

NA62 Collaboration meeting
1 – 5 September 2014, Ferrara (IT)

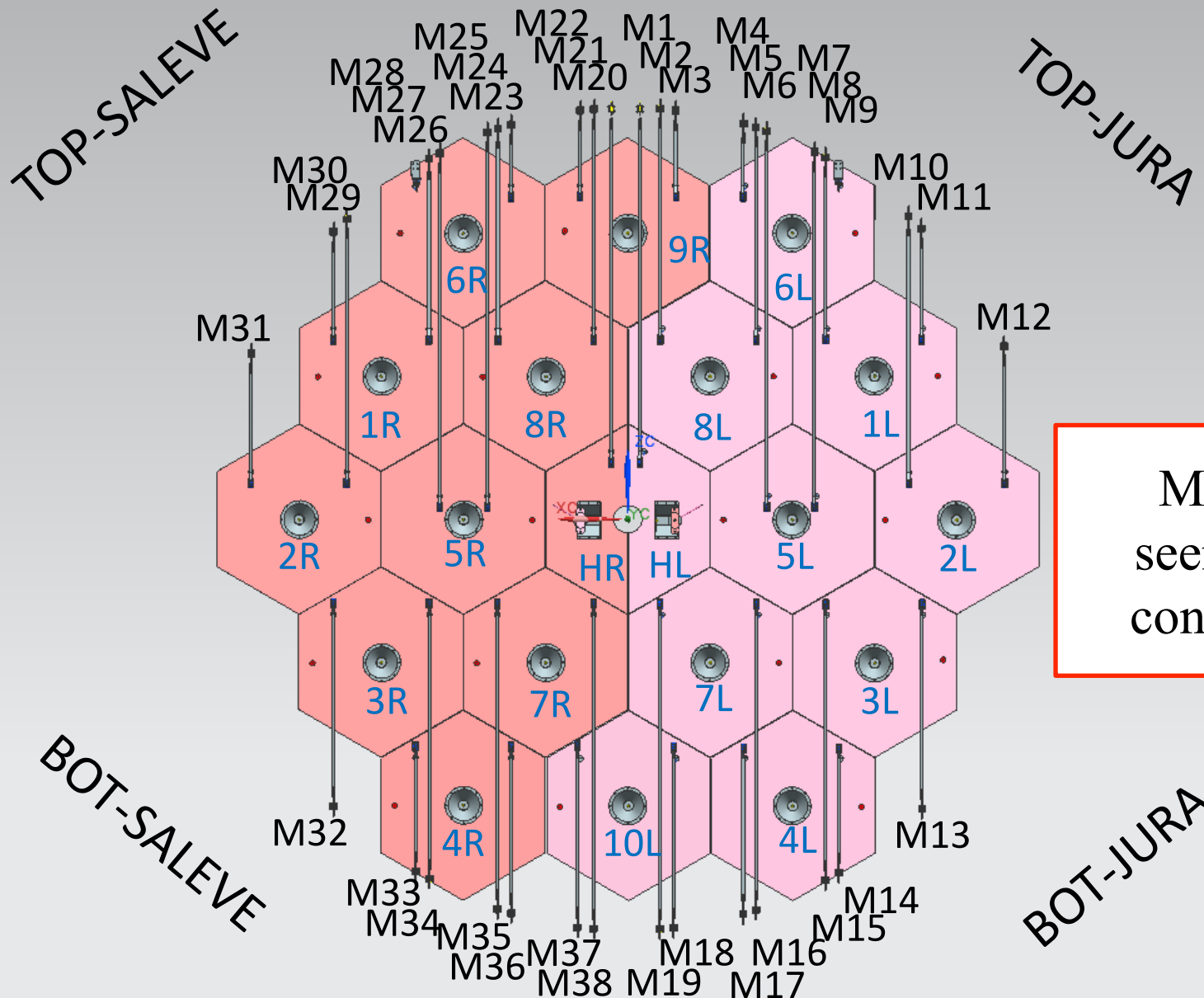


Mounting of RICH mirrors

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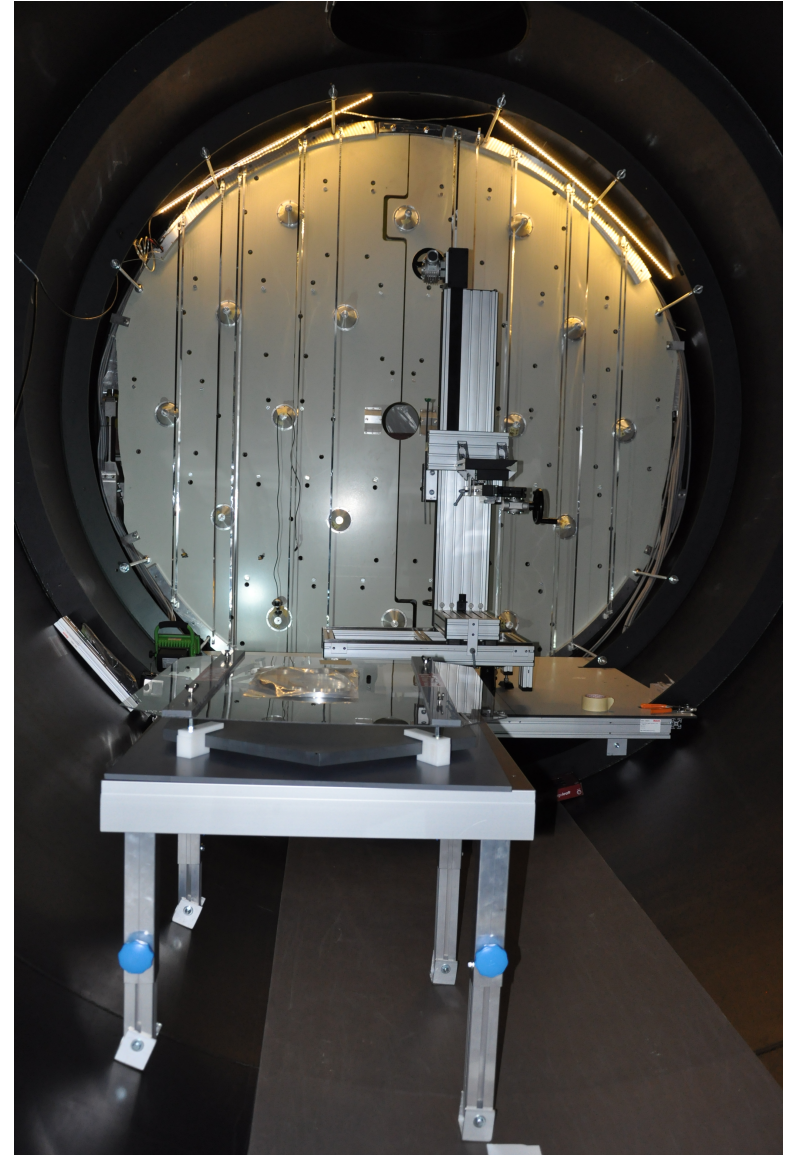


