

# PCMAG permanent probes replacement

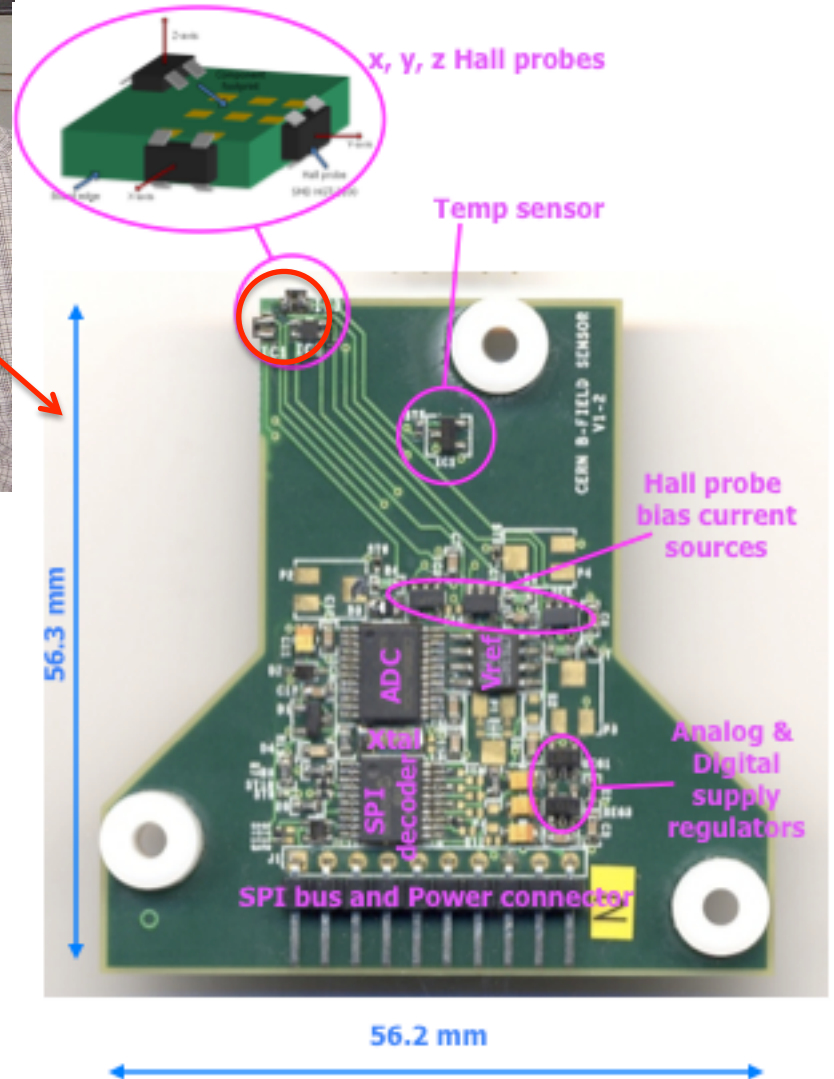
# Introduction

- The PCMAG field map was measured in July 2007
- Technical details about the field mapping and data set (F. Formenti, C. Grefe):
- <http://ilcagenda.linearcollider.org/contributionDisplay.py?contribId=30&sessionId=17&confId=1731>
- <http://ilcagenda.linearcollider.org/contributionDisplay.py?contribId=31&sessionId=17&confId=1731>
- The field mapper contained 24 high-precision B-field sensor cards with 3 Hall probes each
- In addition, 2 sensor cards were placed permanently on the magnet for future reference



