



EMC FWD Mechanics

INFN ROMA Group

R. Faccini – A. Zullo – V. Pettinacci – F. Pellegrino

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2012*

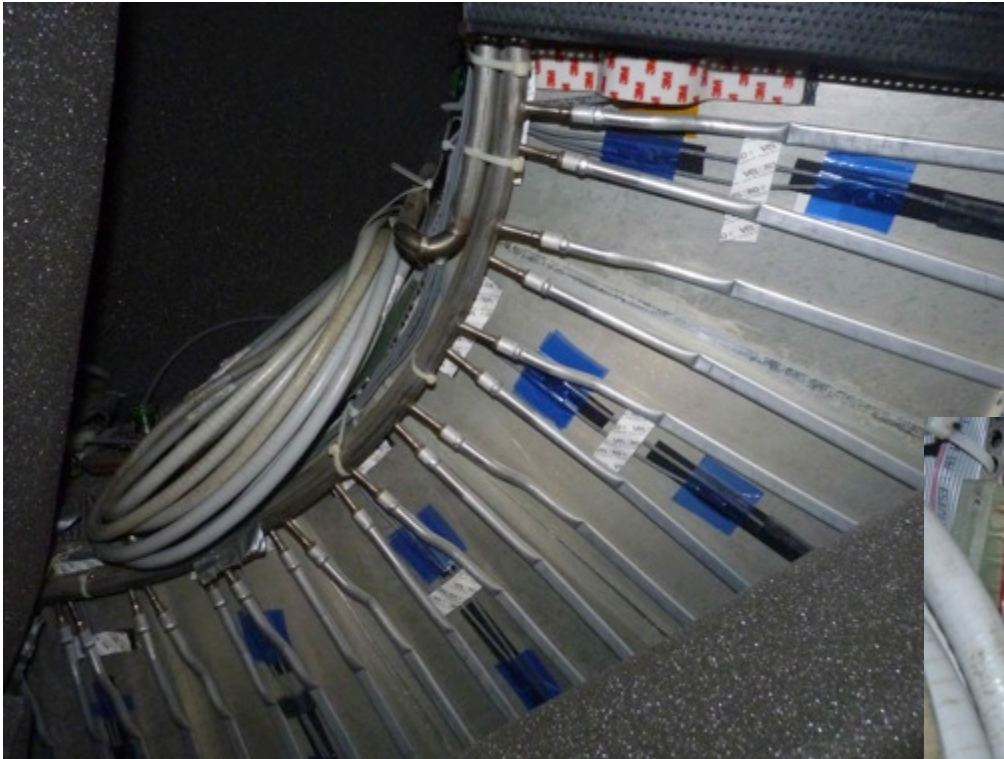
- News from SLAC (July 2012 survey):
 - ◆ FWD Cal present status
 - ◆ FWD Cal Equipment and missing components
 - ◆ Installation procedure
- Spare modules from Caltech
- Conclusions and next steps



- Stored at SLAC inside IR12, in thermalized conditions. Investigated some technical details about cooling.



- Survey on **Calibration System** tubing



- Inner diameter thickness:
about 60 mm
(conservatively)
- Outer diameter thickness:
about 15 mm
(conservatively)



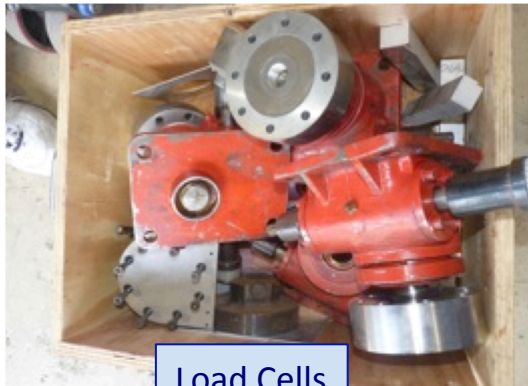
Components collected at IR12:



Rail Extension Table



Module Cart

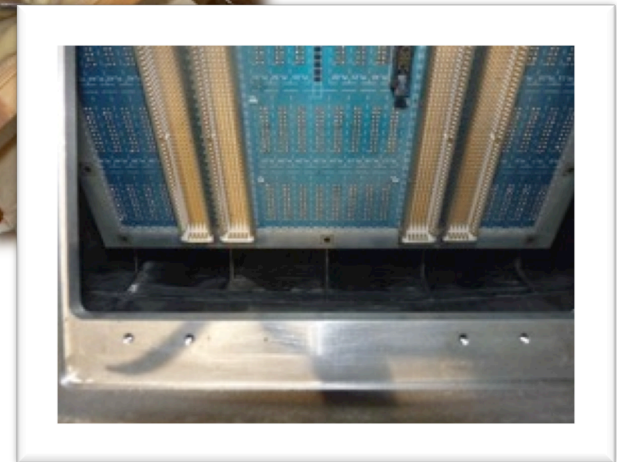
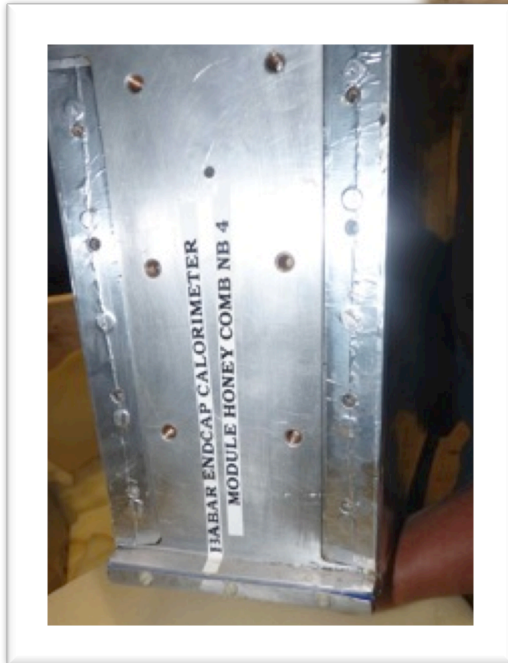