Theory



Mirrors
seen from
cones side

Starting point



Time line



Due to the differences between the expected positions of the dowels and the measured ones (by a CERN survey) we decide to swap mirrors 04-L and 04-R.

Installation started on 29/06/2014:

29/06/2014	Mirrors 04-L and 10-L installed
30/06/2014	Mirror 04-R installed
01/07/2014	Mirrors 03-L and 07-L installed
02/07/2014	Mirrors 03-R and 07-R installed
03/07/2014	Mirror HL installed
04/07/2014	Failed to install HR (touching 07-R)
05/07/2014	Found-out one of the sources of the discrepancies on the dowel positions
05/07/2014	Mirror 02-R installed
07/07/2014	Mirror 05-R installed
08/07/2014	Mirror 05-L installed, failed to install 02-L (touching 03-L)
10/07/2014	Mirrors 02-L (after dowel modification) and 01-L installed
11/07/2014	Mirrors 08-R and 01-R installed
11/07/2014	Mirror 06-L installed by hands (loading tool interfering with the Vessel)
13/07/2014	Mirrors 06-R and 09-R installed after modification of loading tool
18/08/2014	Mirror HR installed after re-machining and re-aluminization (with a special tool)

First mirror

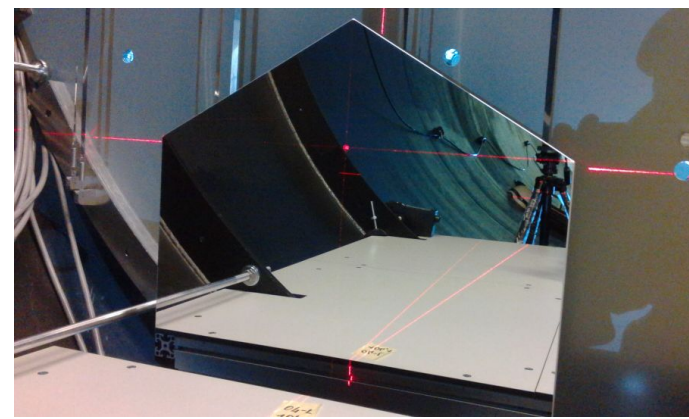
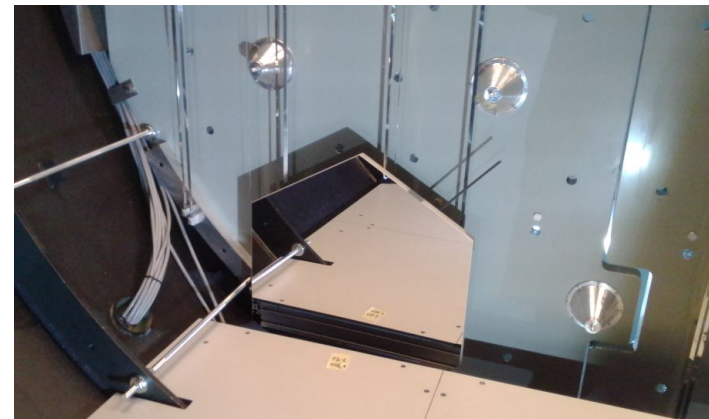
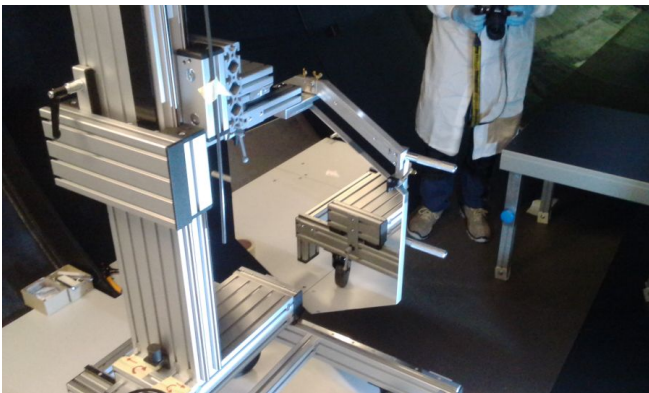
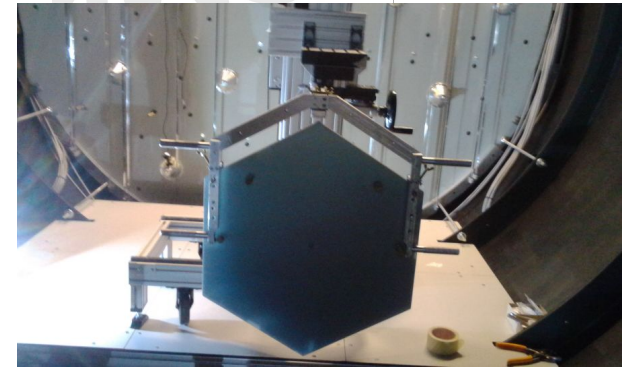
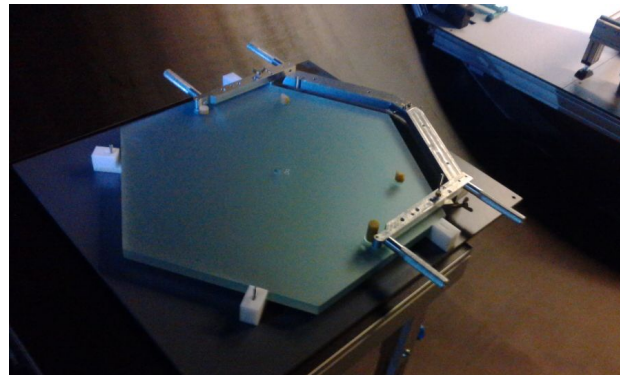
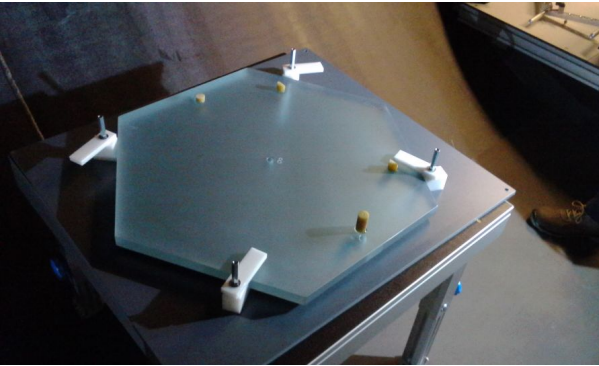


