

Agenda mu-align. March 2005

- Update on hardware status (each subsystem)
- Magnet tests update on installation schedule and common needs/services (Gyorgy + all)
- Status of COCOA development for MT and final geometry (Marcus)
- Calibration database ideas and actual barrel implementation (Zoltan)

Link status report

*IFCA Santander
and
CIEMAT Madrid*

- 1.- ISR-Link components status and calibration schedule
- 2.- TK-Link align assembly and measurement
- 3.- MT configuration at the TK end

ISR Link calibration schedule & status

Schedule:

- March 05: Instrumentation of the setup, safety measures, DAQ setup
- April 05: + Z side calibration
- May 05: - Z side calibration

Status at the ISR-I4 (March period):

- LD+ (LD-) at the ISR: 3D CMM measurements completed at Santander
- AR+: 3D CMM measurements completed at Aachen (see next transp.)
- LD and AR support structures ready/mounted

- Old-Almy sensors: Fiducialization and test completed
- Auxiliary Tilt and Temp. sensors used for calibrations
- Cables and DAQ installation in progress (aim: completed this week)

- Definition of safety measures in progress (TIS)

TK-Link align assembly and 3D measurement at Aachen

Schedule:

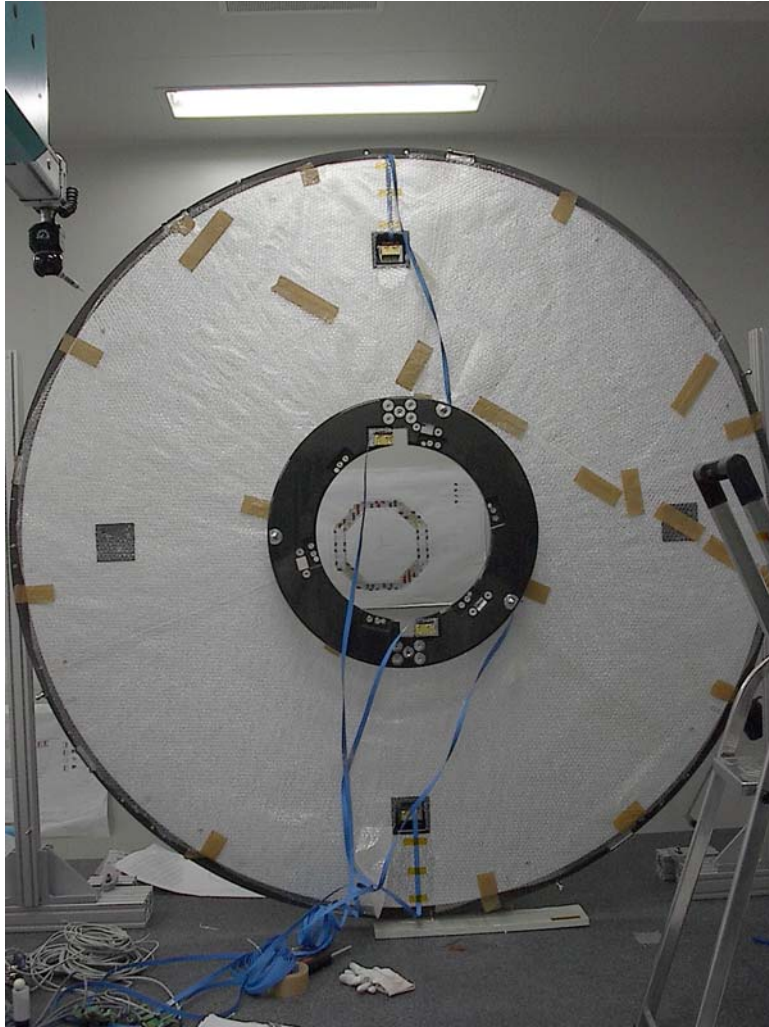
- March 05: Assembly and 3D measurements of +Z side (BD+ & AR+)
- April 05: Assembly and 3D measurements of -Z side (BD- & AR-)

Assembly and 3D measurements of BD- mockup & AR- to be used for Magnet Test

+Z side (3-9 march, 2005) measurements:

- Analysis no yet completed. Results of the measurements “looks” ok.
- Aim:
 - Assembly of AR+ to BD+ using the 3 pillars
 - 3D CMM measurements of the assembled structures
 - Repositioning repeatability
 - Verticalization of the structures within 1 mrad and reading of Tilt sensors in both structures
- BD+ goes to final Si-modules assembly \Rightarrow Final for us, apart from the cable length (not connector at the PP side, by now)
- AR+ comes to CERN for the calibration of the collimators and to complete the instrumentation (proximity sensors and cabling).