Load Cells



Steel Bridge

Inside one crate, another **empty spare module** has been found (Module Honey Comb #4)

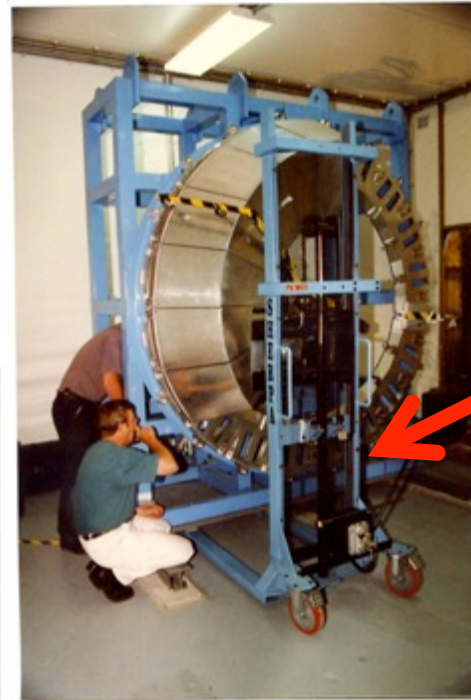


Other components at IR12:

- Some *Manipulator* components disassembled
- Mould with mandrels
- Crate with several crystals mockup, in different materials
- Systems for crystal dimension measurements with dial indicators (one for Barrel and one for FWD) → **Online database exists with measurement of dimension and light yield for each crystal**



The weight of each component has been measured by *M. Racine (SLAC)*. Considering these weights and dimensions, the overall shipment operations cost has been evaluated by an Italian shipping company: about **45000 euros**.

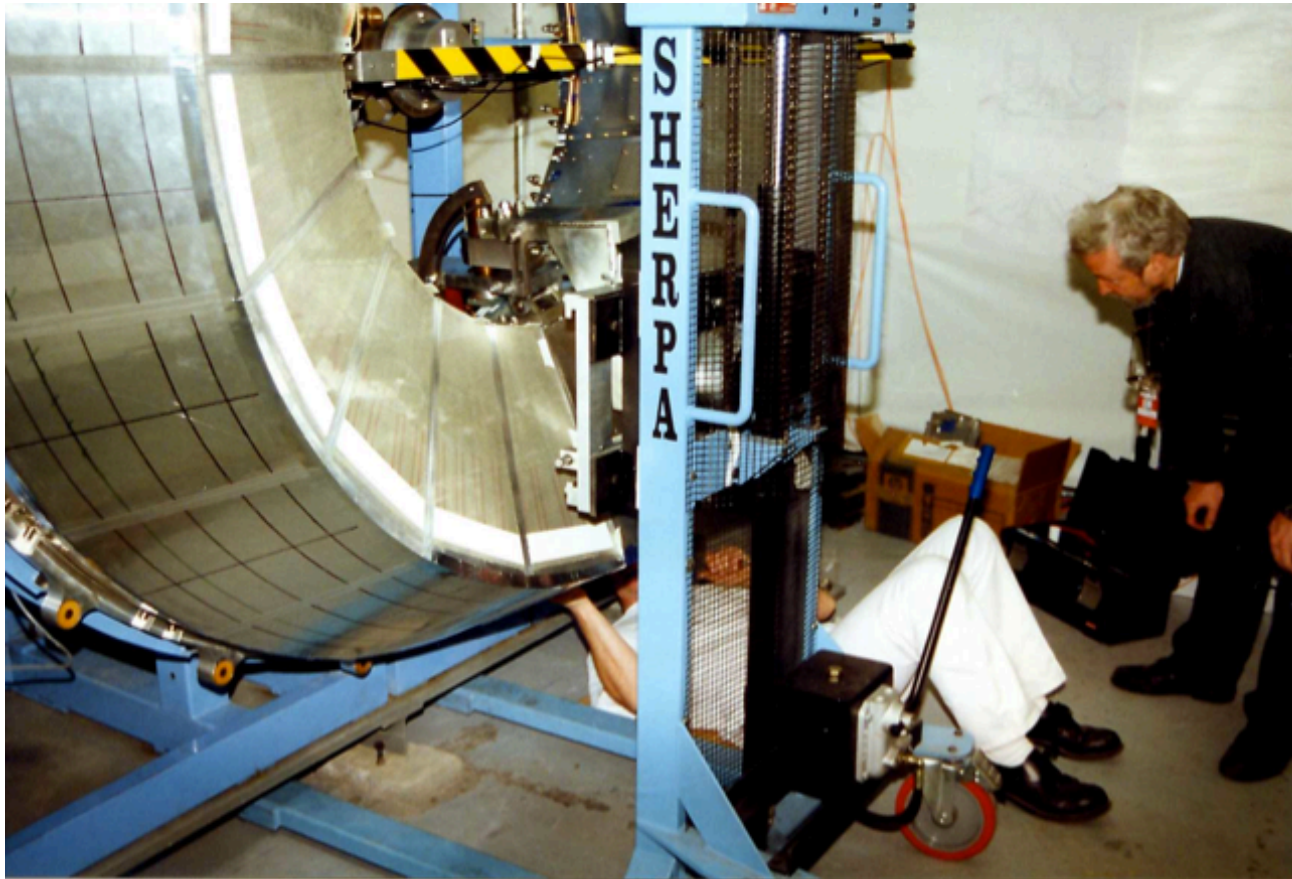


Relevant missing parts and to-do list:

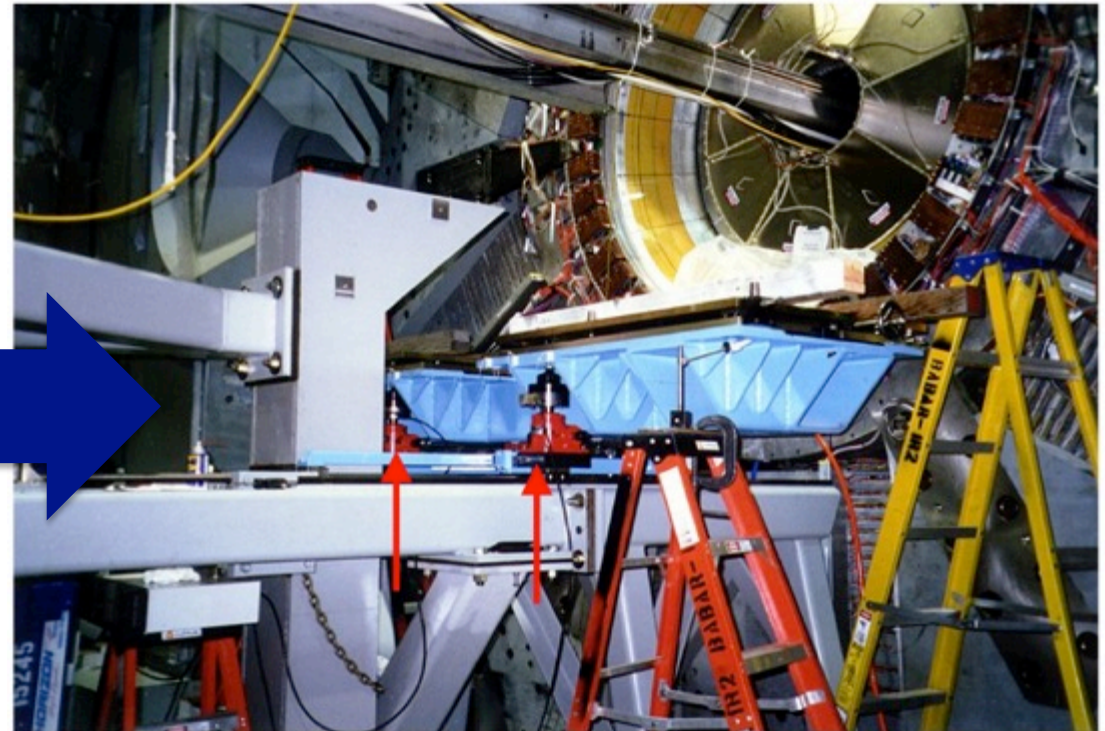
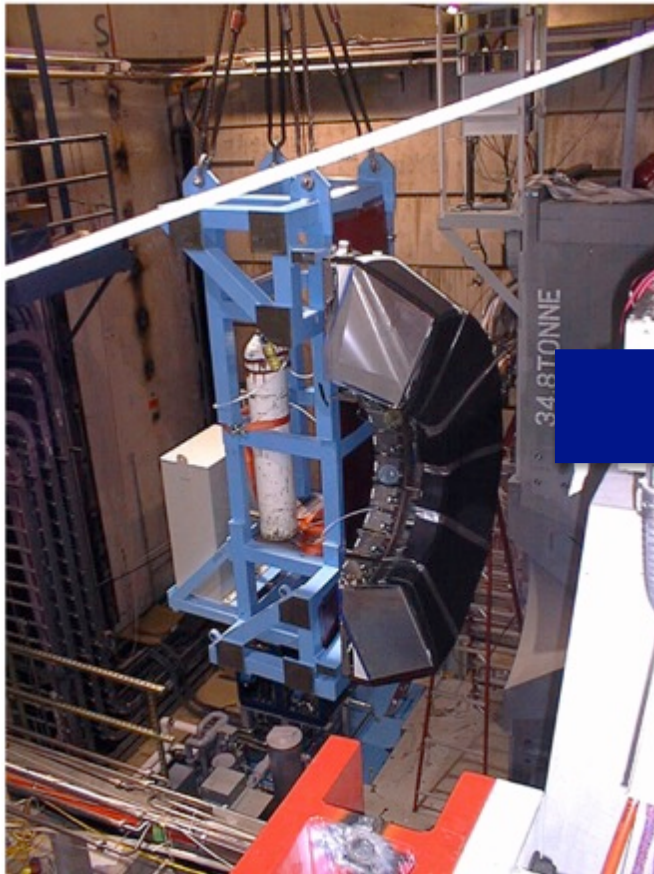
- The *Manipulator*: machine conceived to handle a populated single module (200 kg), in order to install it on the rigid backplate, standing on the blue frames. It's fundamental and completely disassembled. Necessity to buy new commercial parts and remake new mechanical components.
- The *Temporary Stand*: parking fixture for the FWD Cal once assembled; it should host the structure waiting to be installed on the beam-axis rails.
- The *Load Cells*; n.4 are required for installation procedure. One it's note working and needs to be replaced. Optimal to buy other 2 (one spare).

