



Laboratorio Subterráneo de Canfranc

DIRECTOR'S REPORT

Aldo Ianni

18th Scientific Committee

LSC, May 16th, 2016

Welcome to our special guests [1]

- Dña. Marina Villegas Gracia
General Director of Scientific and Technological Research (MINECO)
- Dña. Ángela Fernández Curto
Deputy Director of Planning of Scientific and Technological Infrastructures (MINECO) – Chair of the Executive Committee for LSC
- D. Joaquin Serrano Agejas
Deputy Director of International Projects of the Scientific and Technological Research Division (MINECO)
- Mario Martinez, manager (*gestor*) of the Spanish National Program for Particle Physics and Accelerators

Welcome to our special guests [2]

- David Nygren, Presidential Distinguished Professor at University of Texas at Arlington, Invented the Time Projection Chamber, used worldwide for more than 30 years
- Gioacchino Ranucci INFN Milano, co-spokesperson of Borexino, former co-spokesperson of DarkSide-50 and deputy spokesperson of JUNO
- Amy Catanzano Wake Forest University, North Carolina, USA. Creative writing program

About this meeting

- Mainly a detailed review of NEXT, ANAIS and ArDM
- An invited talk by Gioacchino Ranucci on instrumented Water and Scintillator active veto as a general infrastructure for Underground Laboratories
 - It could be an idea to implement at LSC
- A new Letter-of-Intent for LSC on Direct Dark Matter Search

Info: An indico web page for this meeting has been set-up:
<https://indico.cern.ch/event/523699/>

New 6-year agreement for LSC

- In Dec 2015 a new 6-year agreement between the Ministry of Economy and Competitiveness, the Aragon Government and University of Zaragoza has been signed

Highlights from last SC meeting [1]

- **Underground infrastructure**

- The [radon abatement system](#) has been installed and commissioned in Hall A
- Components for [the radon detector](#) at mBq/m^3 purchased. The detector will be installed in collaboration between LSC and the Jagiellonian University in Krakow
- [New lasers for the strainmeters](#) at LSC; they will be installed in June in collaboration with the University of Salento

- **Surface infrastructure**

- [NO improvement on data connection](#): attempt failed due to technical problems which must be solved by a Company working for the Aragon Government
- [Refurbishment of Casa de los Abetos](#) completed (outside painting missing)
- New outreach ideas underway in collaboration with Carlos Pena-Garay (IFIC) and Gran Sasso Laboratory
- Improvement of [the electro-forming facility](#) in collaboration with Julio Amaré from UZ