Procedure:

- Mirror removed from its protecting cover and attached to the loading tool
- Positioning of the mirror in front of the panel, webcam attached on the panel to insert the dowel inside the hole, spacer used to obtain the proper distance
- Mirror secured with the safety pins, loading tool and spacer removed
- Mirror aligned with the safety pins
- Once aligned, anti-rotating ribbon and actuating ribbons cut with the proper lengths and connected to the mirror
- Safety pins removed, mirror re-aligned



First mirror



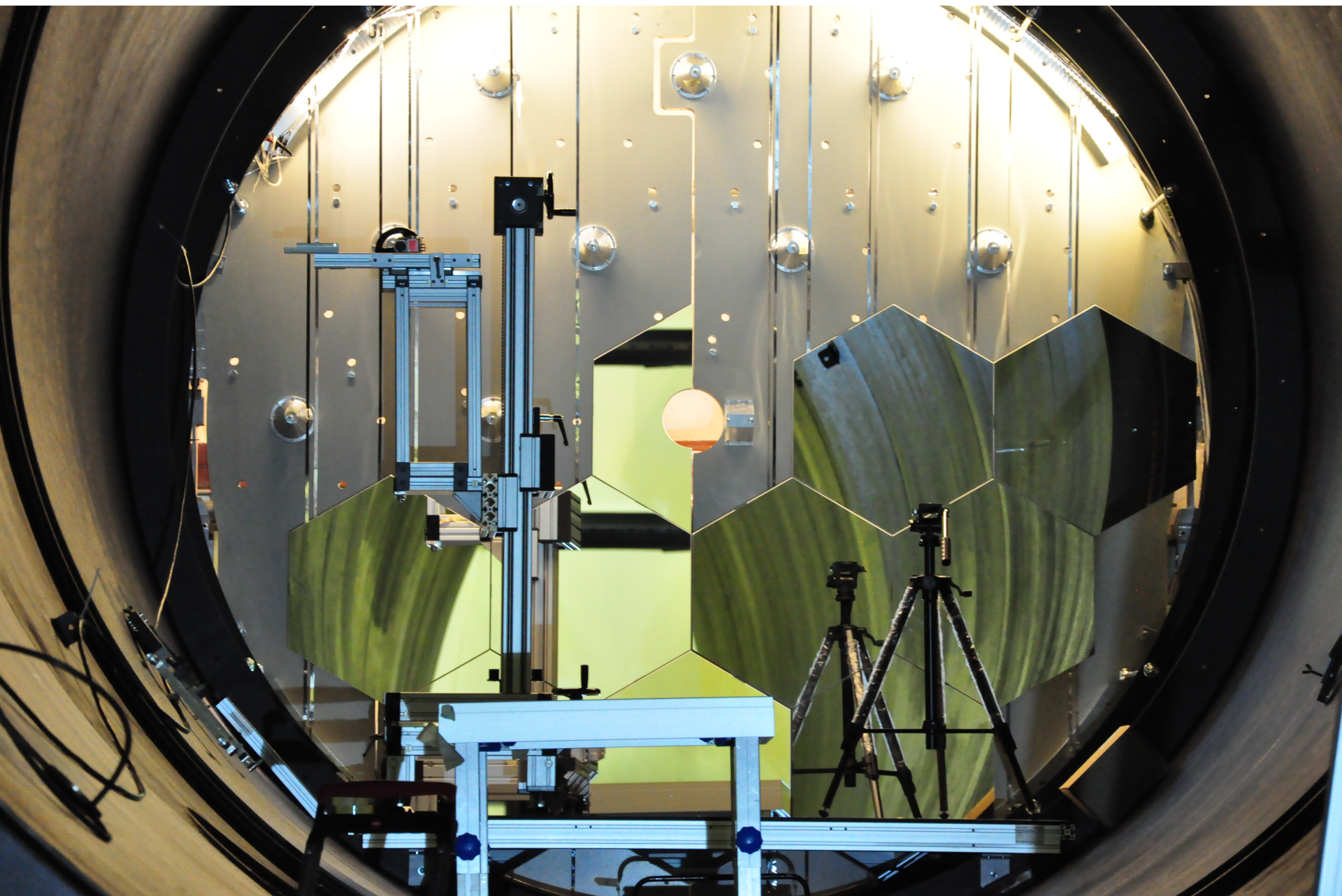
Pannel re-positioned



On 05/07/2014 it has been seen that the support panel was not properly positioned in the Jura side

A tool to safely reposition the support pannel (10 mirrors were already installed!) was immediately produced by Antonfranco and Damiano

On 07/07/2014 support panel repositioned and pin inserted in the proper (and safe) position

