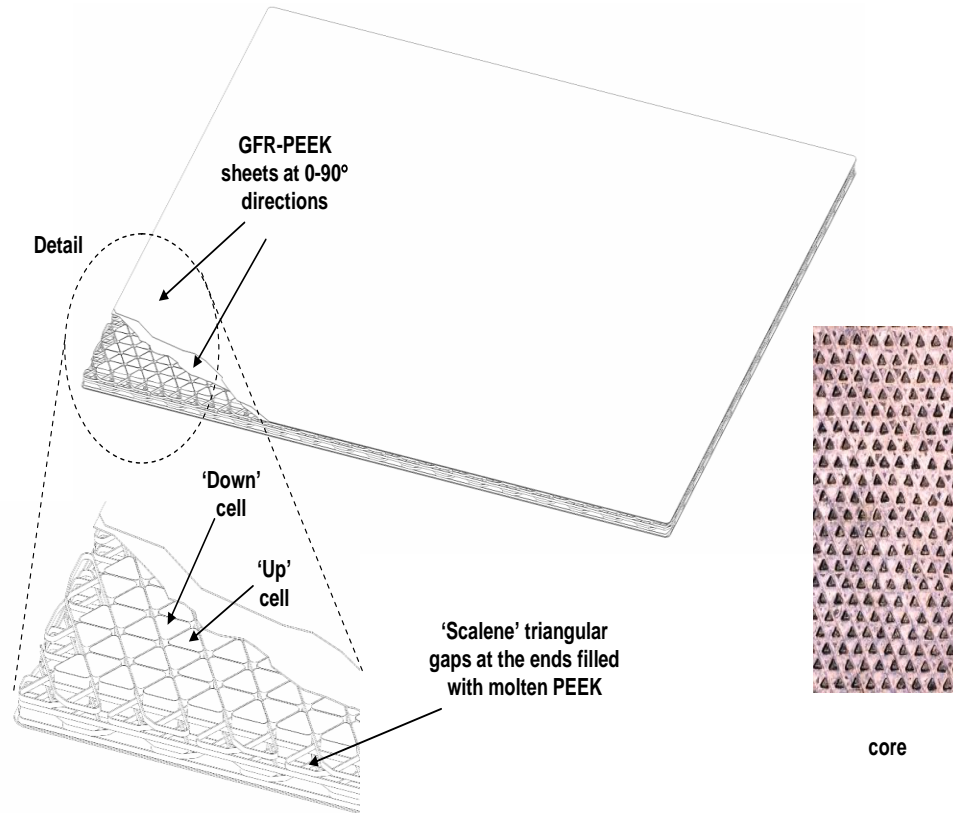
The **D**irectionally **R**einforced **I**ntegrated **S**ingle-yarn (**DIRIS**) architecture in 3-D (bulk structure left) and 2-D (planar structure right)