Laboratorio Subterráneo de Canfranc



Radon abatement plant

Prototype of portable muon telescope for outreach at LSC



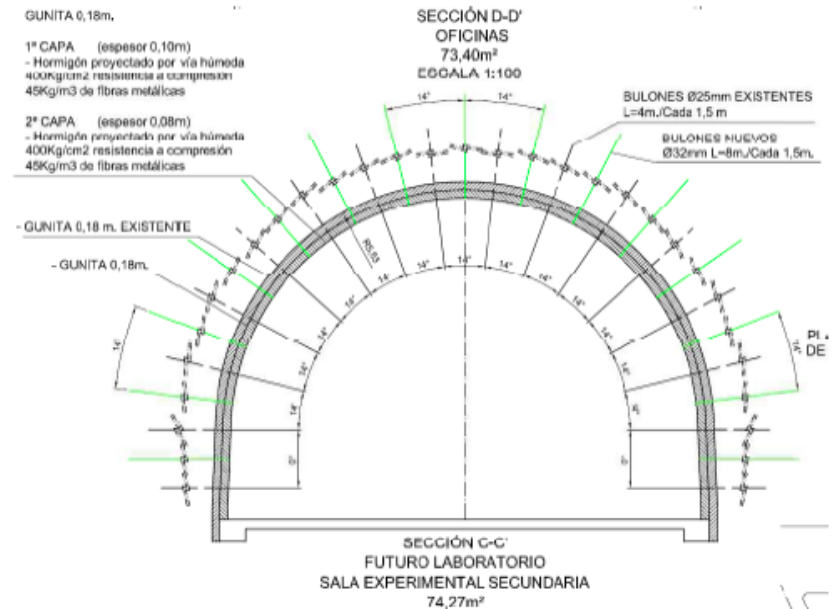
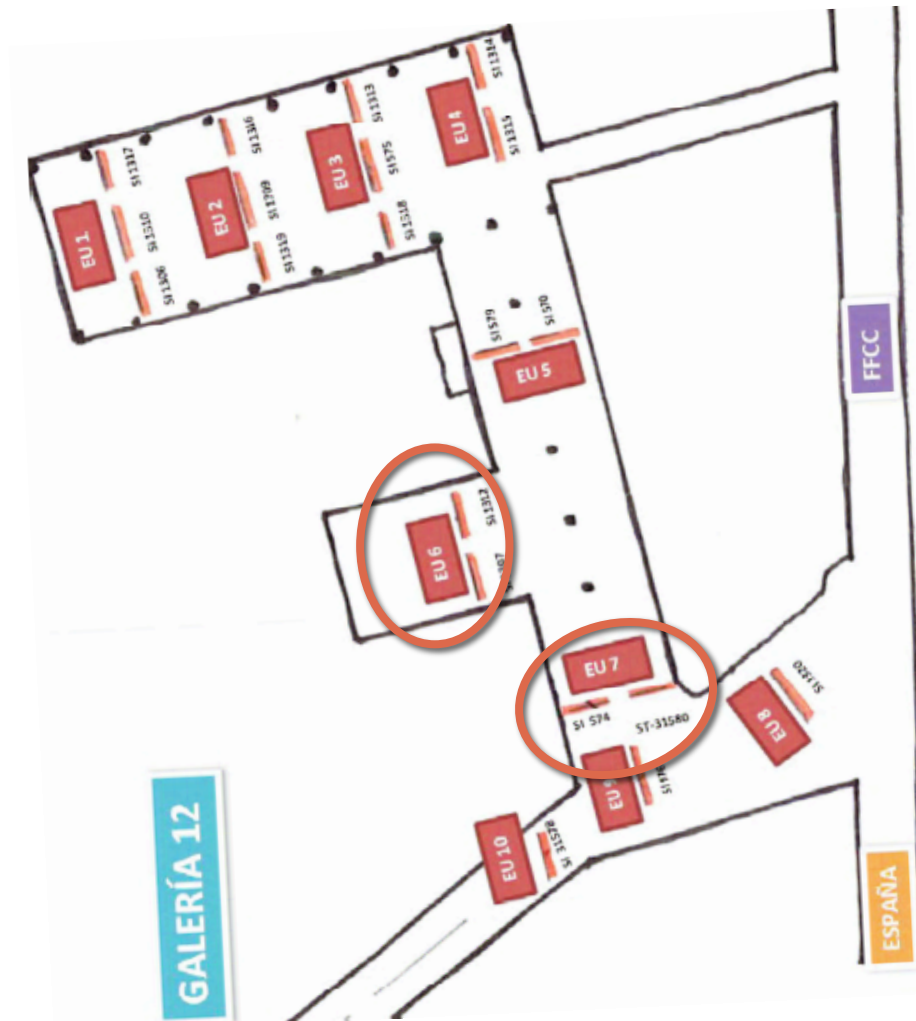
Highlights from last SC meeting [2]

- Workshop on CUNA (see next talk)
 - As requested from the Scientific Committee we have organized this workshop
 - <https://indico.cern.ch/event/484637/>
- New research and collaboration agreements
 - University of Salento in the framework of Geodyn and with an Erasmus program
 - University of Roma La Sapienza to characterize mechanical properties of electro-formed copper to be used in bolometers
 - With the Jagellonian University and the DAMIC collaboration to study surface Pb and Po contamination of electro-formed copper
 - With LNGS to make two muon telescopes for outreach activities