Guide line: to follow the successful procedure performed for the original installation.

1. Install the 20 populated modules, singularly, on the rigid backplate, using Manipulator and Modules Cart.



- Lift up, from the Temporary Stand, the 2 halves of FWD Cal assembled, together with blue towers, and place them on the steel bridge, already installed on the beam axis rails and supported by 4 mechanical jacks with 4 Load Cells.



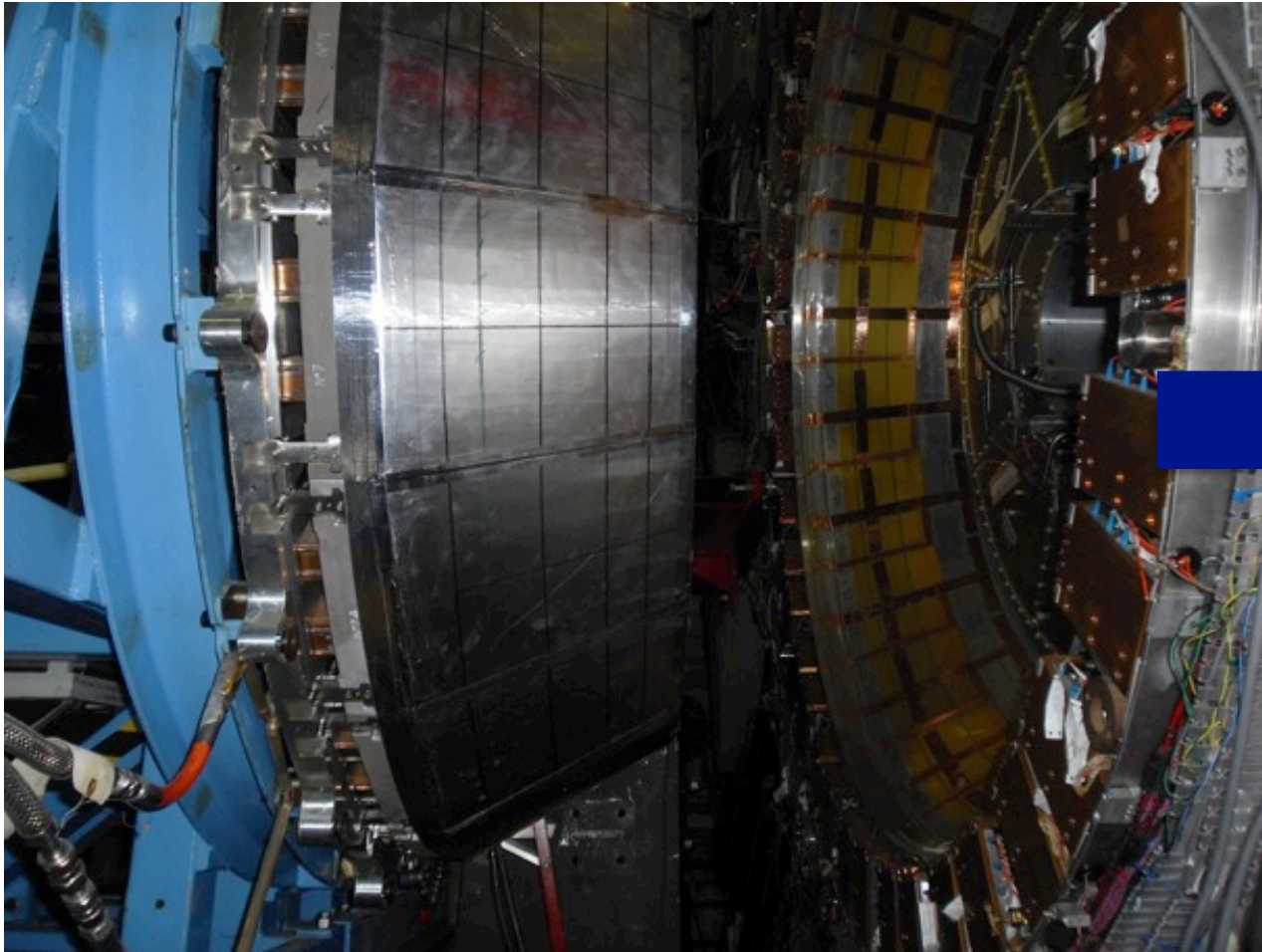
JF_003

Forward EndCap Installation Platform

10/22/98

Load Cells fundamental to understand the distribution of FWD Cal load, in the final position

3. Align and fix the FWD Cal to Barrel Interface: instruments to finely align the structure are required.



In BaBar several instruments and tools have been used (electrical connections, precision dowels and the load cells values).

... from the Integration point of view:



- FWD smallest inner diameter **840 mm** (cooling system needle valve)
- Tungsten Tube outer diameter 510 mm; space around will host supply for internal system



Spare FWD modules

2 spare FWD modules shipped from Caltech to INFN Rome: one damaged on a corner and one in good condition. They are both empty (no crystals).



