AHCAL Electronics.

Status and Outlook

Mathias Reinecke
for the AHCAL developers
CALICE Days
DESY Hamburg, March 31st, 2009

HELMHOLTZ GEMEINSCHAFT

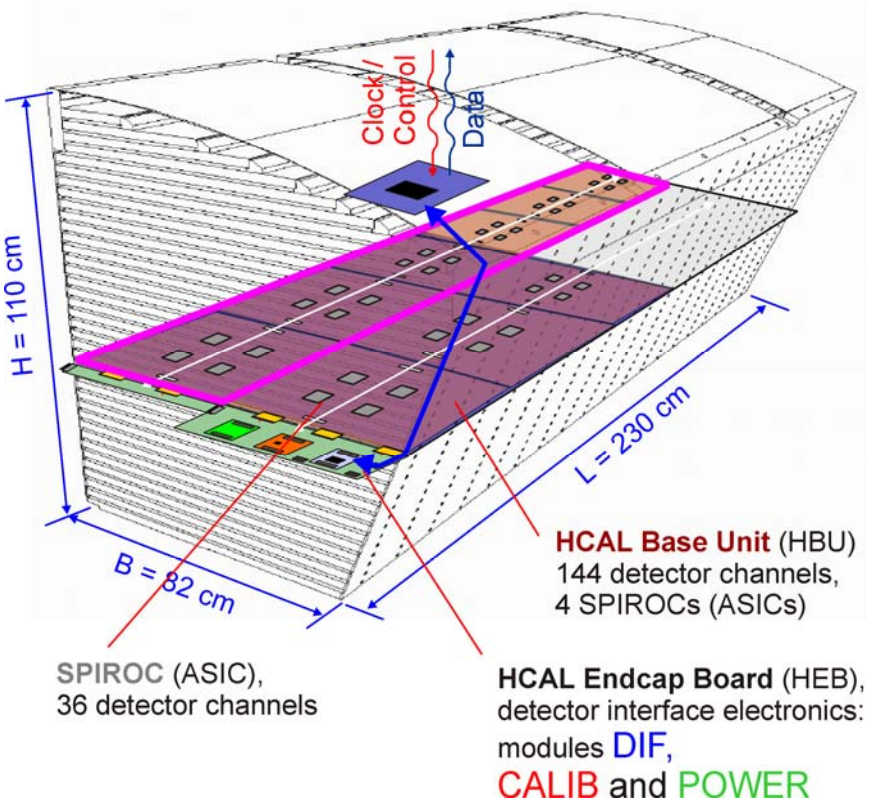
CALICE Calorimeter for ILC

EUDET

DESY

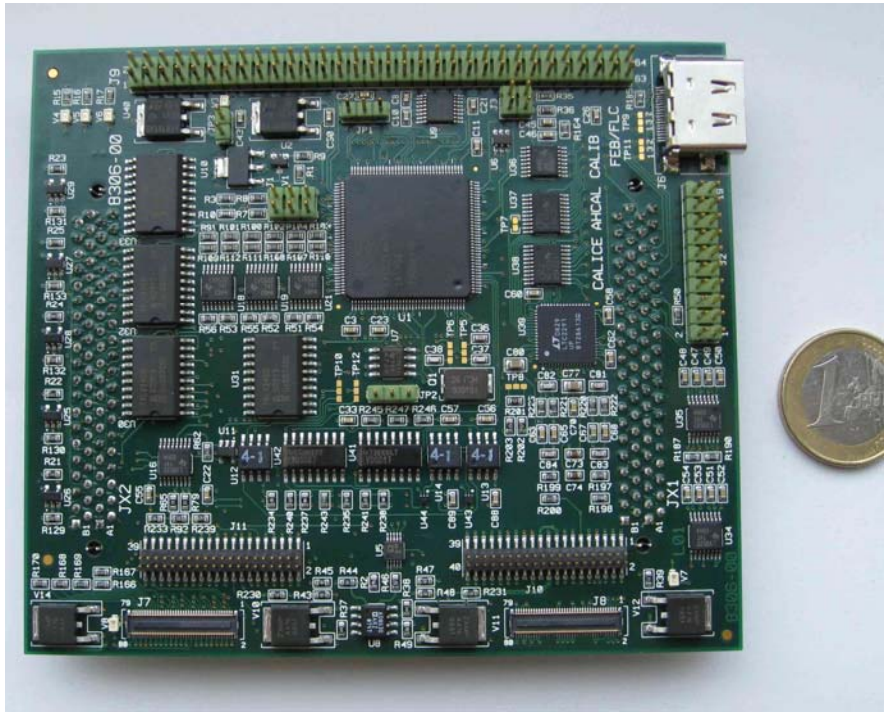
Outline

- Status of (open) Developments
  - CALIB, POWER, Flexleads