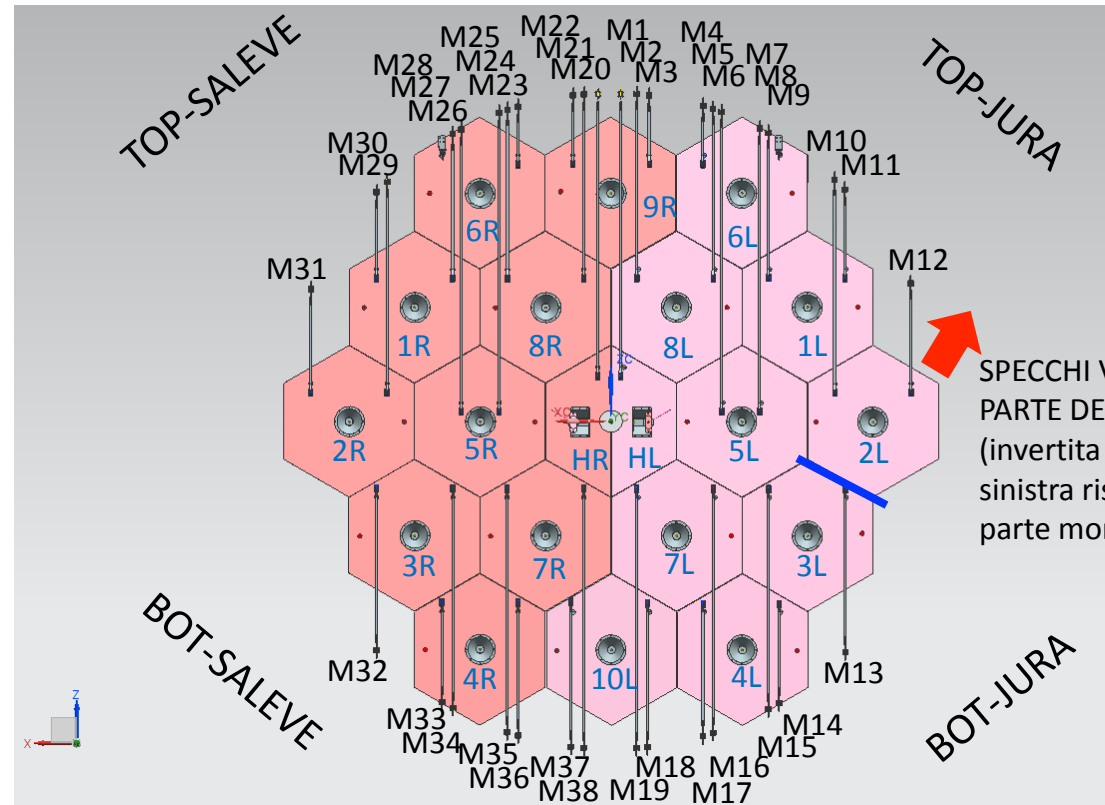
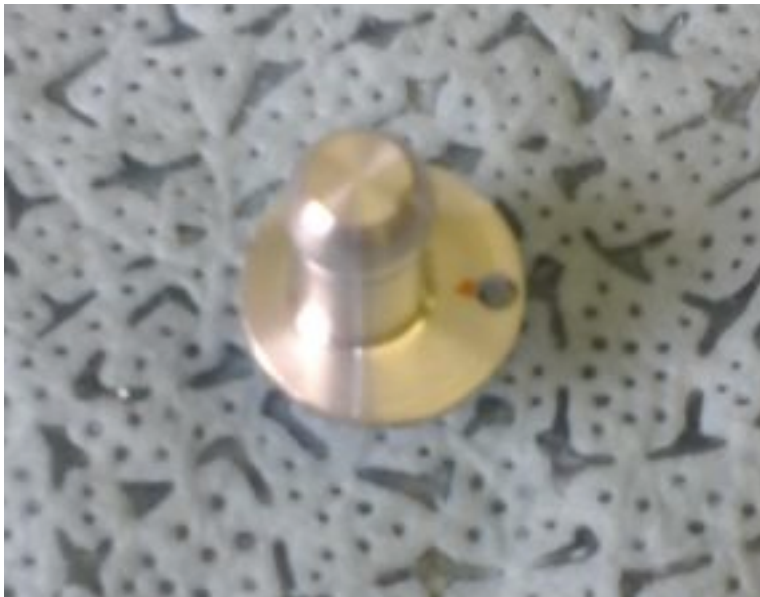


Problems with 02-L



On 08/07/2014 we were trying to install 02-L, it was touching 03-L

A new dowel was produced, with the axis of the screw entering in the cone displaced by **1.5 mm** wrt the axis of the dowel



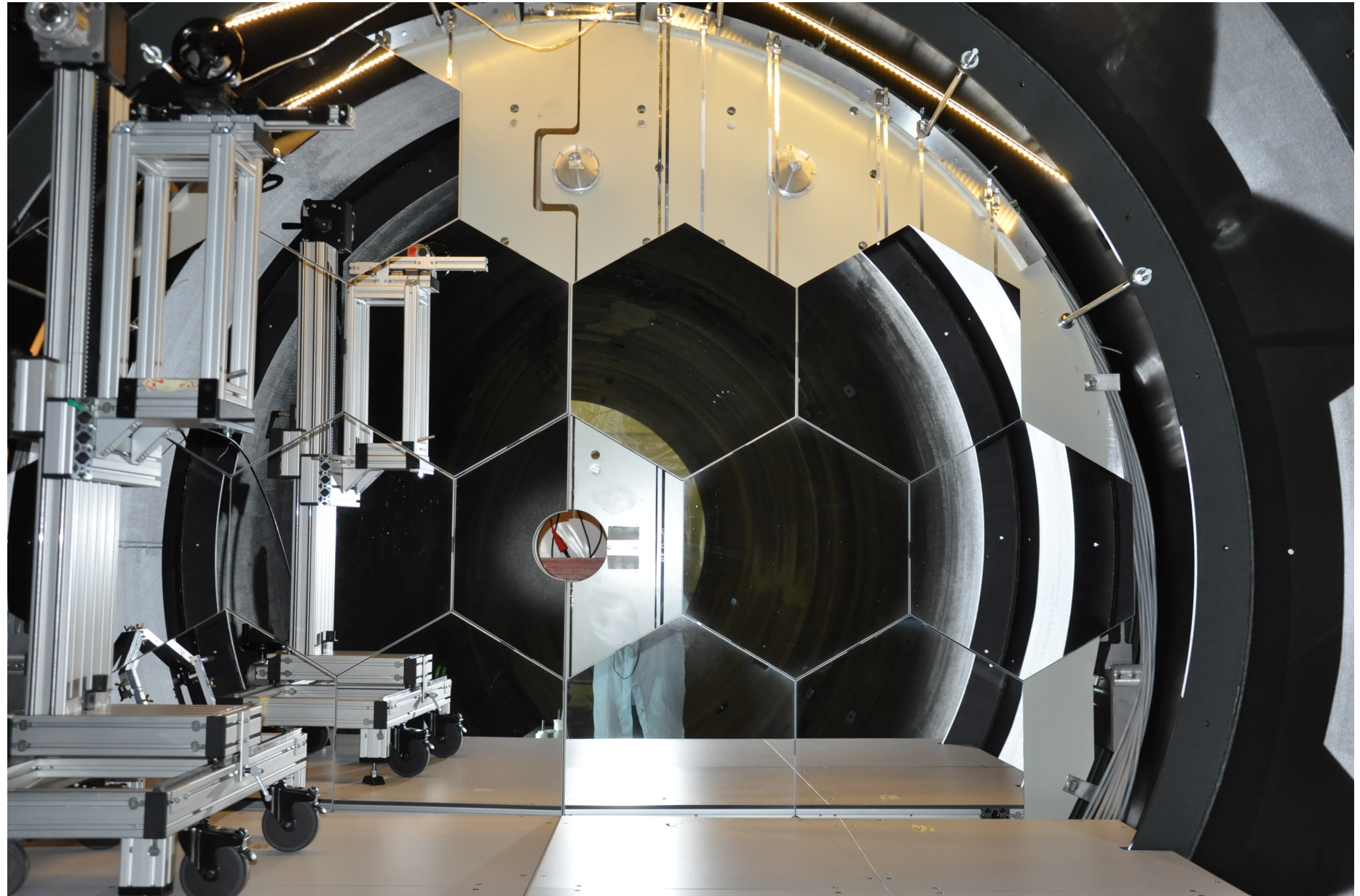
On 10/07/2014 the new dowel was mounted and the mirror 02_1 was successfully installed