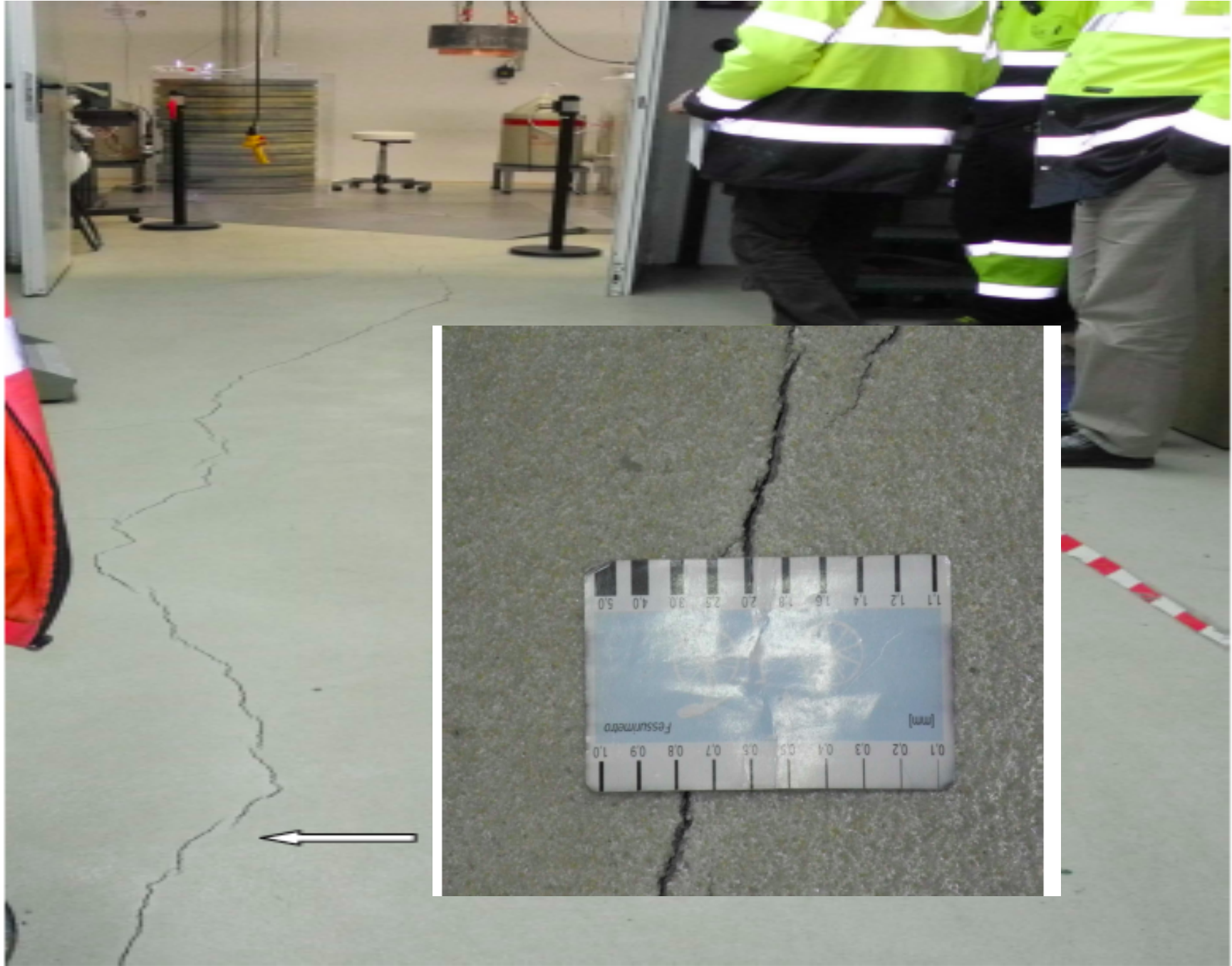
Highlights from last SC meeting [3]