Field mapper

Sensor card



# Permanent probes

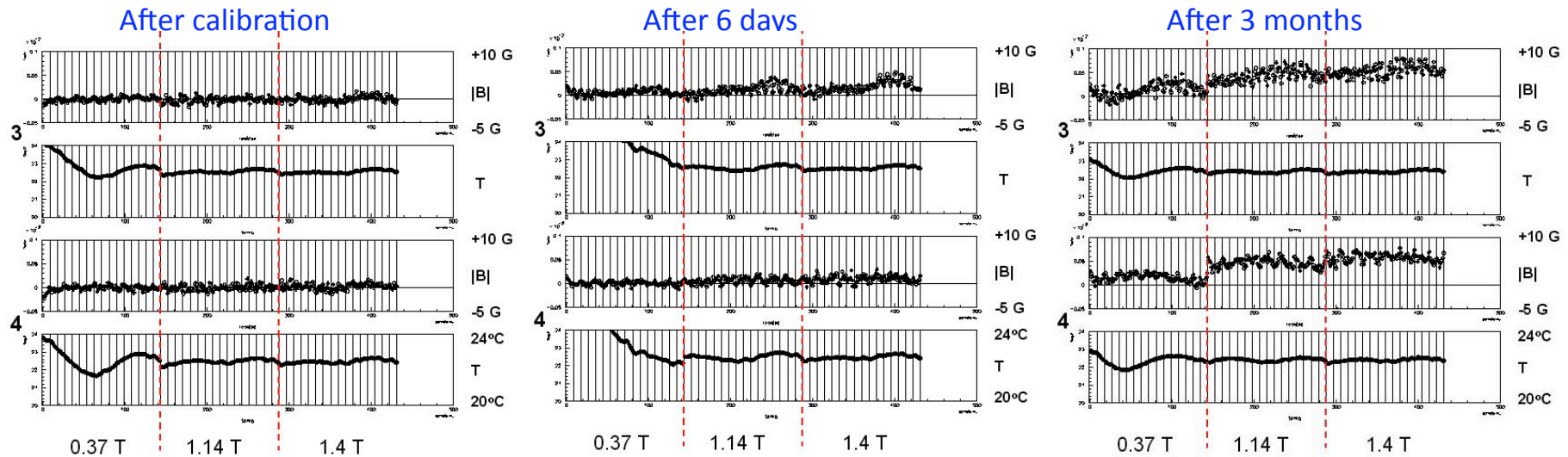
2 permanent probes have been installed

- one in the “neck” of PCMAG
- One glued to the outside of PCMAG

The 2 permanent probes are connected to a readout card (placed on the