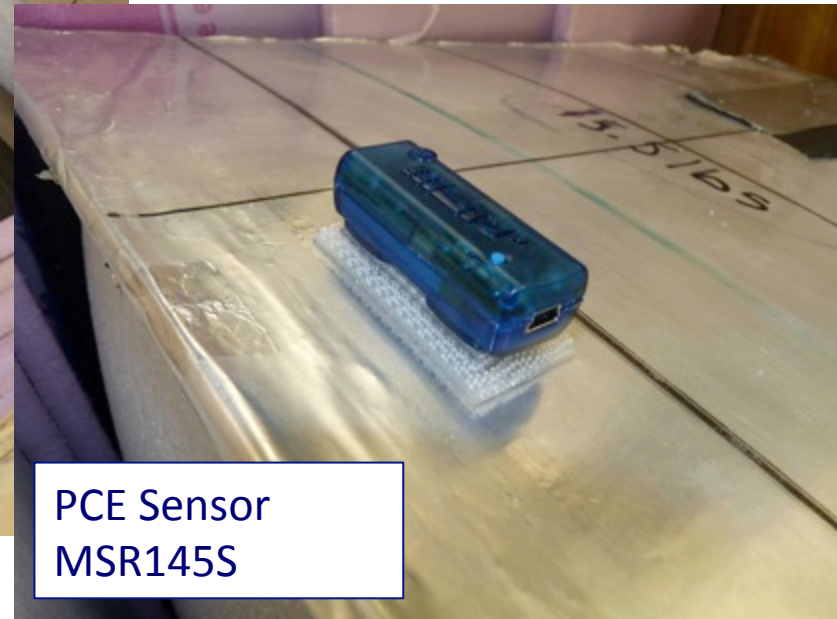
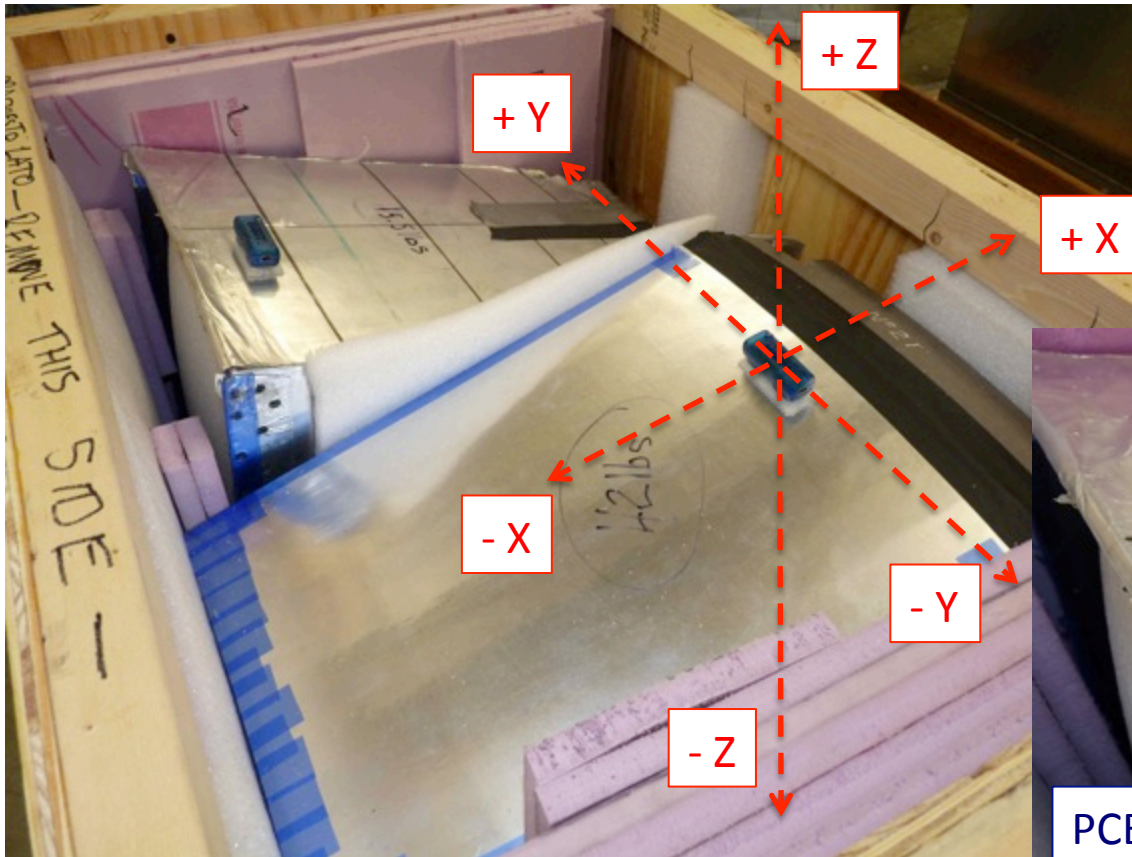
- They'll be used for test of new crystals insertion and to verify the composite structure
- The shipment has been monitored in order to have a first idea about solicitation, Temperature and humidity time history, during a common bulk freight operation.

Spare FWD modules

Modules safely packaged, inside a single wooden crate, at Caltech using insulating panel and damping foam.



