



Overview of the Barrel Muon Alignment Project

The Barrel muon Alignment Collaboration:

**Institute of Nuclear Research, ATOMKI,
Debrecen, Hungary**

**European Laboratory for Particle Physics CERN,
Geneva, Switzerland**

**Institute of Experimental Physics of Debrecen University,
Debrecen, Hungary**

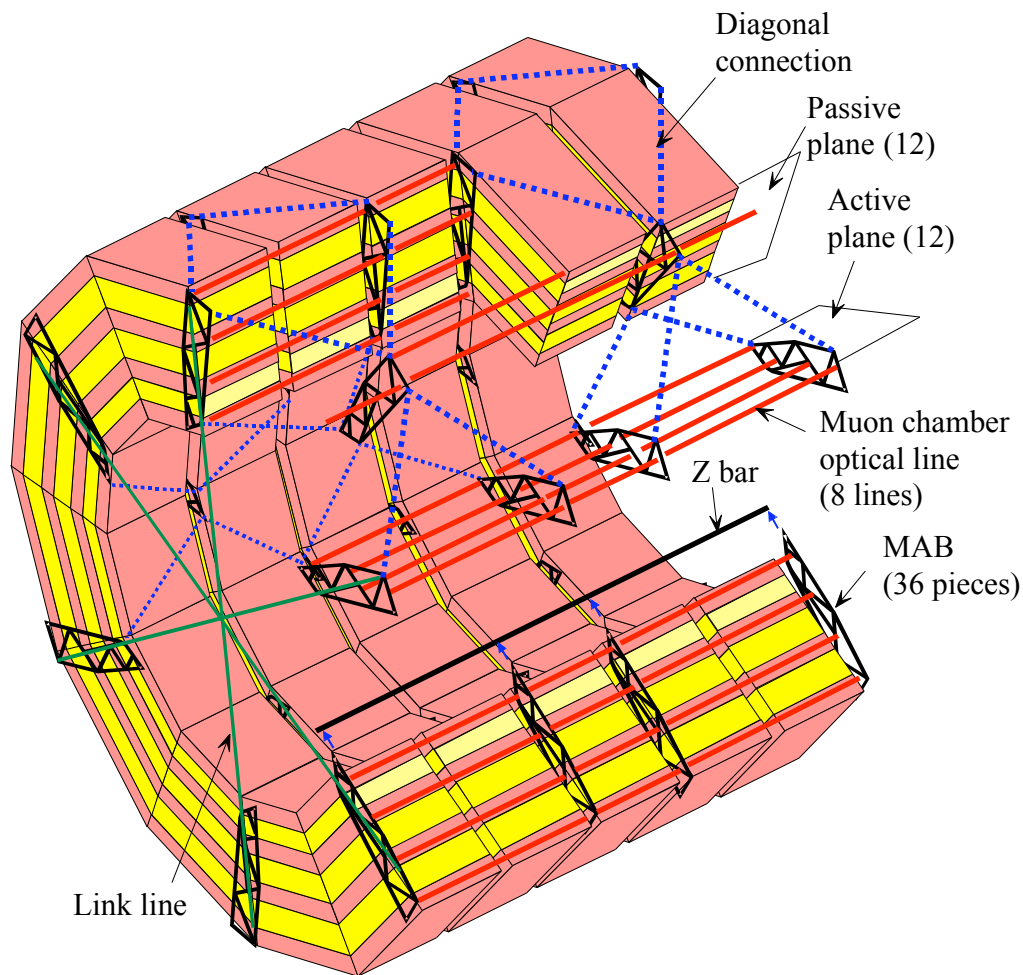
**Institute for High Energy Physics,
Vienna, Austria**

The project is supported by The Hungarian Scientific Research Fund OTKA T034910, T 043145

For those who are less familiar with the project:

Elements of the system:

- Rigid structures (MABs, z-bars)
- Video-camera boxes (on the MABs)
- Chamber LED holders (called forks, on the chambers)
- Diagonal and Z LED holders (on the MABs and z-bars)
- Board computers (one for each MAB)





(Info from Hubert Gerwig and the Survey group)

The MABs are manufactured at the Institute of Mechanics of Materials & Geotechnics (IMMG), Greece:

20 MABs have been made.

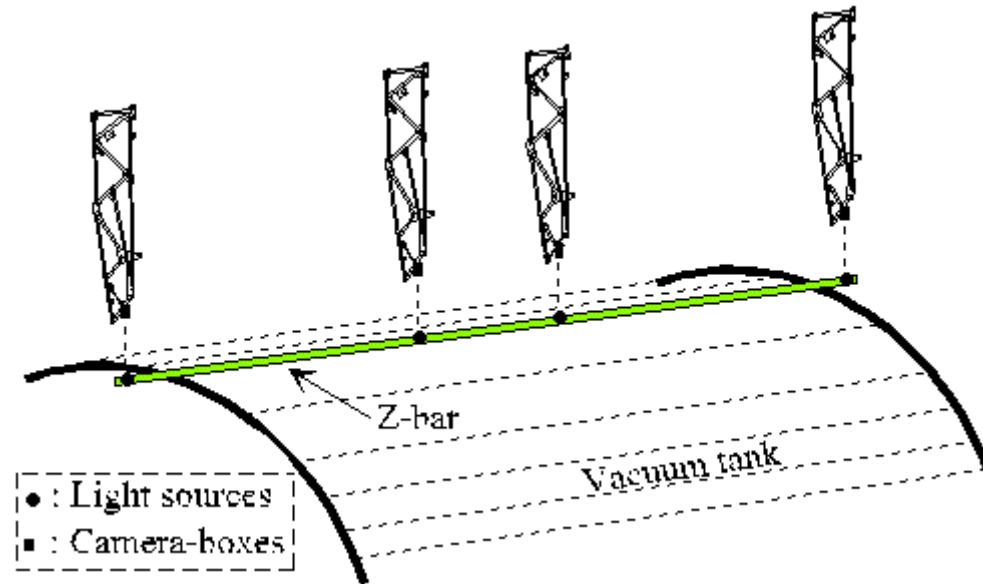
They are close but definitely out of tolerance except one made under H. Gerwig's supervision:

**specified general tolerance for critical points is about $\pm 1\text{mm}$,
many measured points exceed $\pm 1\text{mm}$.**