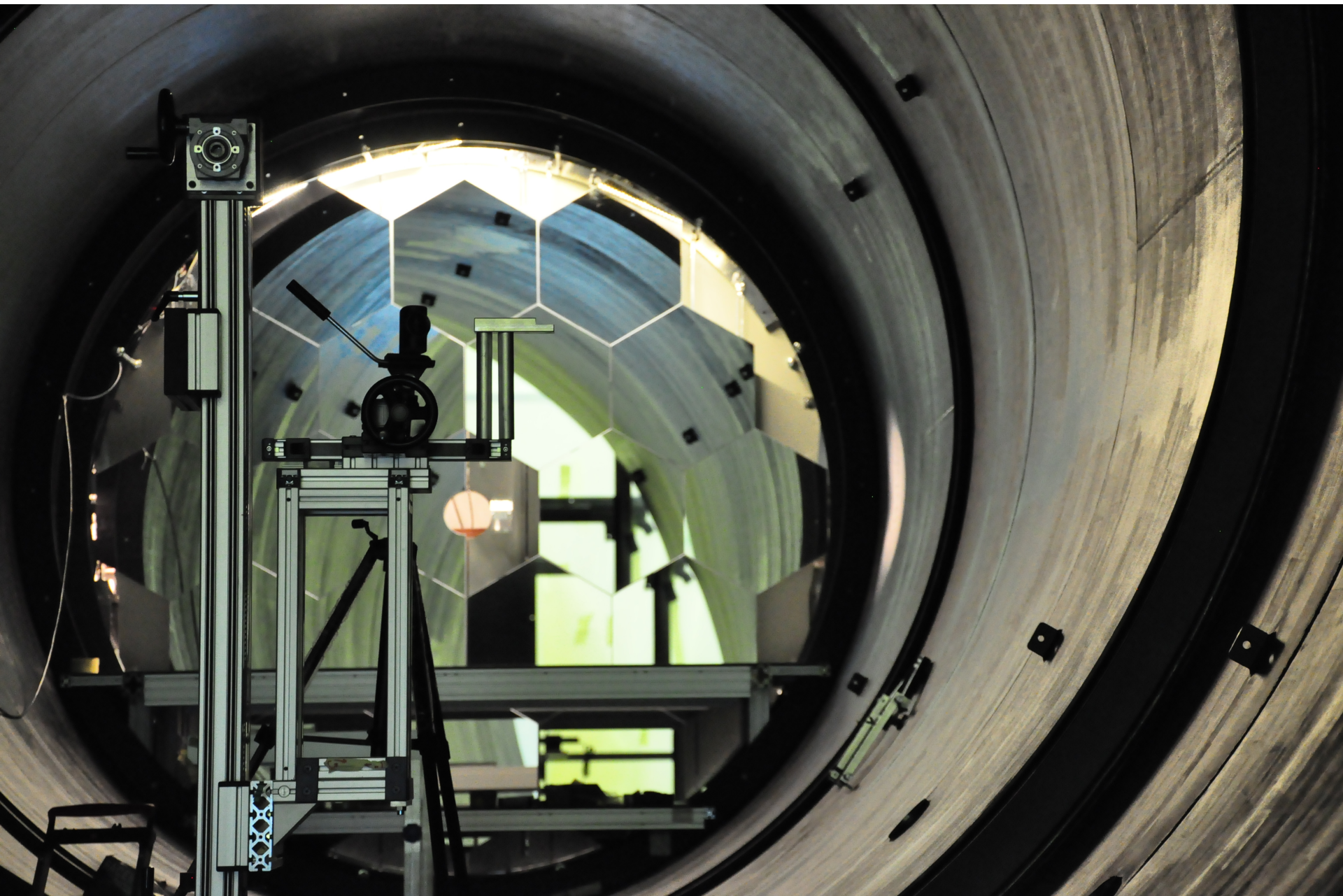
The last raw

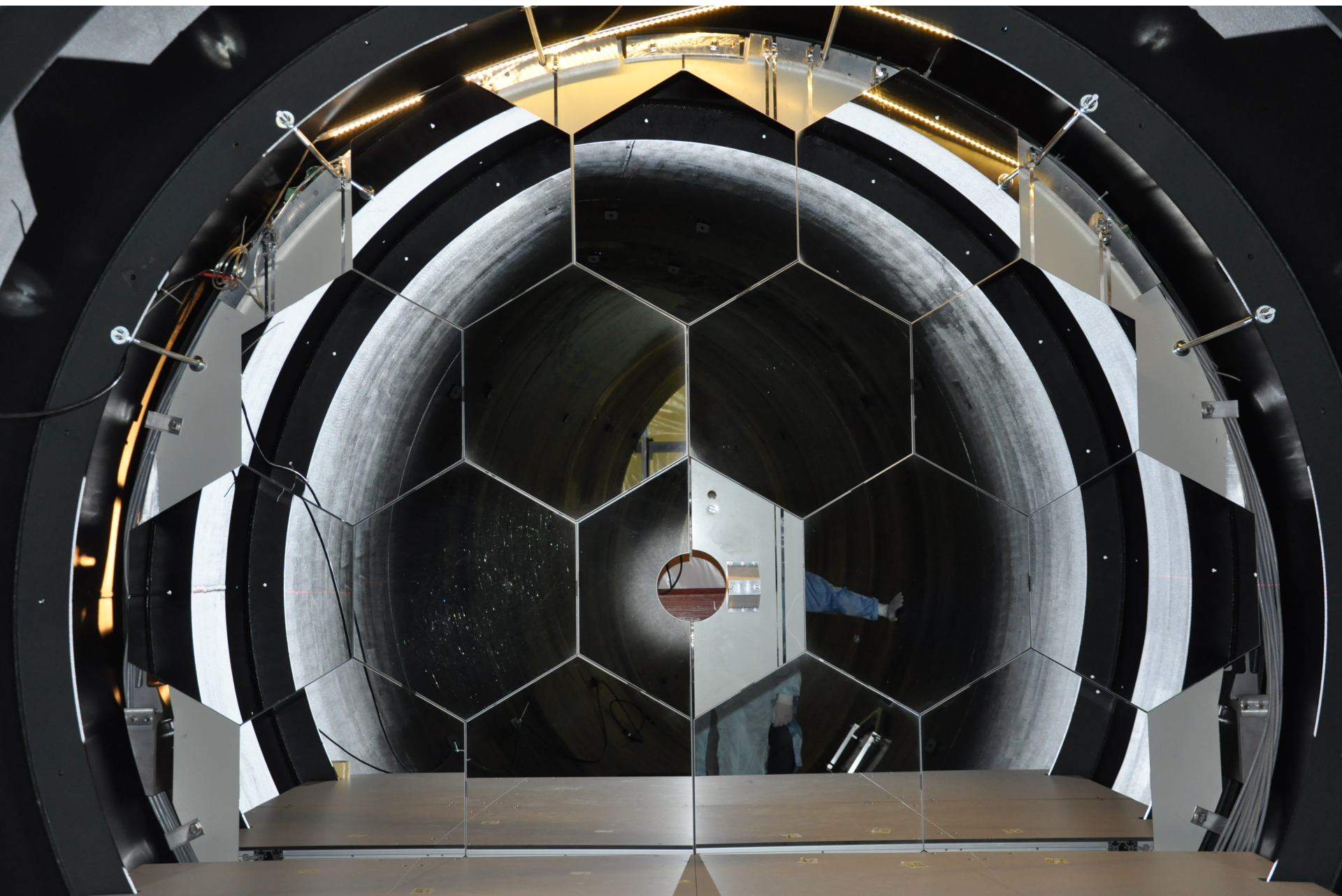


For the last raw the top part of the loading tool was touching the vessel, we install the first mirror by hands, just using the crutch, than for the last two mirrors we decide to produce a “nose” to avoid the problem









Mirror HR

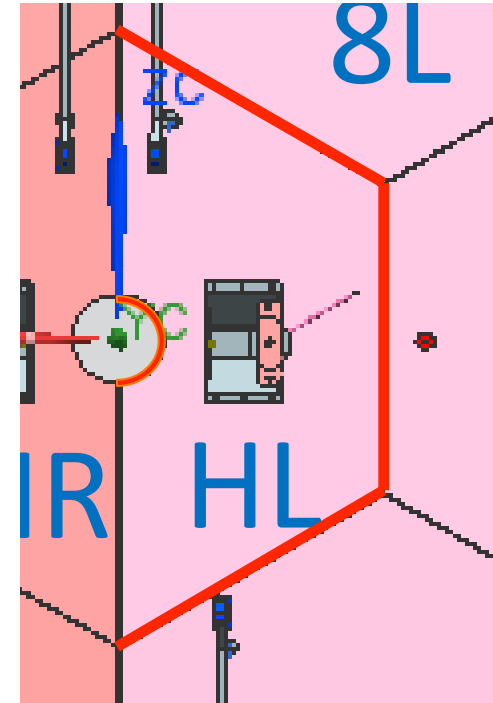


Already when we try to install HR for the first time we immediately saw that it was conflicting with 07-L (already installed).

Making some calculations we also found conflicts on the two remaining external sides (with mirrors 05-L and 08-L)
Conflict also expected in the inner part with the beam pipe (diameter 180 mm, tolerances included)

When we decide, with the support of Thomas workshop, to re-machine the mirrors, cutting 5 mm of the mirror on the external sides and on the inner hole. After that, mirror was polished and re-aluminized.

All the process was taking 2 weeks, in the meantime the installation was continuing, so we also need to produce a special tool (a clamp) to handle the mirror only touching a small surface around the inner hole. That surface was partially damaged during the installation.





Bad news



After two weeks from the installation of the first mirrors, we start to see a deterioration of the mirror surface.