On each module has been installed a sensor, able to record in time, 3-axes accelerations, Temperature and Humidity



PCE Sensor
MSR145S

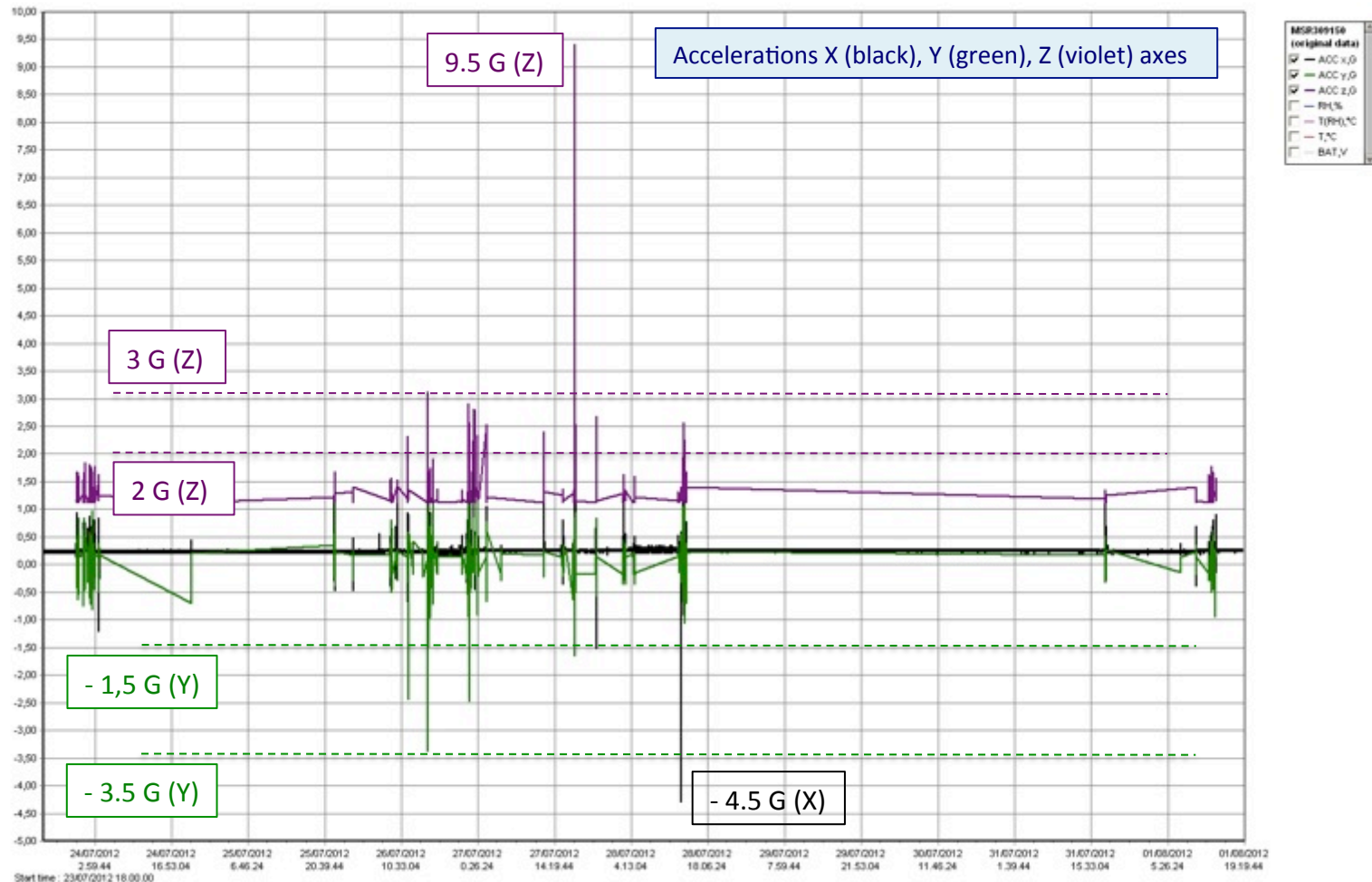
2 Shock Watches and 2 Tilt Watches have been glued to 2 orthogonal sides of the crate.