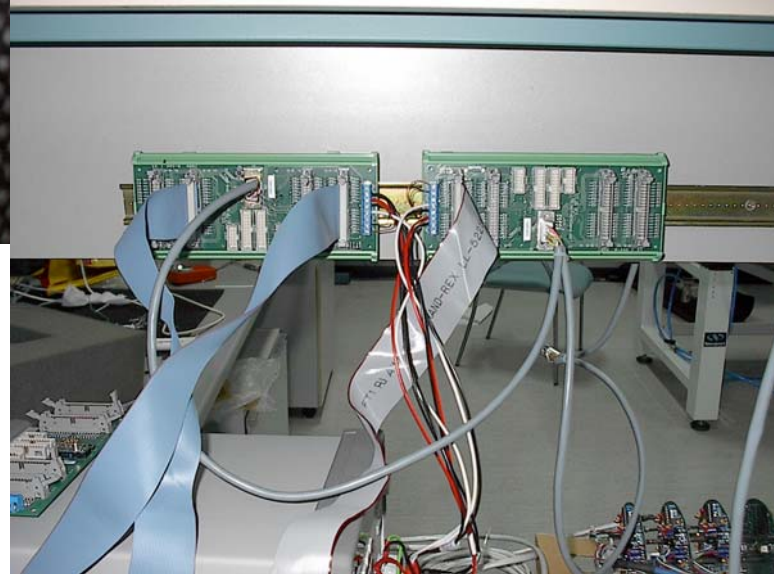
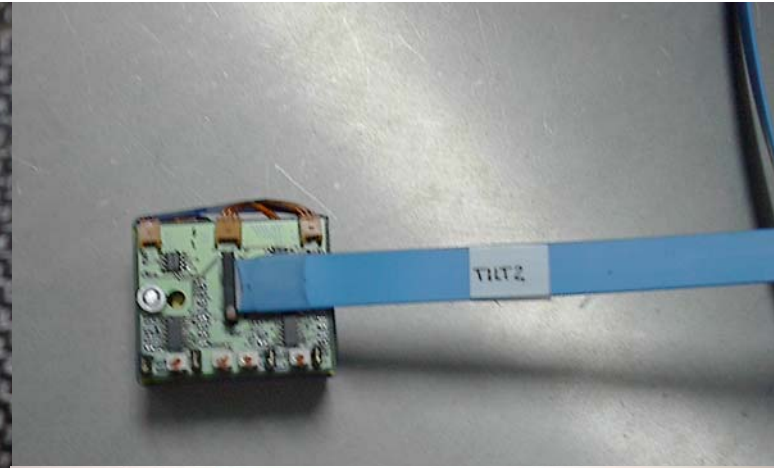
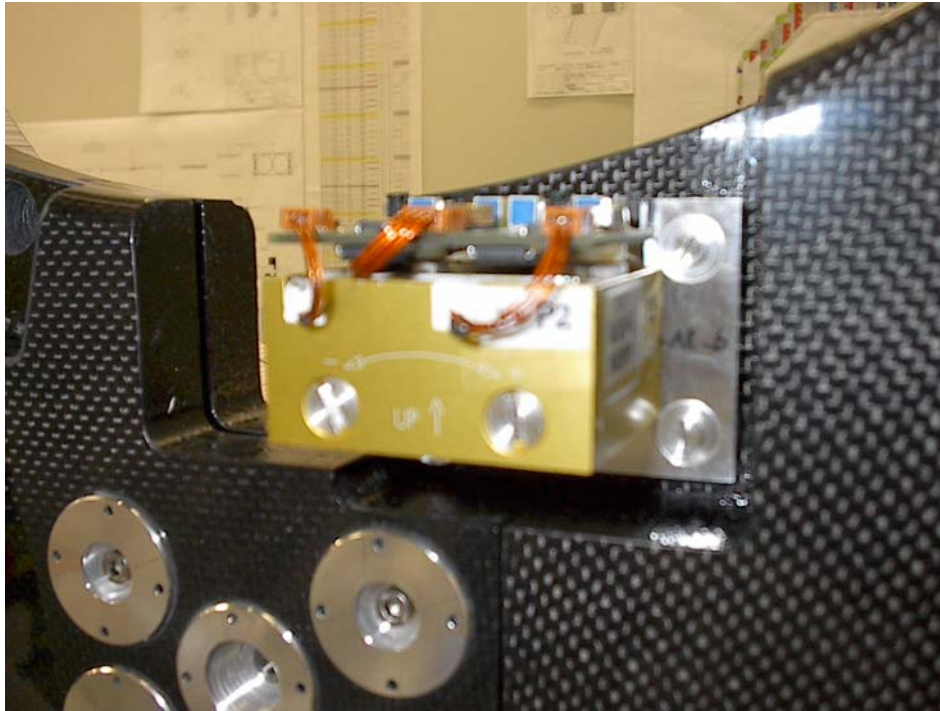
TK-Link align assembly and 3D measurement at Aachen



At the Aachen CMM (last week)