  - Scintillating-Tiles and HBU0
  - DIF + mechanical setup + Labview
- Commissioning Plans / Redesigns
  - HBU and DIF redesigns
  - Labview (USB) / ‘final’ DAQ
- Conclusions and Outlook



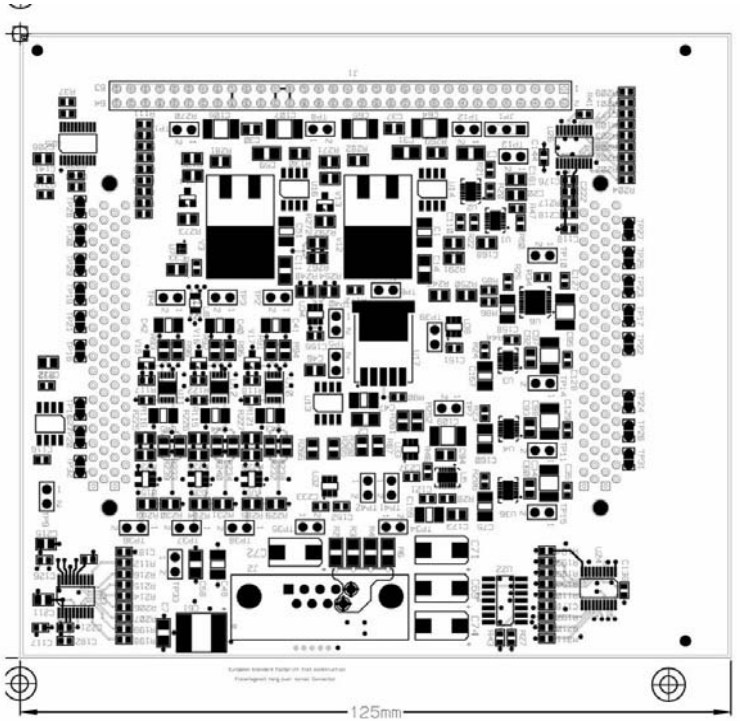
CALIB and POWER modules

CALIB module: 11 x 10 cm²



> 4 Modules finished.
> First tests successful.