- In February we have organized a two-day Risk Analysis review of the gas system in NEXT with engineers from LNGS and FermiLab
 - ✓ Recommended HAZOP (done!)
 - ✓ Recommended integrated risk analysis for Hall A (to be done)
- Organized a survey of the rock stability in Hall B
 - ✓ Quotation from two companies (IDOM and Finzi Associati)
 - ✓ Detailed discussion in next slides
- Silvia Borjabad and Iulian Bandac from the LSC staff following a course to obtain radioprotection qualification at CIEMAT
- Jose Luis Rubio from LSC staff obtained CERN access in order to follow training courses on safety (thanks to Ariella and NEXT collaboration for their support)

Survey of Hall B



- "Swelling" (hinchamiento).
- "Squeezing" (shear flow, sliding, fluencia)
- "Rockburst" (explosiones de roca).
- "Ravelling" (desmoronamiento estructural).



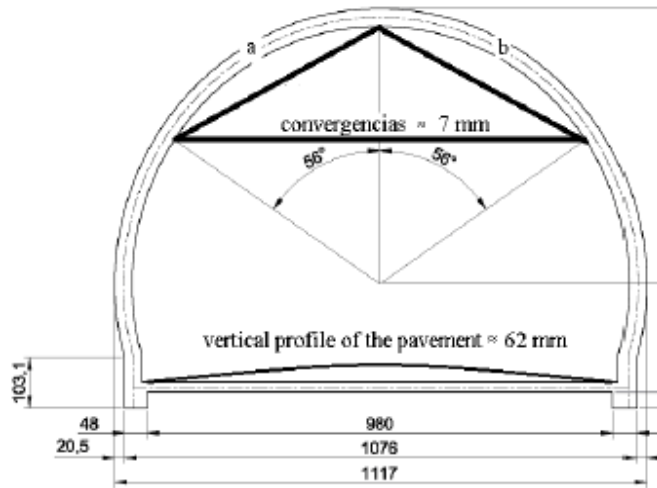


Fig. 1.2 deformations observed through the monitoring activity

Optic fibers measures a deformation of 1mm over 5m

Convergence measurements show larger deformation up to 6mm

Liner made of fibre-reinforced concrete 18+18 cm with bending resistance in compression of 40 MPa