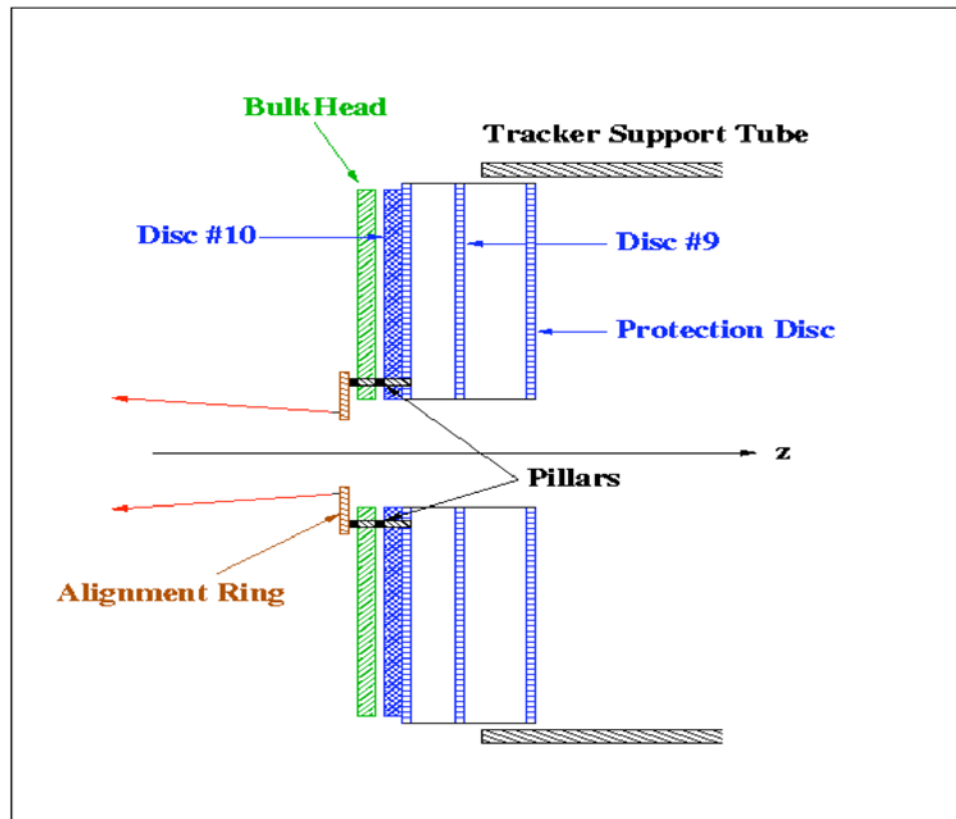
TK-Link align assembly and 3D measurement at Aachen



Assembly: 1 2D tiltmeter +
2 2D B probes +
1 Temp sensor
Readout by ELMB cards

TK-Link align configuration for the Magnet Test

Proposed layout for the -Z side: TEC- mockup



Disc10 (BD) instrumented with
2 1D Tilt assemblies

AR- (final unit) fully instrumented:
- collimators
- Tilt assemblies
- z-displacement sensors

The specs for the TEC placement
and orientation accuracy w.r.t. its
nominal position:

transverse offsets (X,Y) : $\leq 2 - 3$ mm
longitudinal offset (Z) : ≤ 5 mm
azimuthal and polar tilts (θ, φ) :
 $\leq 0.5 - 1$ mrad

TK-Link align configuration for the Magnet Test

Side effects to follow up:

- No real schedule/effort is really foreseen at the $-Z$ side for the MT
- $+Z$ side not used/instrumented by TK. Whatever implementation depends on us. (the material and resources available)
- No TK-align test at the MT is intended

Barrel status report

*Debrecen and
CERN*

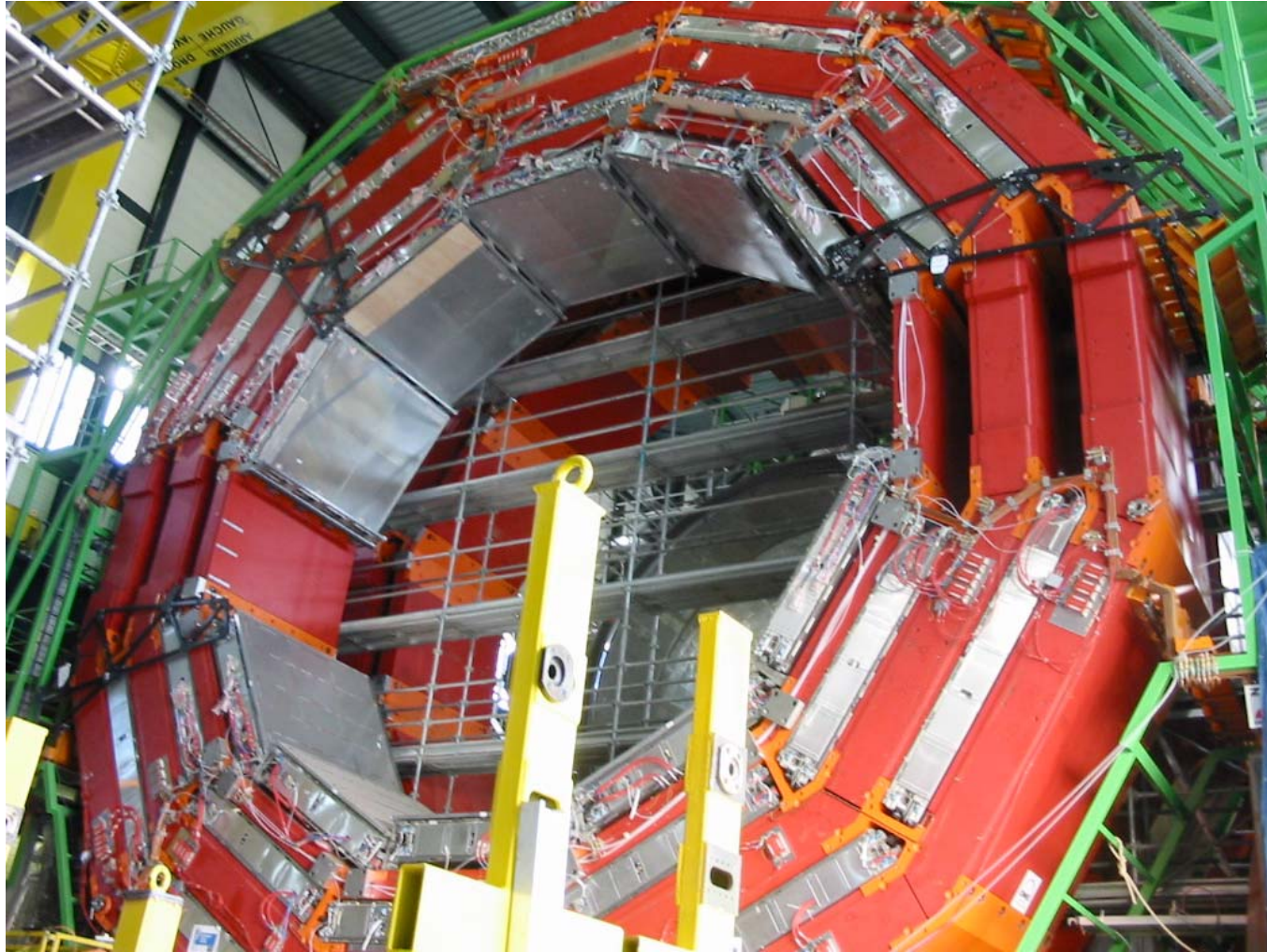
- 1.- Chamber calibration status
- 2.- MABs calibration & installation schedule
- 3.- MAB's components (Video Camera boxes, LED holders)