POWER module: 12.5 x 11 cm²

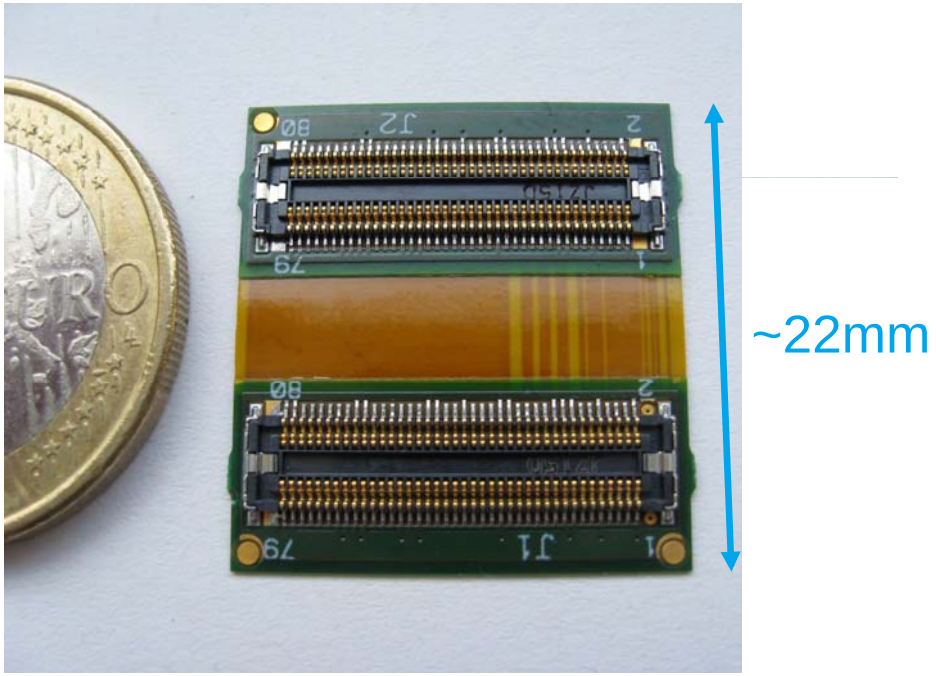


> Layout ongoing.
> Expected end April.

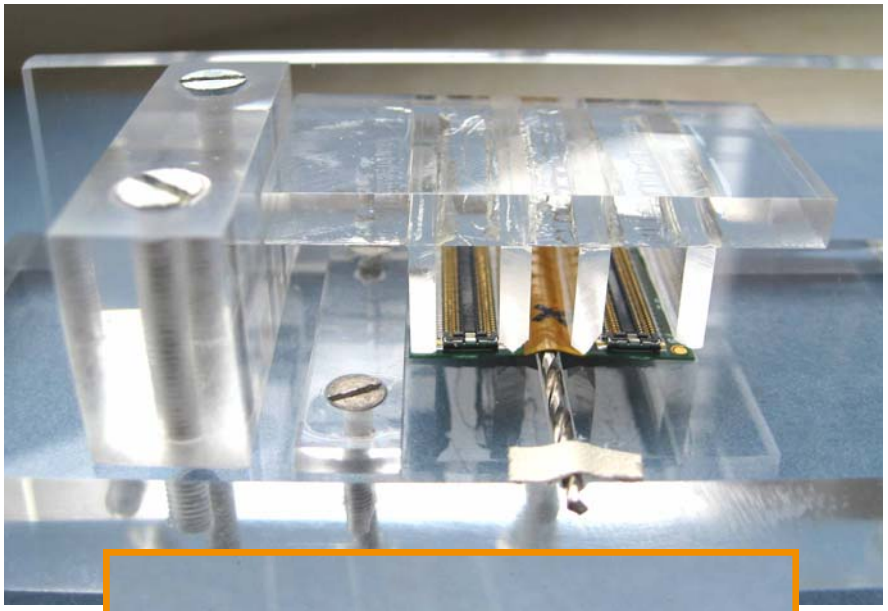
CALIB: M. Zeribi,
POWER: H. Wentzlaff

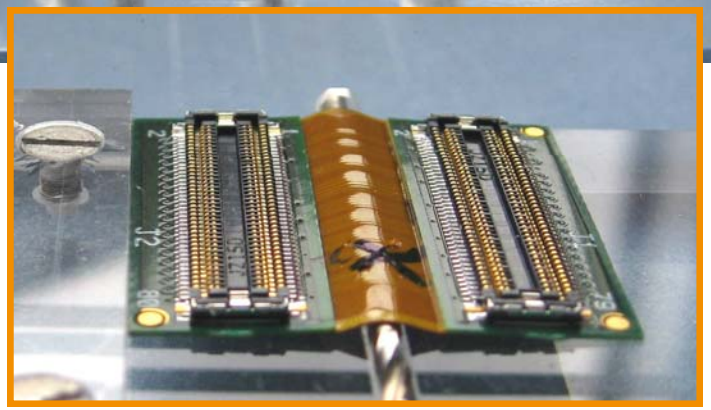
Flexleads (SIGNAL and POWER)

Flexleads finished:
20 pieces of each type.