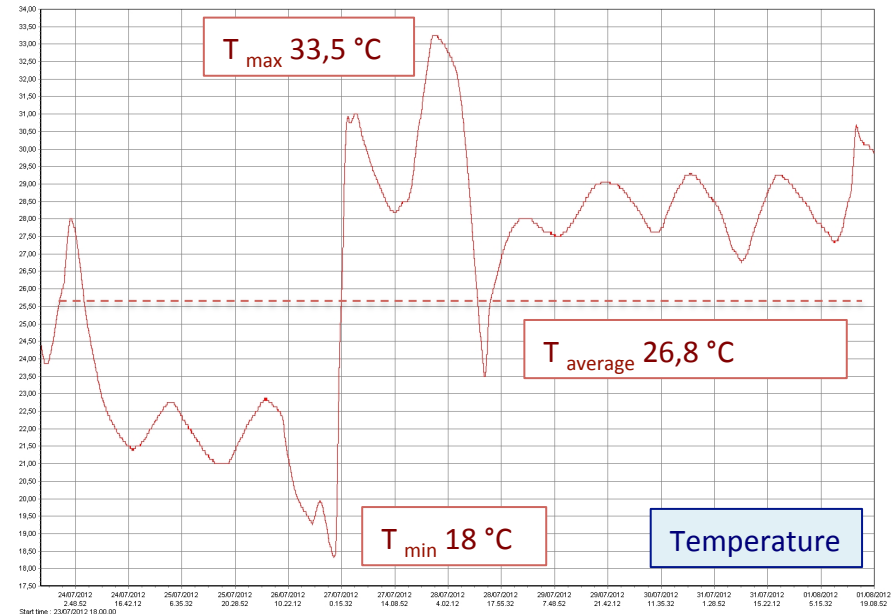
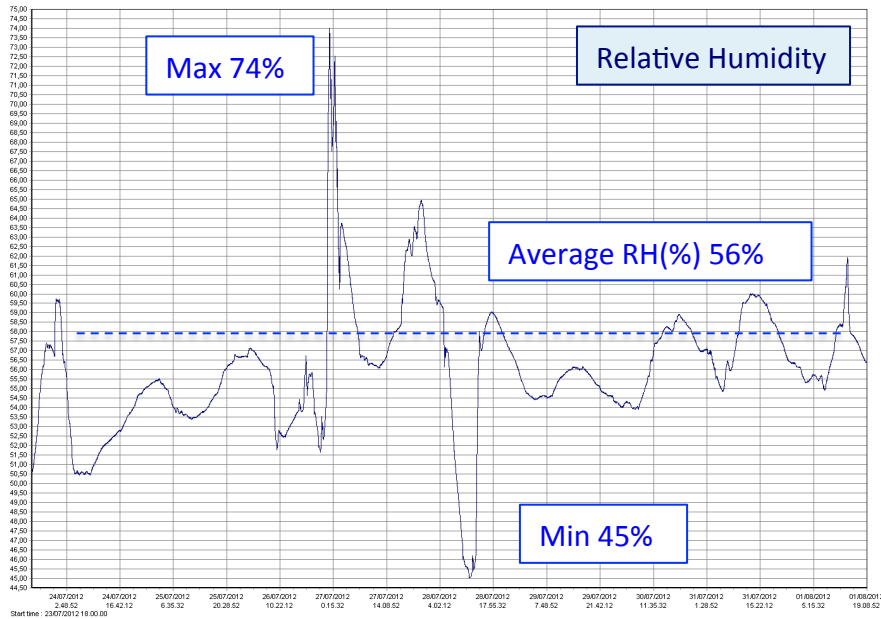
They left Caltech on July 23rd and arrived at INFN Rome on August 2nd. They looked like to be in good condition, but on the smallest crate side both tilt and shock watch showed limit exceeding (red mark).



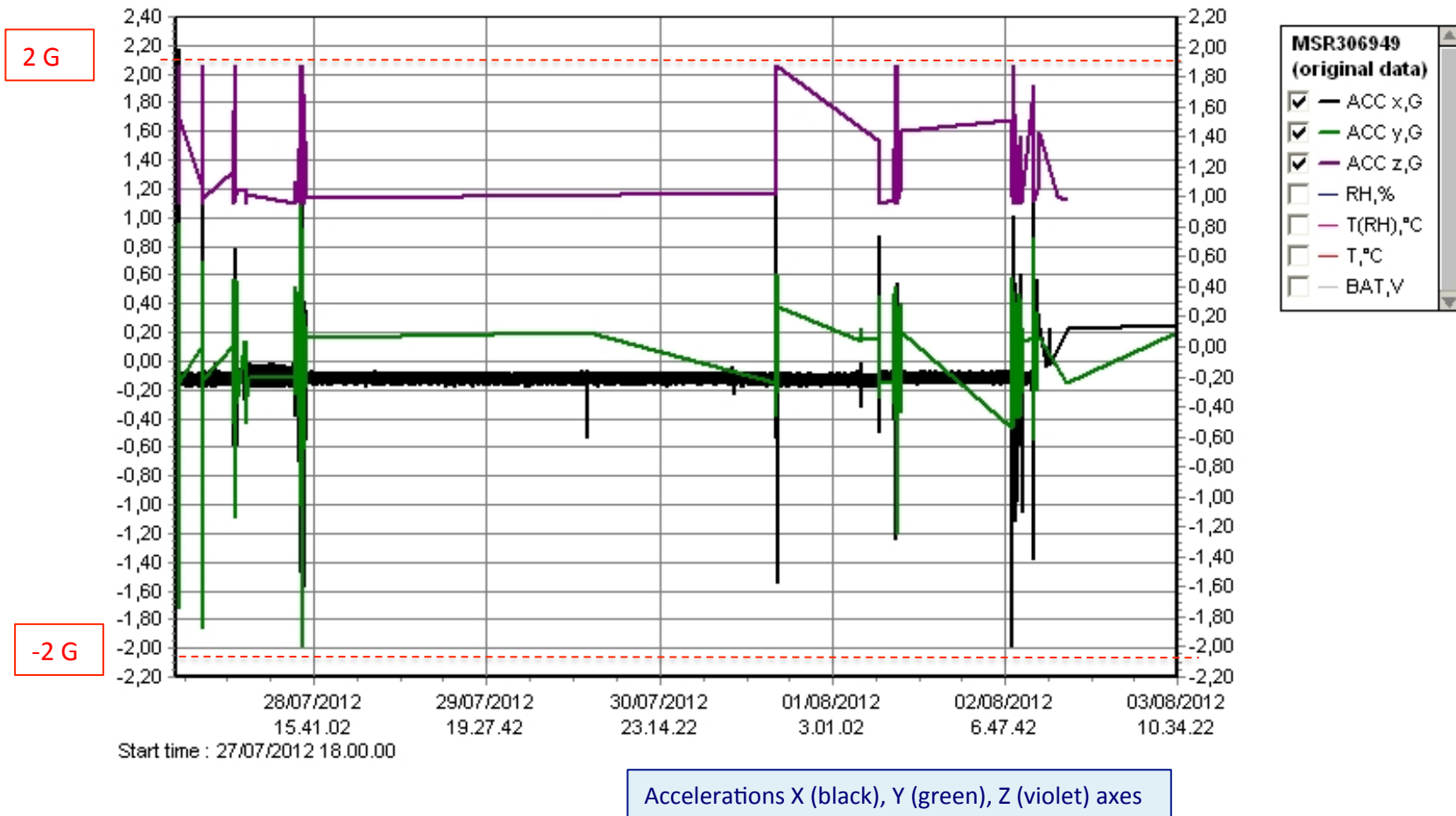
The first sensor recorded from July 23rd to August 1st