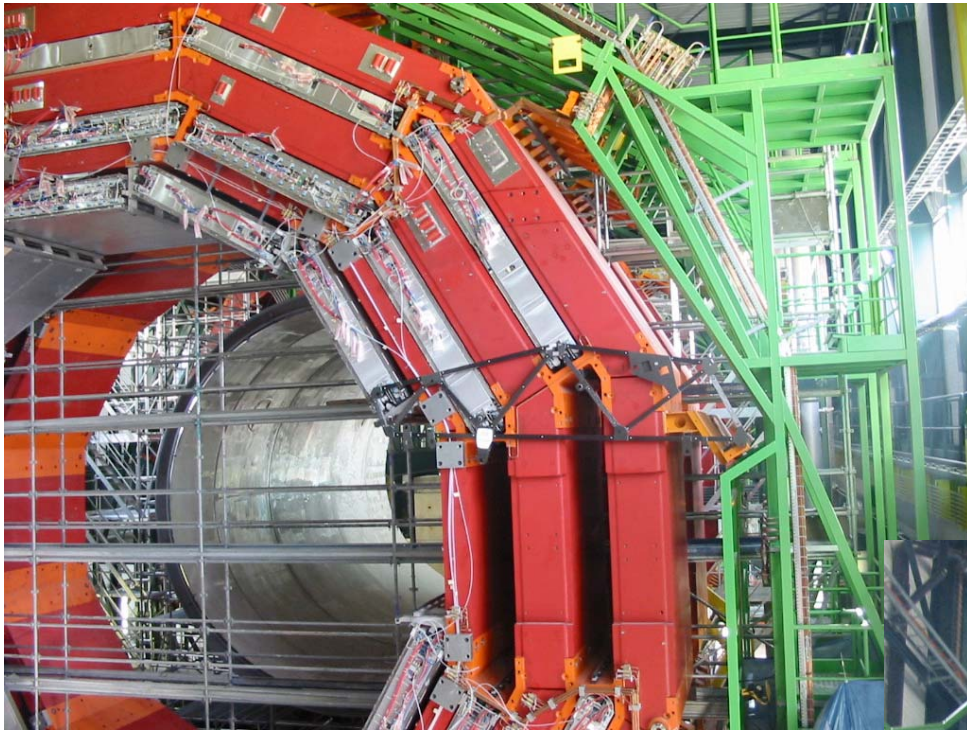
Chamber calibration status

- **Total quantity to be calibrated:** 267 (250 in CMS, 17 spare)
- **Assembled and calibrated**

MB1 standard	41
MB2 standard	45
MB3 standard	42
Chimney (all types)	4
<u>MB4 (all types)</u>	<u>26</u>
Total calibrated:	158
- **Next period:** June'04 (perhaps a few chambers earlier)
- **Bench stability:** Some calibration plates are already used, have to be replaced.