magnet), which in turn is connected to a PC in the counting room

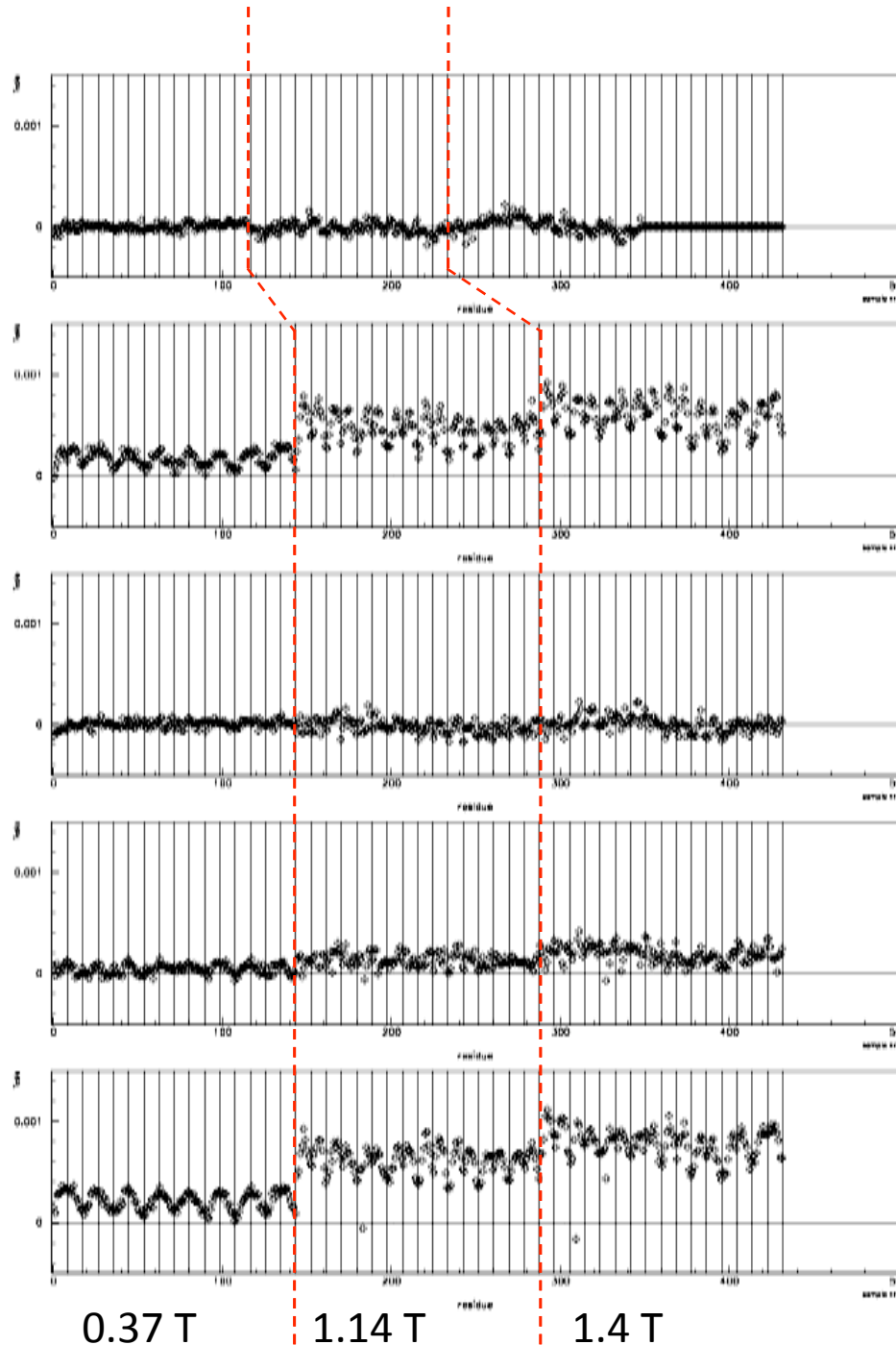
Together with the reading of the current of the PCMAG power supply, the permanent probes will give a redundant check of the overall magnetic field strength