Design - Construction of a 7-g, 10ton, DIRIS Shaking Table



The actuation system of the IMMIG shaking table

Design - Construction of a 7-g, 10ton, DIRIS Shaking Table



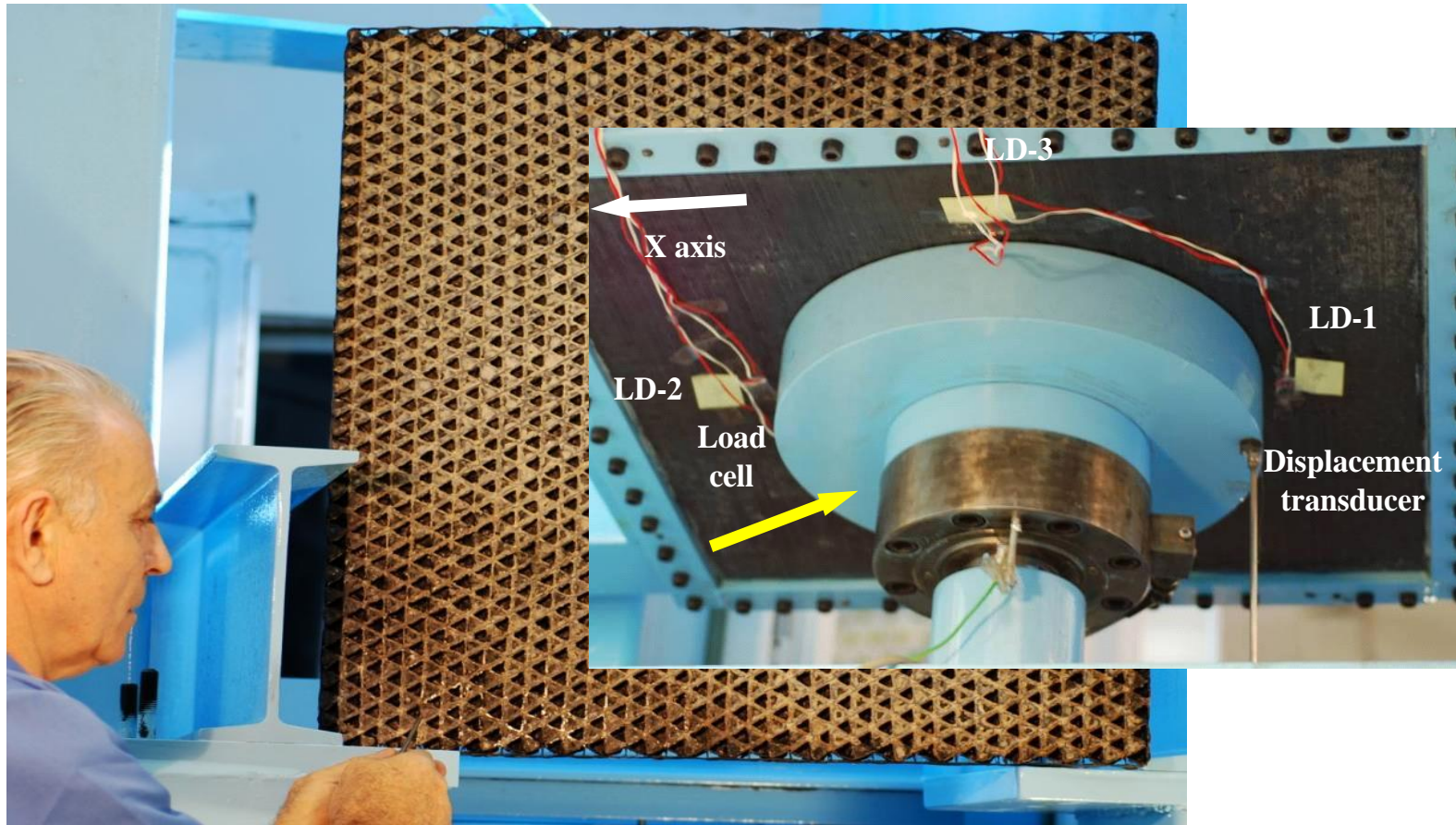
Architecture of the DIRIS core and panel IMMIG shaking table

Design - Construction of a 7-g, 10ton, DIRIS Shaking Table



Damage inflicted on the masonry specimen tested at IMMG
(unreinforced – left, repaired-reinforced – right)

A DIRIS core manufactured for the ESA

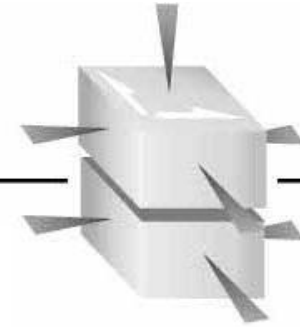


An assembled 1mx1m **D**irectionally **R**einforced **I**ntegrated **S**ingle-yarn (DIRIS) isogrid core for spacecraft floor and the corresponding panel at the testing machine (ESA 2009)

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Thank you for your attention

Website at: www.immg.gr