Stronger stress justifies observed deformations

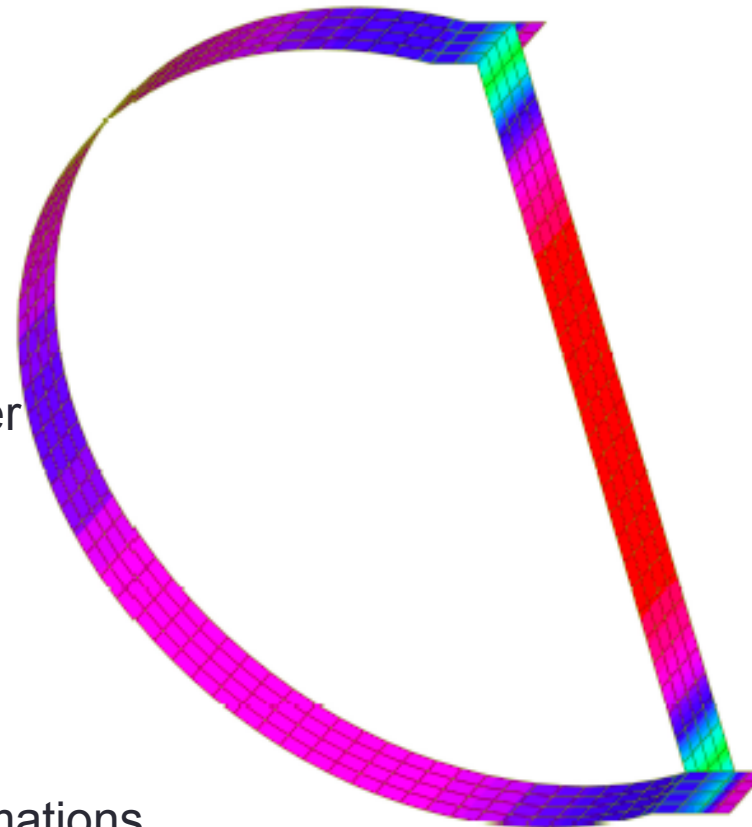