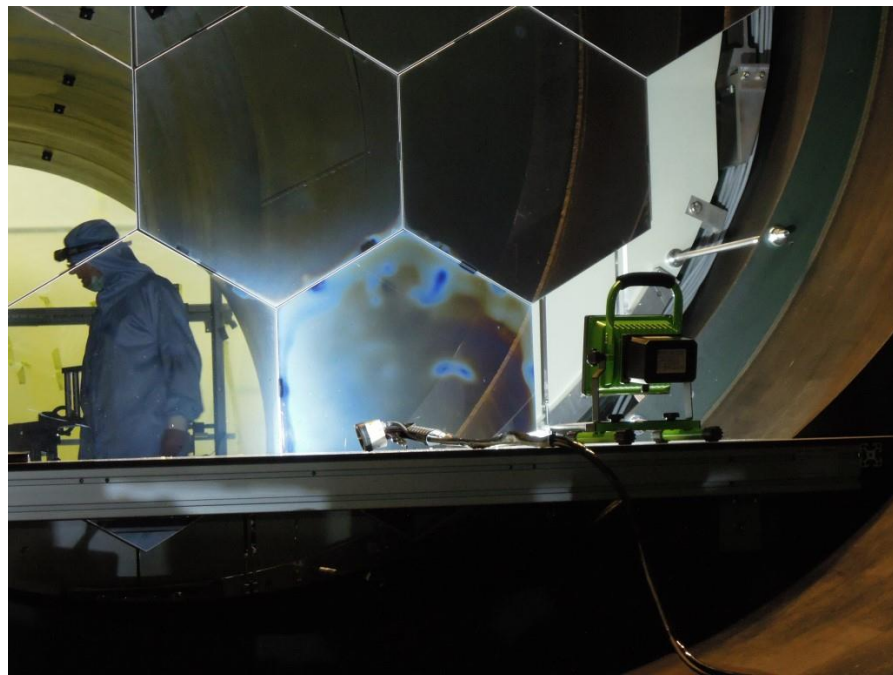
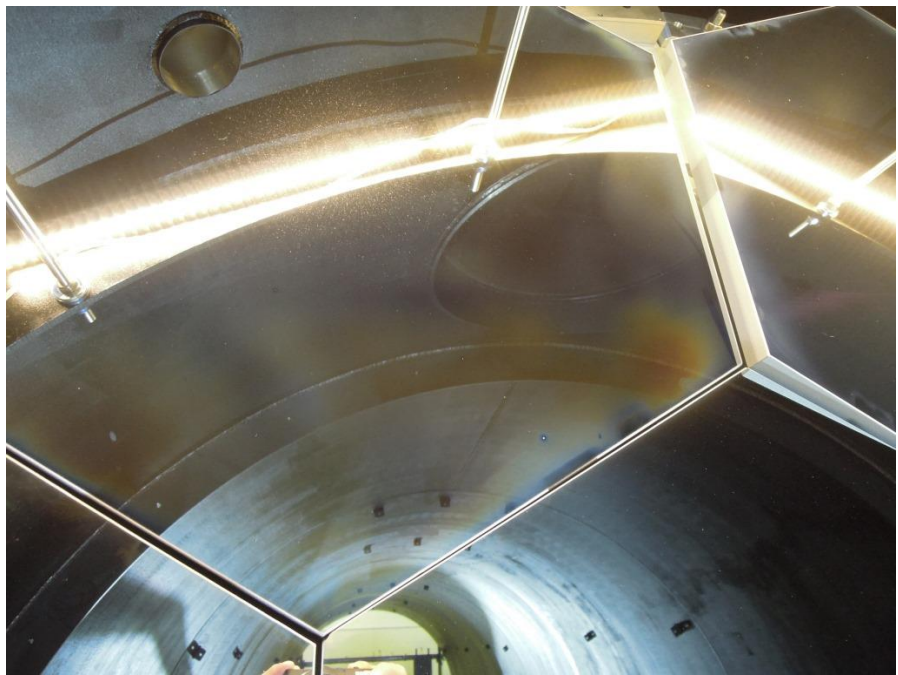
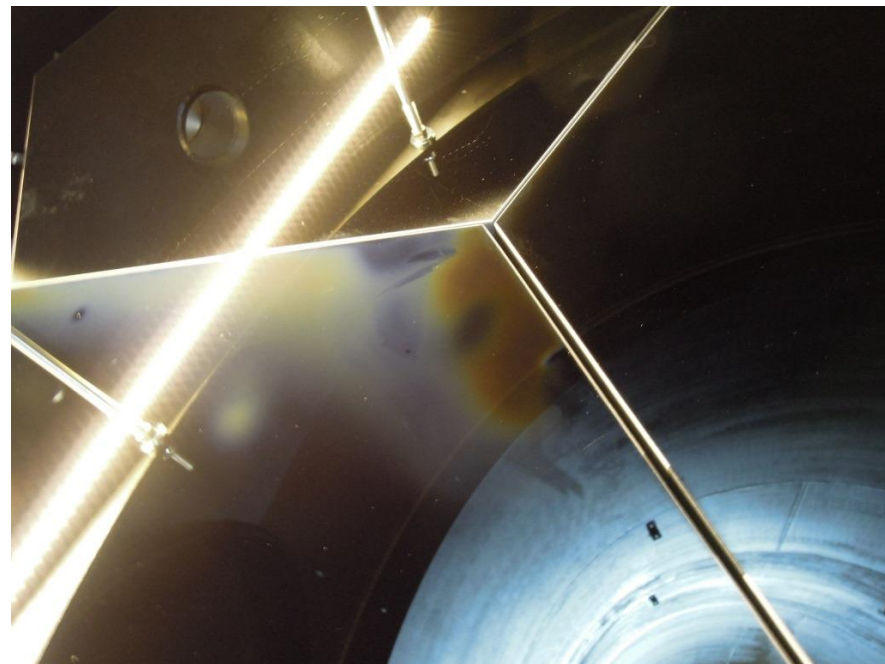
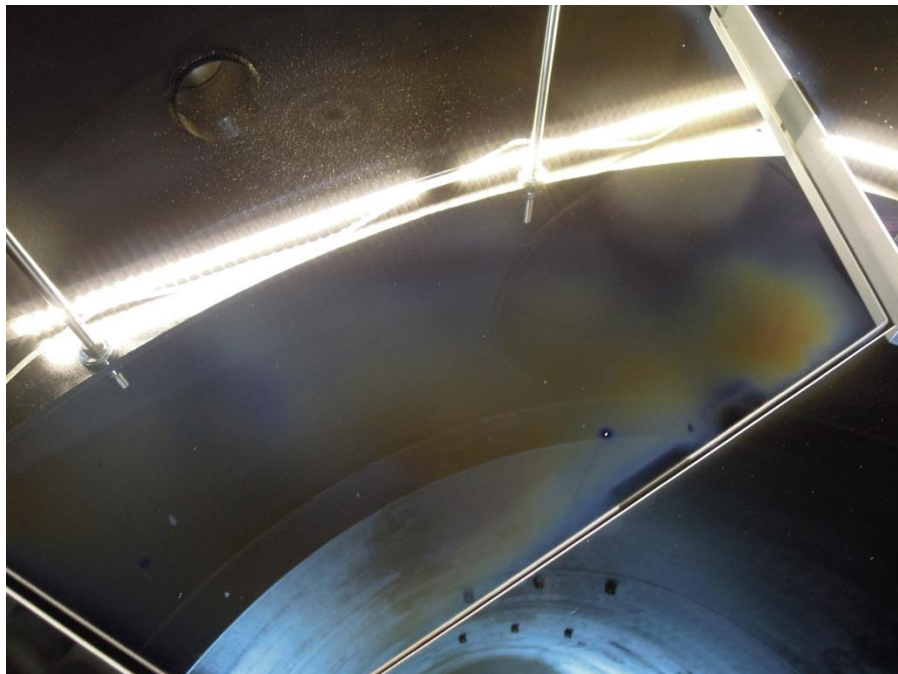
We were “hoping” to have some condensation effects, but fluxing the mirror with dried air didn’t help.