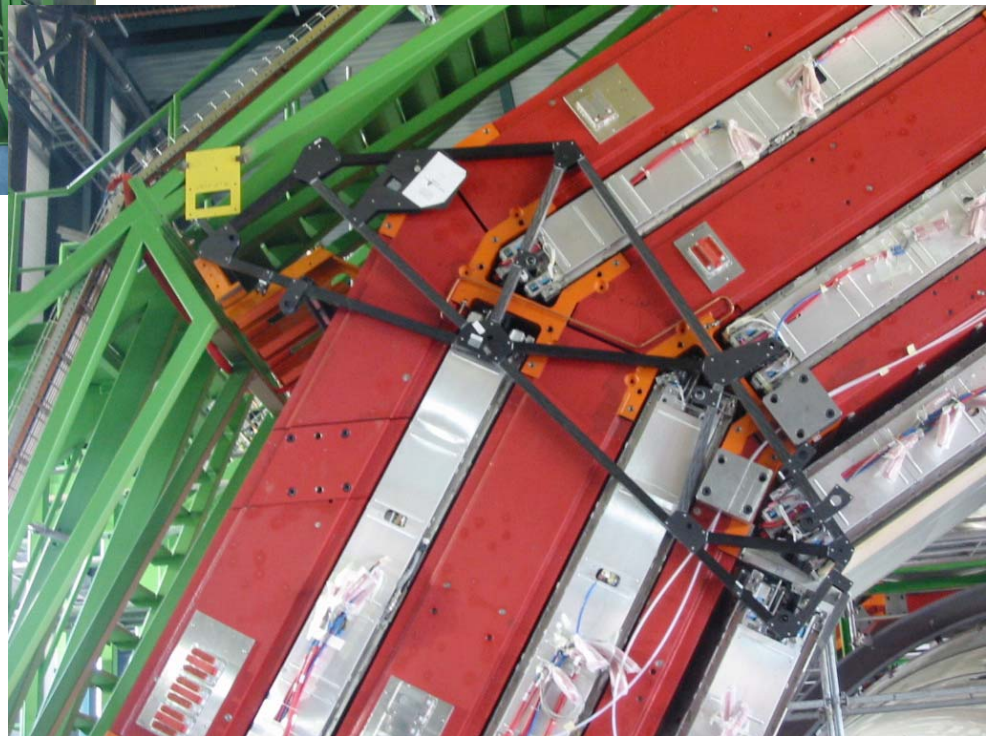
MAB installation test 10-14 March





Straight MAB

“Croissant” MAB



MABs installation & calibration schedule

Outline of installation and Photogrammetry meas. schedule vs MB installation & cabling for the +Z side wheels.

Assembly and calibration schedule:

- April 05: Cabling of video cameras
- April – May : Setup for optical calibration & Reparation of MABs
- June -> : Start calibrations

Video Camera boxes design, production and assembly

All types are designed (H. Gerwig, A. Patino, G. Bencze)

- sensor holder
- single + single cover
- double
- Z and chimney
- Z cover
- diagonal lens holder
- diagonal sensor holder + cover

All the sensor holder disks (750 pieces) are manufactured, arrived to Debrecen, the assembly started.

Sensor quality control bench 99.9% ready (two ICs are missing from the driver card, slow delivery).

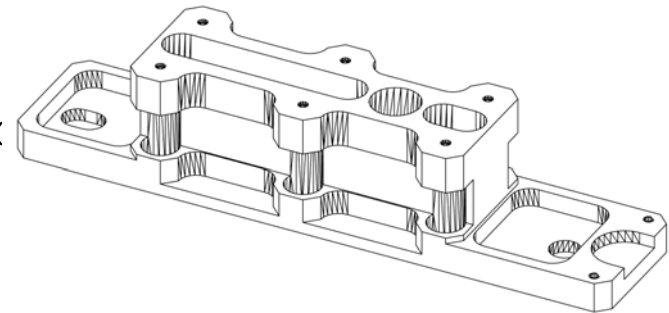
Then: pieces to Debrecen → assembly → calibration. Calibration tool under design.

Z LED holder & diagonal LED holder

- ❑ Z-LED holders:

Designed, ordered (24+8 spare), under production
PCB-s ready.

Calibration tool ready, “etalonage” done.

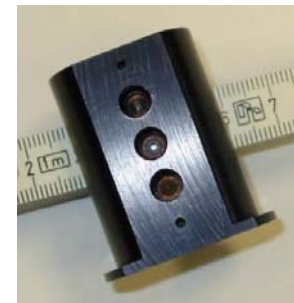


- ❑ Diagonal LED holders:

Manufactured by EMMG (Greece) together with the MABs. The tolerance is loose and there are two slightly different diameters (production mistake). The LED holders are sent to Debrecen for assembly/calibration.

The PCBs are ready.

Calibration tool under design



Endcap status report

*FNAL and
Florida Tech*

1.- Installation & calibration status

2.- DAQ & COCOA progress

EMU Alignment Installation

- (1) Trial Installation Dec 04; Interface Electronics (six stations), one SLM of Optical Sensor Readout + associated cables installed and operated on ME+2

- (2) All Transfer plate supports and most Z tubes installed -some Z conflicts – ZEK will fix YE1, -1 Pt 4 (pipe & support gusset), YE-3 PT4, YE3 support plates

- (3) In May: complete SLMs for ME+2 (and maybe ME+3)

EMU Alignment System Progress

All components and mechanics ready

(2) Completion of ME1,2,3 R sensors (R2, R3), (R1, R2), (R1, R2)