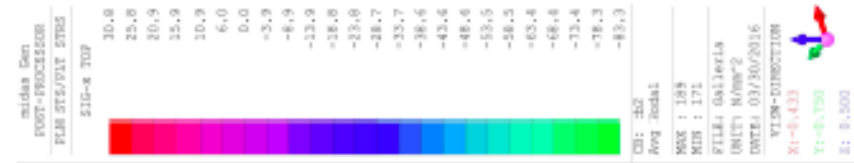
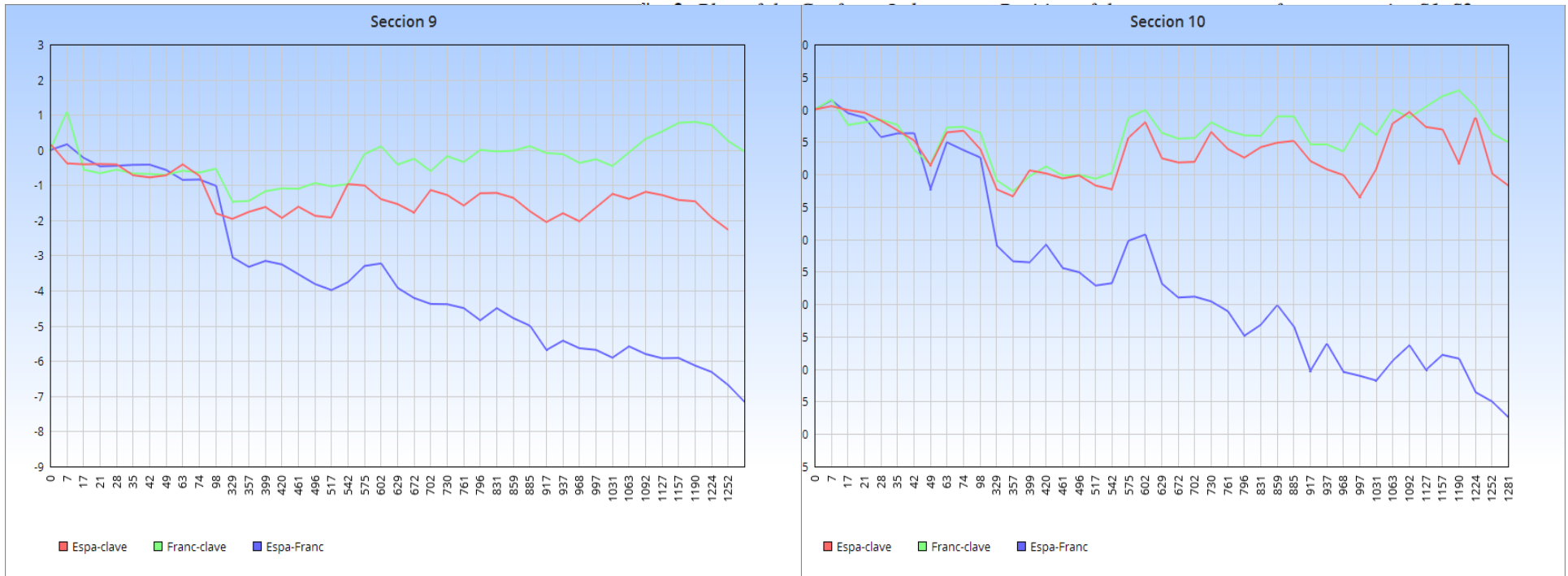
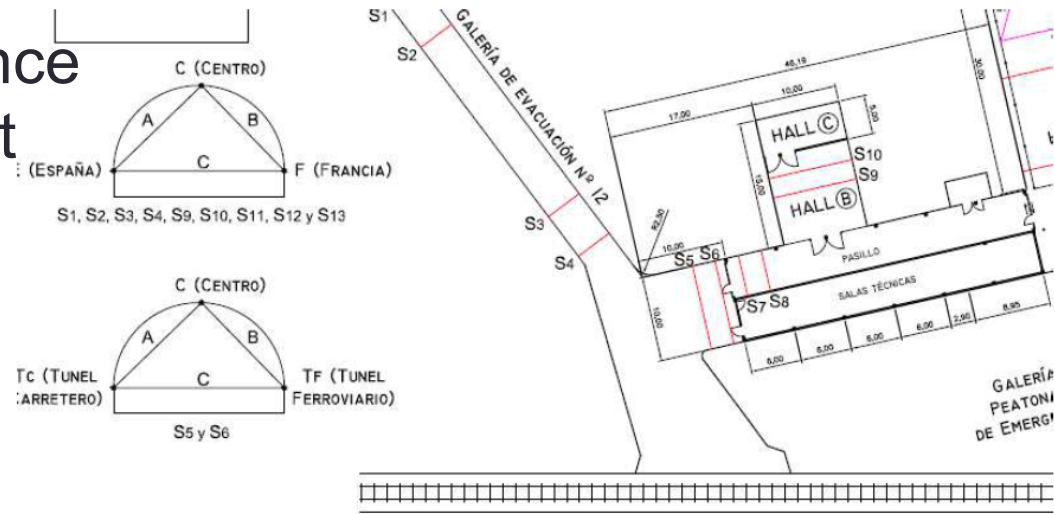