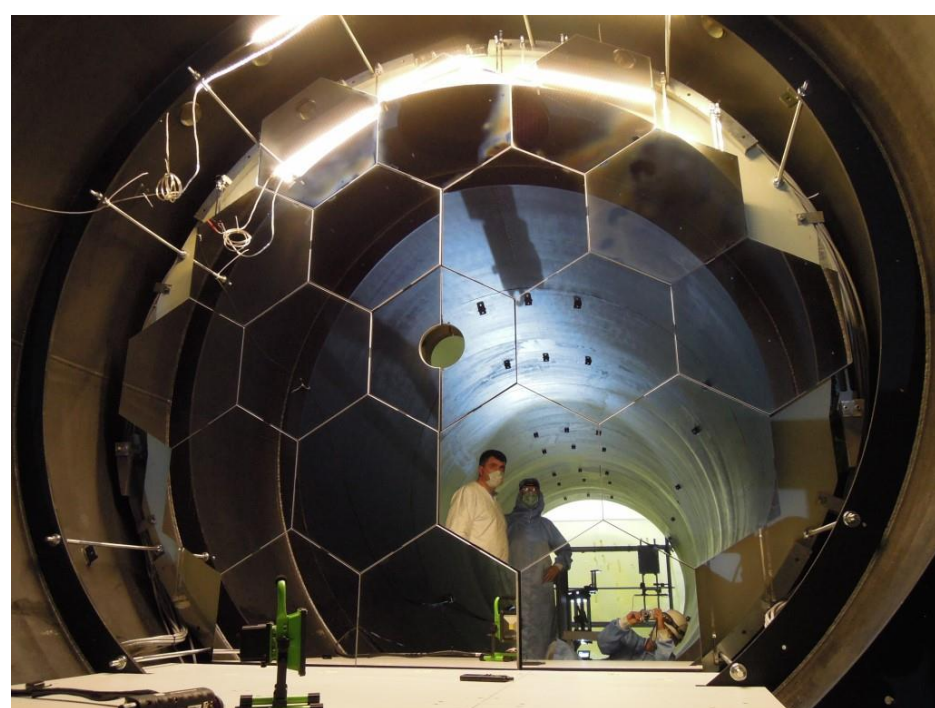
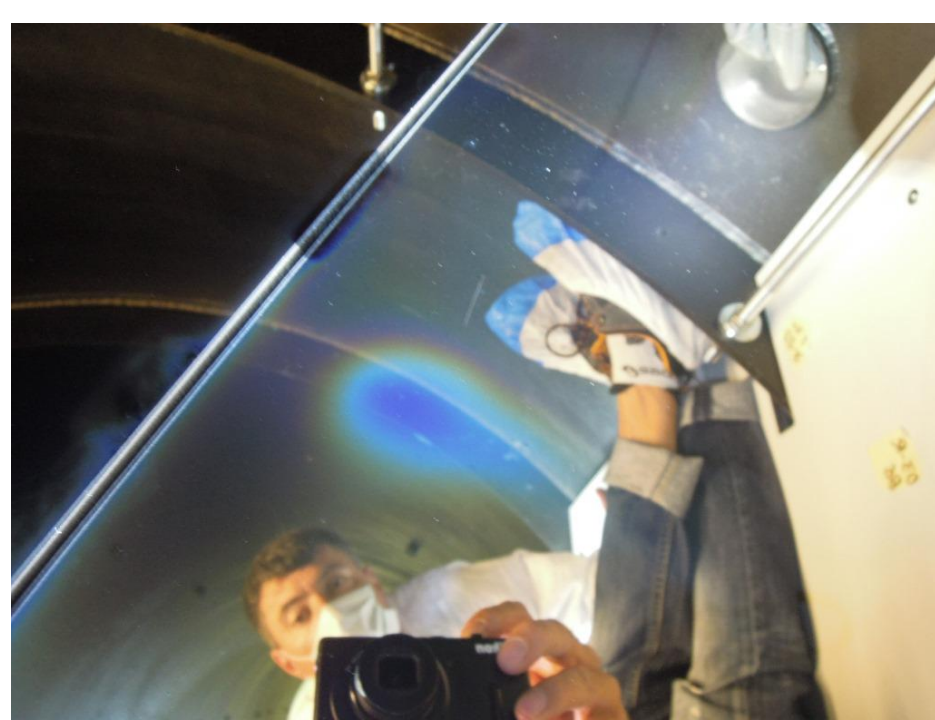
The deterioration has continued during the past weeks involving many mirrors.

It is only visible looking to the mirrors from some angle (not from the front), no way now to predict what will be the effect on Cherenkov photons.

In the mean-time the conditions inside the vessel have changed, we don’t have anymore ventilation (downstream end of the vessel closed).

To investigate the problem small mirror samples aluminized with the main mirrors has been used as probes. Three were installed inside the Vessel touching the support panel (one is no more accessible) and others were isolated in dedicated boxes with some of the materials we have inside the vessel: carpet, glues, anticorrosive coating of the vessel (?)





Summary

From the mechanic point of view, the RICH is ready for data taking

We know we have problems (see also Andrea's presentation), but only data taking will allow us to evaluate their seriousness and to eventually find proper solutions.

Many thanks to Perugia and Firenze services and to CERN for the full support!

Now we must fully commit ourself to install the read-out and to improve the software (alignment and data quality checks are fundamental to operate the detector).

Next two months will be essential to eventually react, at the end of the run we should already know what to do to improve the detector for the 2015 run, in fact we will only have 5 months available.