(3) Completion of Temperature sensors (T1, T2, T3) and Calibration

(4) Completion of ME2,3,4 Z Transfer sensors

(5) Completion of ME1 Z Transfer – MAB Z sensors

(6) Completion of Transfer Plate Inclometers

(7) Completion of ME1/2 Inclometers

(8) Completion of DCOPS Calibration Bench, CMM measurement, mirror alignment

ME1, 2, 3 R sensors



ME2,3,4 Z Transfer Sensors



ME1 Z Transfer - MAB Z Sensors



Transfer Plate Inclonometers



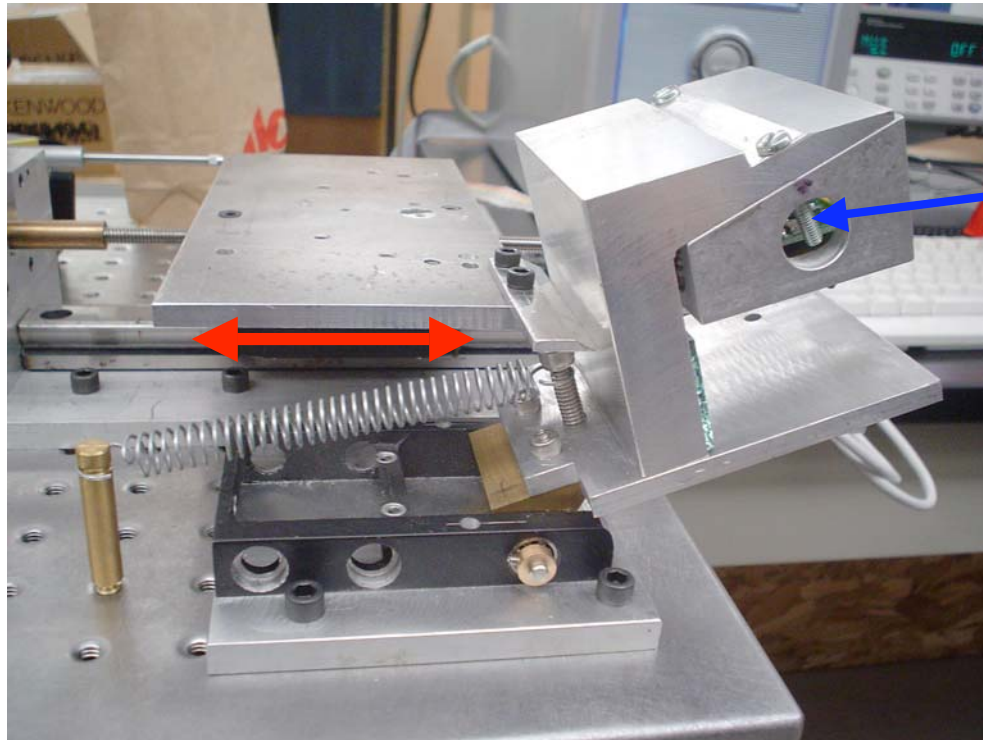
EMU Alignment System Progress

- (9) Completion of design of ELMB custom motherboard and three analog sensor mezzanine boards for Analog sensor DAQ and laser control; crate LV distribution board in design -parts on order, PCBs on bid – a first board for DCS testing
- (10) Evaluating fibers/optical modems for DCOPS system readout to USC55
- (11) System LV on YE1, YE-1 as a CAEN A3006 module/disc with jumper cables in the –X chains
- (12) Power cables and specialty electronics cables completed – in house
- (13) Twist & Round Cable fabrication in bid – all parts and materials
- (14) SLM and Transfer Laser assembly/alignment (60 units) -in progress

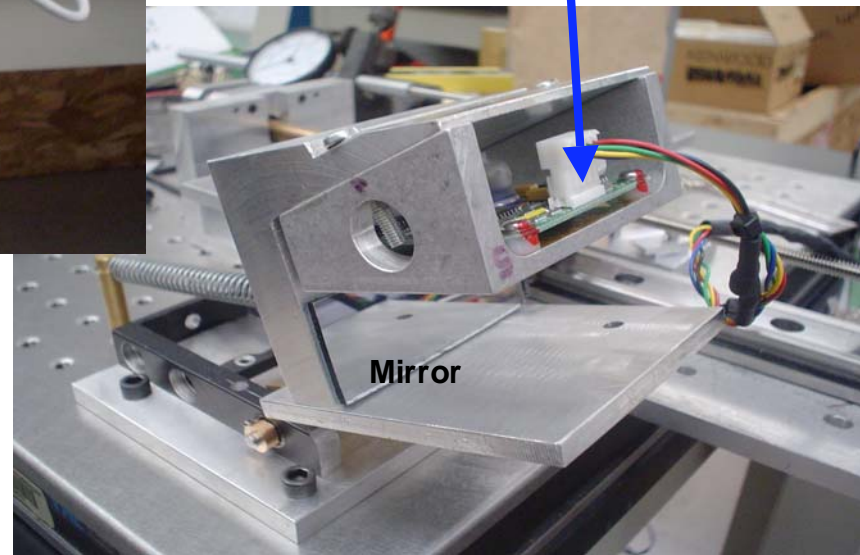
Florida Tech tasks list

- **Fl. Tech has agreed to the following tasks:**
 - Calibrate 200+ ME analog sensors (R, Z, Clino.)
 - Incorporate calib. data into appropriate data base
 - Develop COCOA so that analog sensors are included for EMU
 - Help to set up and maintain data base for alignment constants that feed into reconstruction
 - Use COCOA to produce alignment constants for
 - ME magnet test
 - ME commissioning and first data