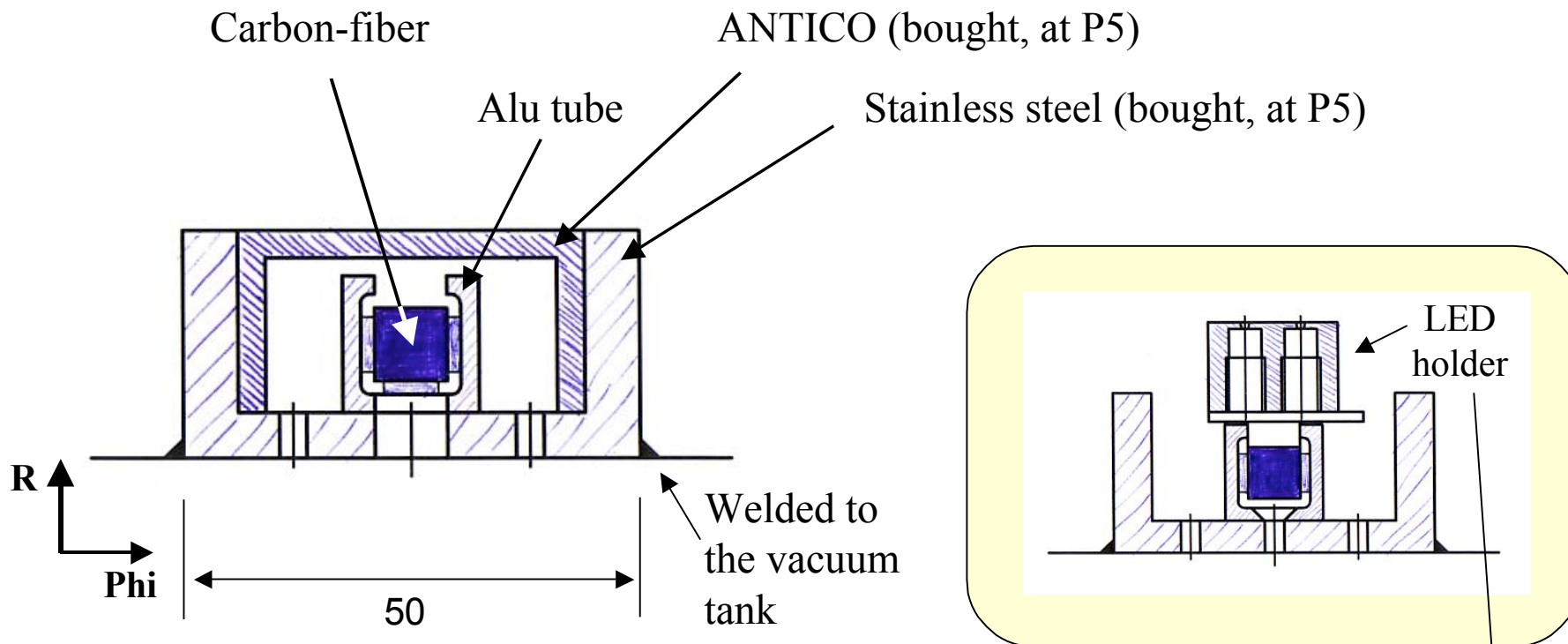
Also, IMMG is questioning the price (would like to increase).

After visits, heavy discussions the situation can be summarized as follows:

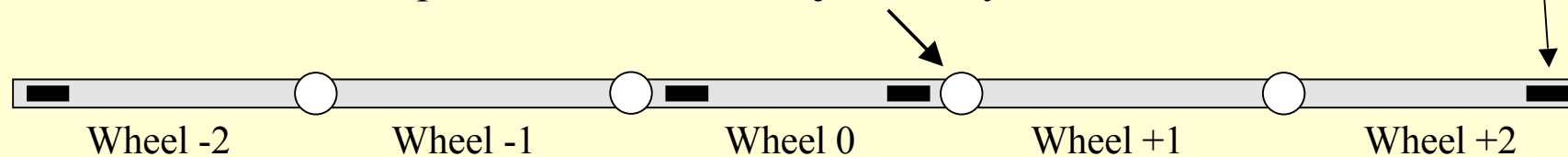
- **The MABs can be repaired.**
- **IMMG is able to produce good MABs.**
- **The interest to continue still exists (on both sides).**
- **With Hubert's help the technology can still be improved.**
- **No danger for the project (so far).**
- **The severe control must be continued.**
- **The financial questions are discussed with the Purchasing Office.**