Fig. 1.10. Detailed map of the elastic stresses at the internal skin fiber. Traction and compression.

Measurements of convergence and change vs time over last few years



Survey of Hall B: conclusions and recommendations

- No structural threat present
 - 8m long tendons prevent an event such as the one occurred in March 2007
- Observed deformations consistent with finite element analysis outcome
- Equilibrium condition not reached yet
 - deformations in S7, 8, 9, 10 still in action with trend to decrease
- Add measurement of floor deformation in our monthly monitoring data
 - the vertical profile is deformed and asymmetric
- Plan in one year a second review
 - only after equilibrium is reached one could any action

Highlights from last SC meeting [4]

GOLLUM: after the recommendation of the Scientific Committee in Nov 2015, we got funding to support the start-up of this activity.

Last week first samples were taken along the train tunnel



DULIA



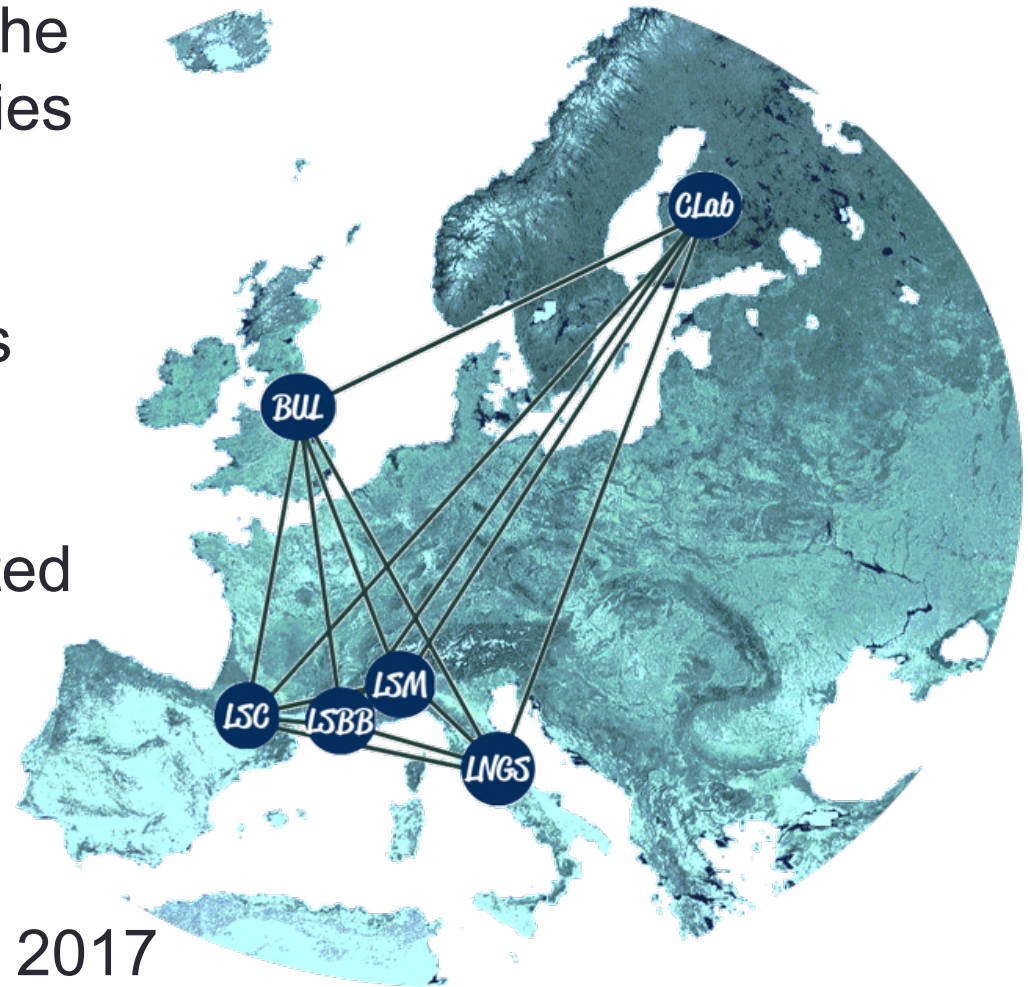
Laboratorio Subterráneo de Canfranc

Goal:

- 1) Make a network between the Deep Underground Laboratories (DULs) in Europe
- 2) Ask EU 5M€ in 5 years to support collaboration activities among DULs

Status:

- 1) First step proposal submitted end of March
- 2) by end of June we are told whether we could move to 2nd Step
- 3) Final proposal due by early 2017



More highlights



Laboratorio Subterráneo de Canfranc

- Jens Kallmeyer, Potsdam Germany, new external member of the Scientific Committee to support proposals on biology and life in extreme environments at LSC
- BiPo set-up to be used by other experimental groups ≥ 2017
- Annual Report 2015 edited and submitted for preliminary formatting and printing
- Measurements of KSTAR (Korean Superconducting Tokamak Advanced Research) thermonuclear fusion samples performed by four European underground laboratories (including LSC) completed. Goal: determine leakage of charged particles from plasma.

Good visibility of LSC low counting facility

- ✓ Final results will be presented at the Conference Low-Level Radioactivity Measurement Techniques 2016
- Opportunities for students
 - Analysis of data taken with the muon telescope
 - Assembling and data taken with the radon detector
 - Muon telescopes to be made in collaboration with Gran Sasso Laboratory



Laboratorio Subterráneo de Canfranc

Conclusions

- I would like to thank the LSC staff for the great effort made in the last months
 - LSC needs more manpower to properly and professionally face the new requests of collaborations and research activities on site
 - Permanent engineer to work on safety
 - Temporary research position
 - I am working on Marie Curie fellowship opportunities
 - DULIA will help if successful
 - ...
- I would like to thank all members of the Scientific Committee and, in particular, Ariella Cattai and Concha Gonzalez-Garcia for their work at LSC, being this their last meeting as members of the Scientific Committee
- I would like to thank Angela Fernandez Curto for her constant support