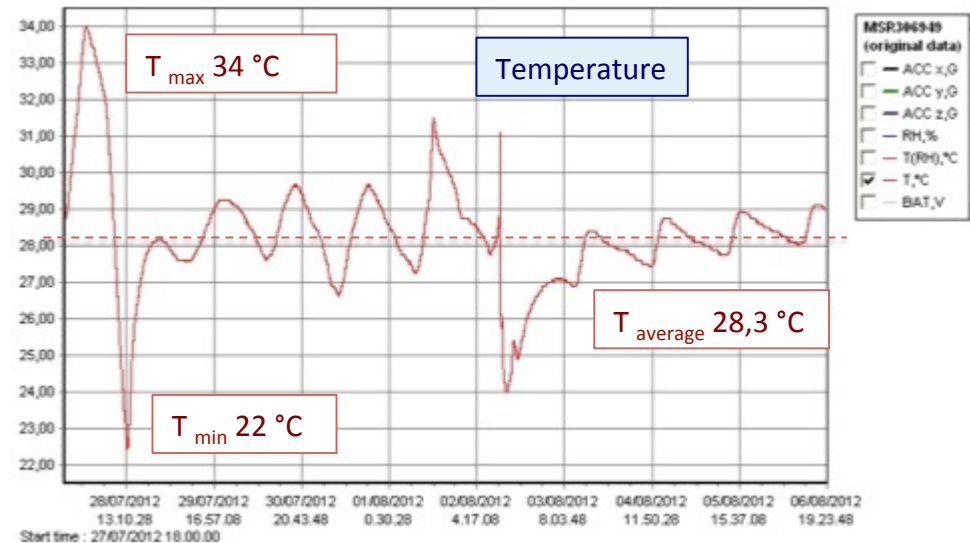
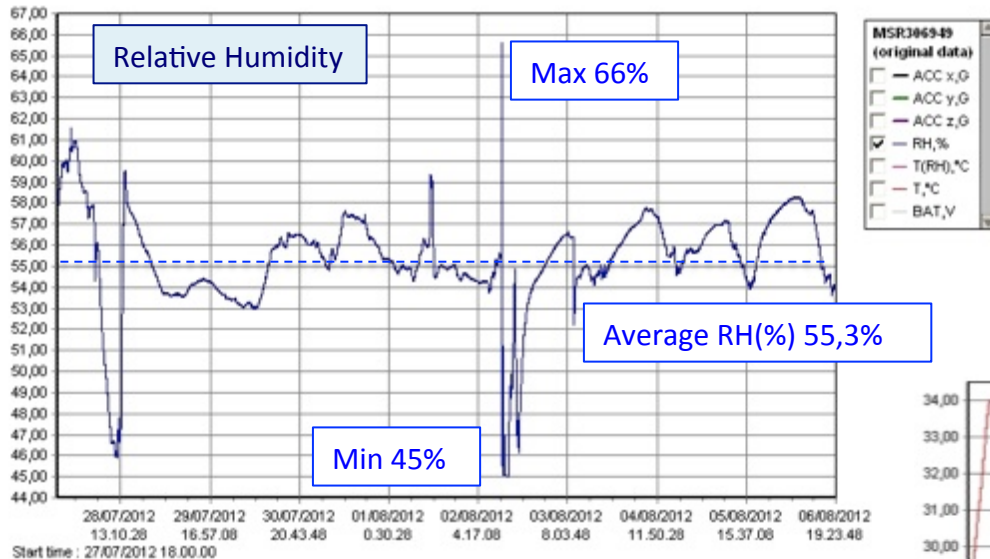
The first sensor recorded from July 23rd to August 1st



The second sensor recorded from July 27th to August 8th.



The second sensor recorded from July 27rd to August 6th.



- The sensors results will be investigated in the next weeks.
- Use the spare modules at Rome for test about crystals insertion
- FWD Cal will be dismounted at SLAC and shipped module by module
- Desirable strong collaboration between INFN and SLAC staff in order to exploit the know-how, and to verify the procedures of modules handling and FWD Cal installation.
- This process implies to remake the missing parts and refurbish other ones; it needs manpower and money.



Everything is conditioned by BaBar D&D program development in the next months