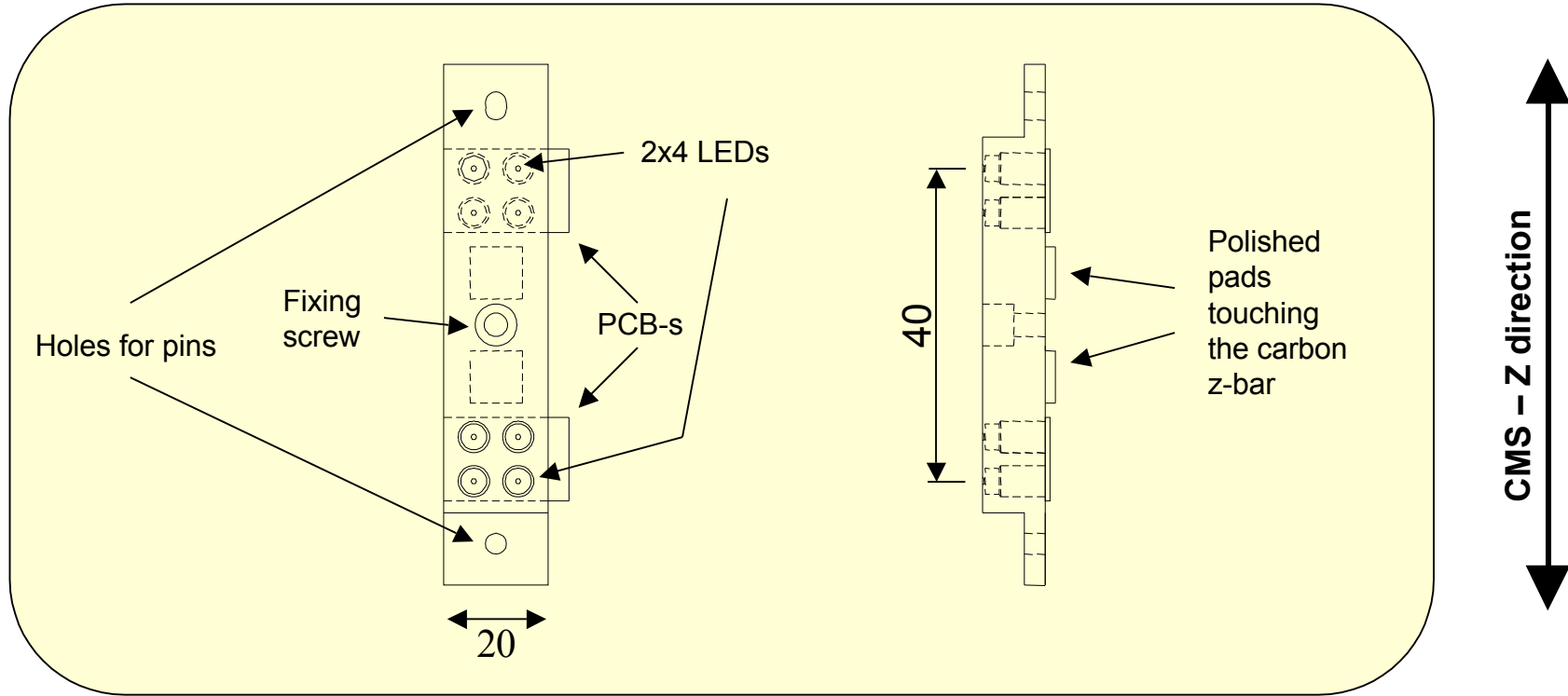


The Z-bar contributes to the measurement of the distances between the MABs.



In Z: Made of 5 pieces connected with joints easy to dismantle





Still under design

- Total quantity: 1200 (1000 in CMS, 76 on the spare DTs, ~10% spare)

- Up to now (April 2004):

Material procured:	for 1200
Forks assembled:	1000
Calibrated	1000
Delivered to CERN:	1000



- For the 200 spare forks all the material is in Debrecen, the assembly started.
- During the chamber calibration 16 forks (out of 416) were found doubtful. They have been sent back to Debrecen, repaired, checked, recalibrated and sent back to CERN.

(More about the forks: see the talk on the calibration.)