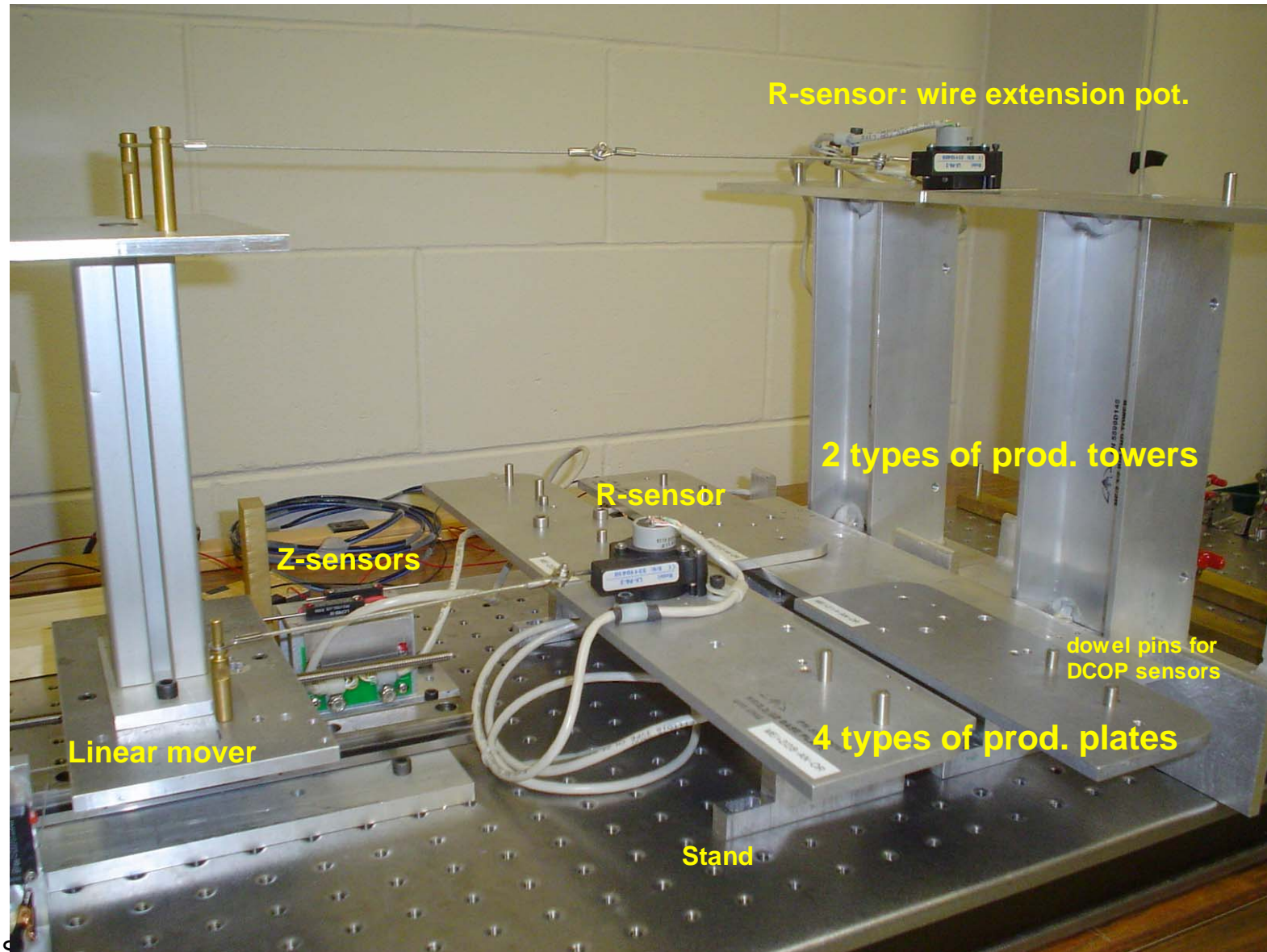
Calibration bench: Clinometer



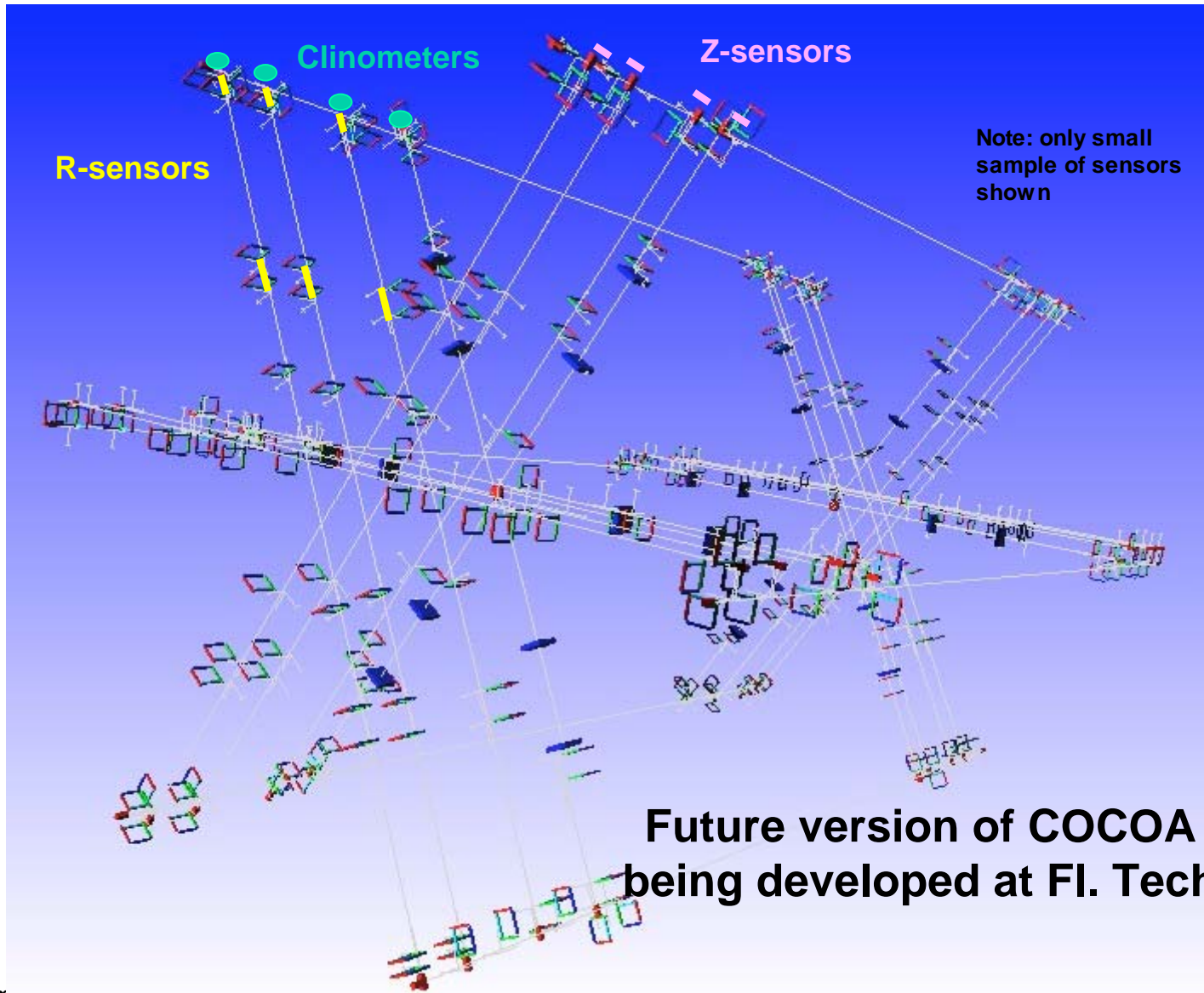
Clinometer



Calibration bench: R, Z



EMU geometry and analog alignment sensors



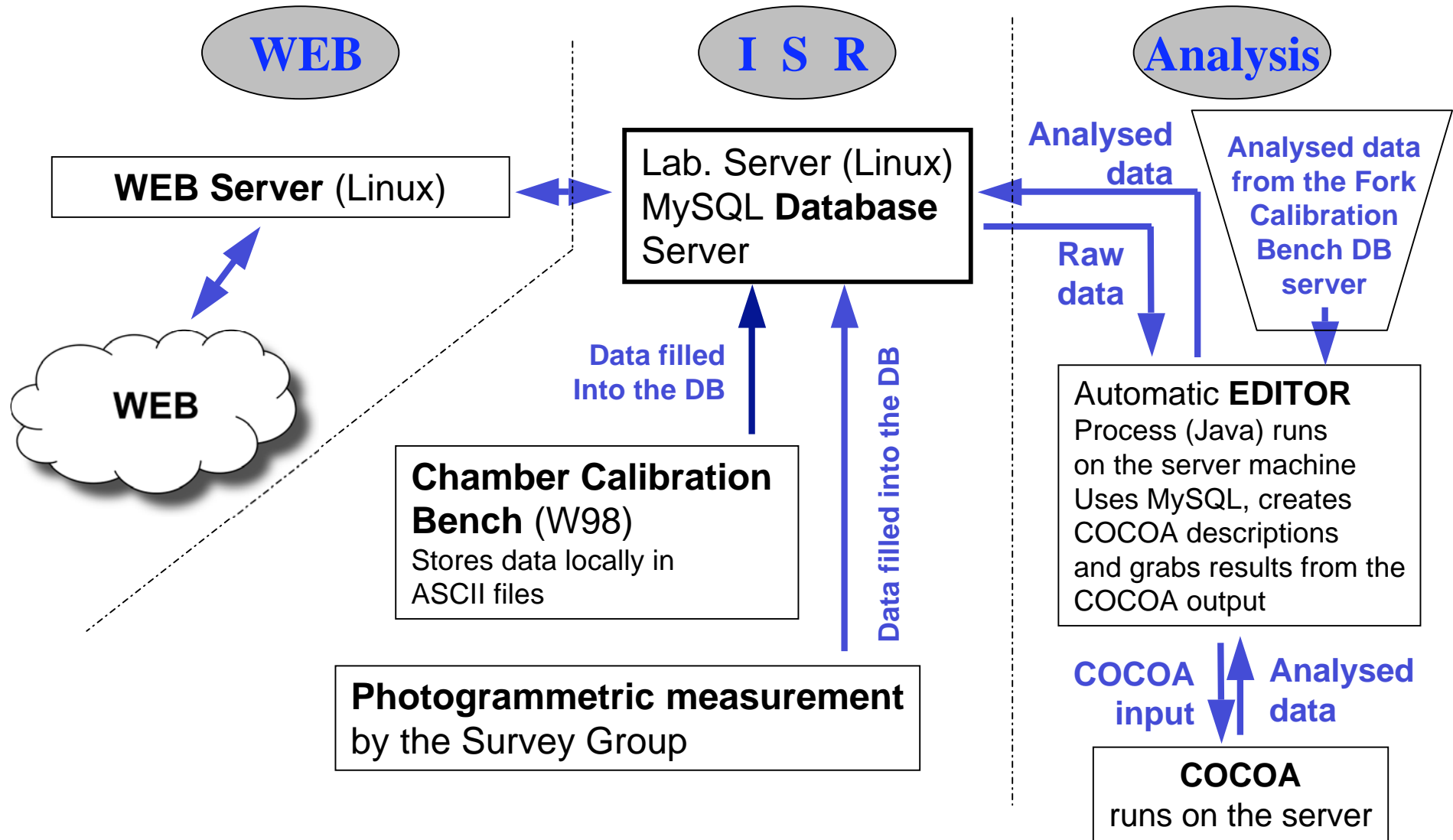
DataBase Considerations of the Barrel Alignment

Z. Szillási

This project is supported by the Hungarian Scientific Research Fund (OTKA): T043145 and T034910

Summary Mu-Align. CMSWeek March 2005

Data flow & storage strategy of Chamber Calibration



COCOA analysis and the DB: proposed strategy

COCOA model is built in absolute CMS system and communicates with the Editor.

The Editor provides the data to the COCOA model (always up-to-date).

COCOA results (output) is transferred to Result Interpreter.

The Result Interpreter is filling the database.