# Calibration results



- Perfect adjustment after performing calibration at three B fields.
- Unexpected calibration degradation in the long term, especially at high fields.
- Tests going on to understand cause of effect:
  - Temperature characterization
  - Reference voltage slow variations.

Eudet cards used at DESY  
card 5



0 days

+15 G

6 months

-5 G

+15 G

6 months  
recal

-5 G

+15 G

6 months

+40 days diff

-5 G

+15 G

6 months

+40 days total

-5 G

**Calibration drift up to  
~10 Gauss (1 per mille)  
after 6 months**

12 cards tested, look similar

Measurements at 22 °C  
Calibration done at 20, 24 °C

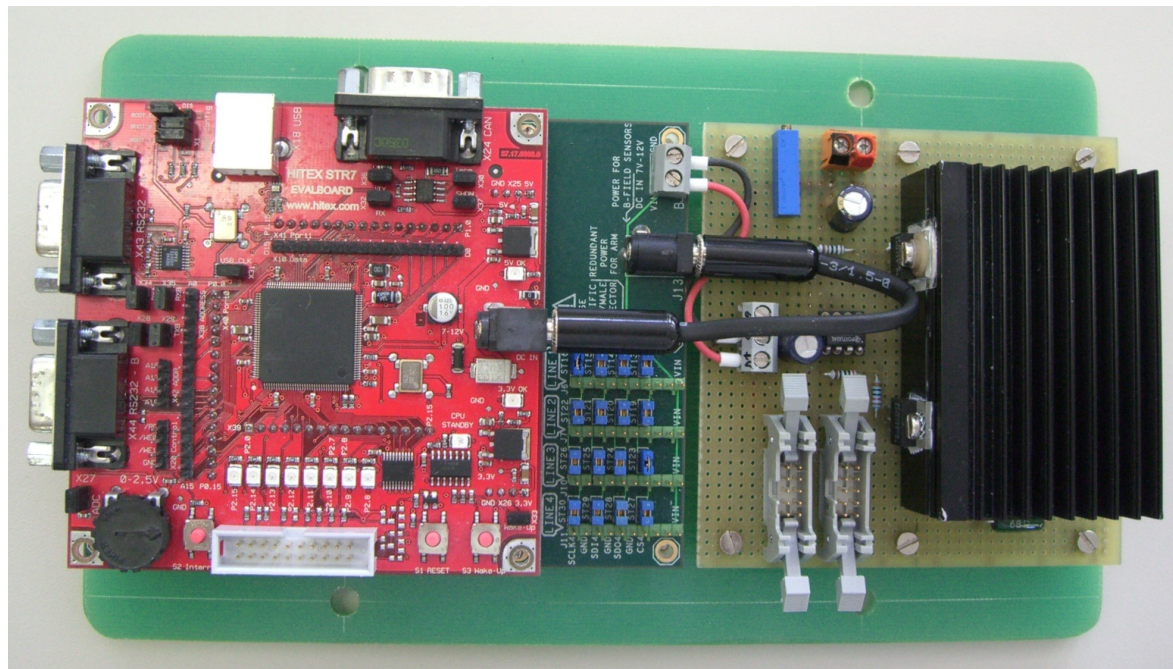
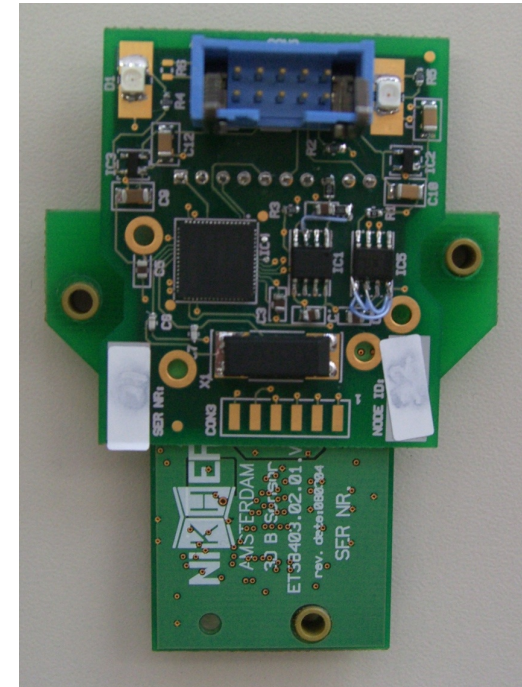
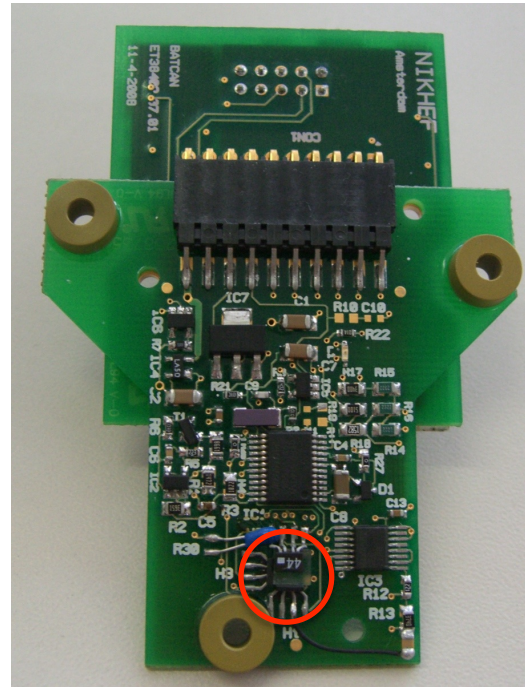
# New sensors cards

- Improved sensor cards are being developed by Nikhef and CERN. First production batch of 10 cards will arrive at middle of September.
- 4 new cards can be made available to EUDET in September
  - 2 cards to replace permanent sensor cards on PCMAG
  - 2 cards for the field cage, as requested by Ron



# New sensor cards

Geometry is different from previous card; Hall-probes are take a different position on the card.



# Acquisition board

Fixed to magnet, and needs a software update



# Actions/decisions to take

- 2 probes to be placed permanently on field cage:
  - OK?
  - Where?
  - When?
- Scheduling of intervention (after Sept. 15<sup>th</sup>):
  - Replacement of the 2 permanent sensor cards;
  - Software reload of the readout board (this board is already attached to PCMAG);
  - Positioning of an NMR probe in the centre of PCMAG;
  - Excitation of PCMAG (2-3 current values);
  - Measurement of NMR and the 2 sensor cards to obtain new reference values;
  - Removal of the NMR probe.
- Implementation of software protocol for B-field data exchange with DCS. Who is the contact person for us?