- **Total quantity to be calibrated:** 269 (250 in CMS, 19 spare)

- **Assembled and calibrated:**

MB1	32
MB2	32
MB3	28
<u>MB4 (all types)</u>	<u>12</u>
Total calibrated:	<b style="color: red;">104

- **Calibration speed:** (max) 4 chambers/day

- **Next period:** June-August'04

- **Bench stability:** Regularly measured with LTD *:
No movement detected

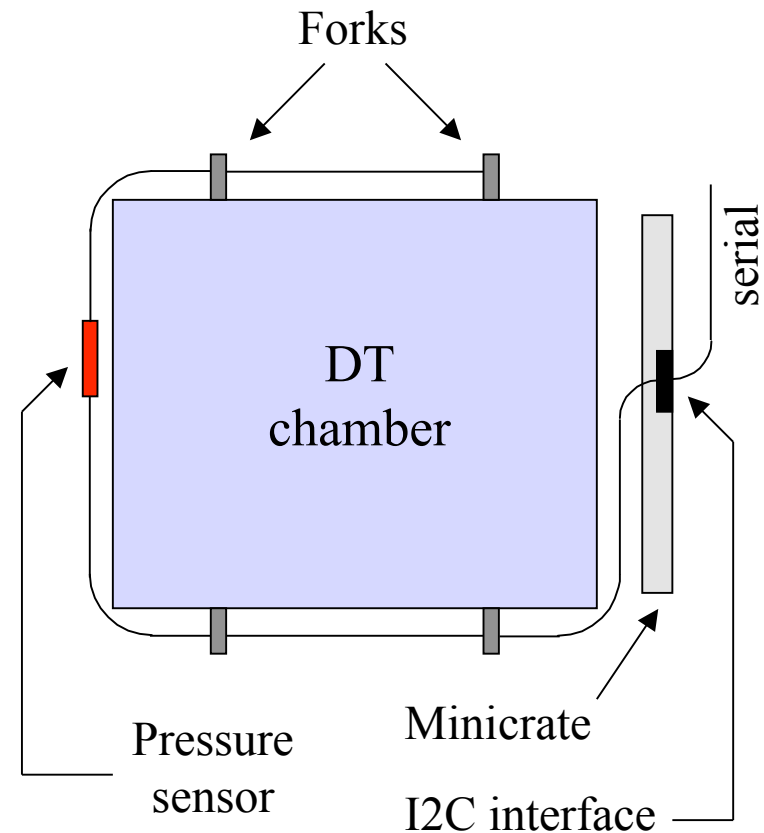
* LTD = Laser Tracker Distancemeter (<40 μm precision)



(More about the chambers and the calibration: see the talk on the calibration.)

Requirements, constraints:

- Standard protocol *
- 1 kHz clock frequency
- Fix addresses for the forks
(0xA0, 0xA2, 0xA4, 0xA6)
- I2C cable
CERN Catalog No.
04.21.22.310.9 (6 wires)
- I2C connector
AMP Micromatch
Type 215079-6 (on the panel)
Type 215083-6 (on the cable)
- Pinning
1: Vcc; 2: SCL; 3,4: GND;
5: SDA; 6: Vcc
- Power
5V, max 0.5 A



* <http://www.semiconductors.philips.com/acrobat/literature/9398/39340011.pdf>



LV “prototype” order

Barrel Muon Alignment

CAEN offer (13 April 2004):

	Description	Q.ty	Unit P
EASY3000 – Embedded Assembly System	11.269,00	5	1.205,
SY2527 - Universal Multichannel Power Supply System		1	8.140,
A1676A - 6 ch Branch Controller	1	1.136,00	5
A3006 - 6CH 16V 6A 45W	4	4.387,00	5
Optional:	A3485 - AC/DC CONV.400VAC T.MPL-5000W	1	3.340,
Optional:	A34FU - Fan Unit	1	1.069,
			Total

This is (more-or-less) the minimum system needed for the Magnet test (Aug 2005)



- The first and most critical part of the Board Computer, the video-image grabber has been ordered from AJECO (Finland):

50 pieces (36 to install + 30% spare)

15700 EUR

- The processor, memory and the power supply units are at the market search phase.



Expected date: August-October 2005

Sectors equipped with DT chambers: 10-11

Setup (barrel part): 10 MABs fully equipped



As the minicrates will not be operational an interface built by us for the test will have to be connected to the forks. It is not yet clear how these interface units could be connected to the DT-s.