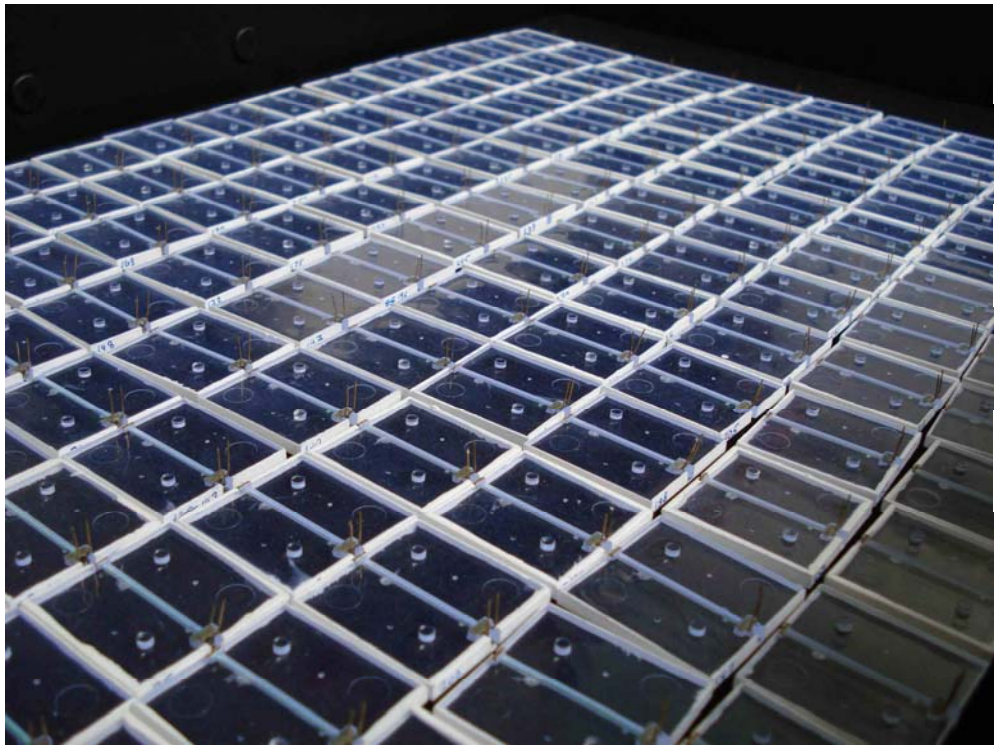
Flexlead Pre-Bending:

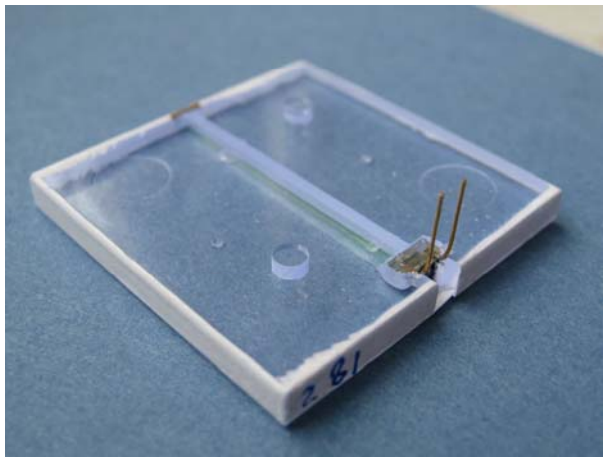




Bending Adapter: K.-H. Gooßen

Tiles

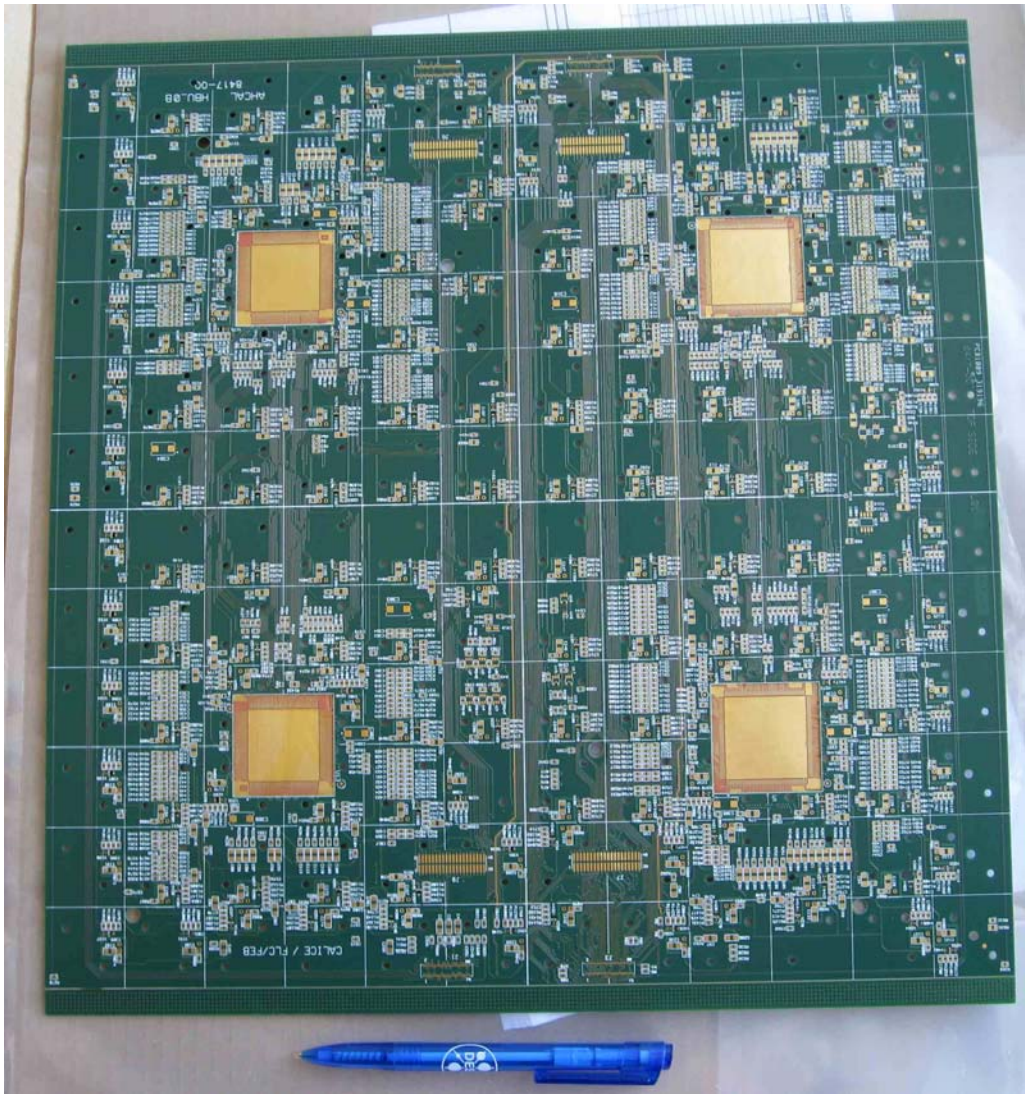


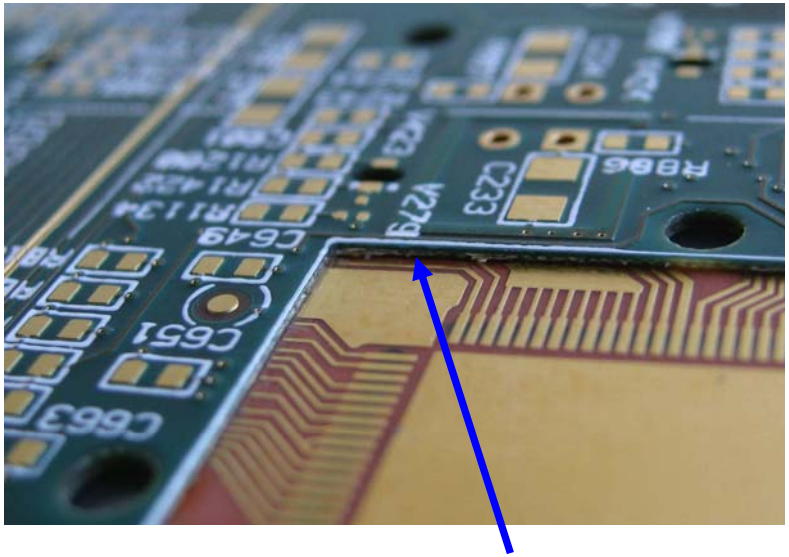


- 153 prototype tiles arrived at DESY (144 needed for a HBU0).
- Assembly procedure Tiles-HBU (alignment pins) works at least for one tile.
- 20% of the SiPMs show ‘long tail’ response (under investigation).

Tiles: ITEP, SiPMs: CPTA

HBU0



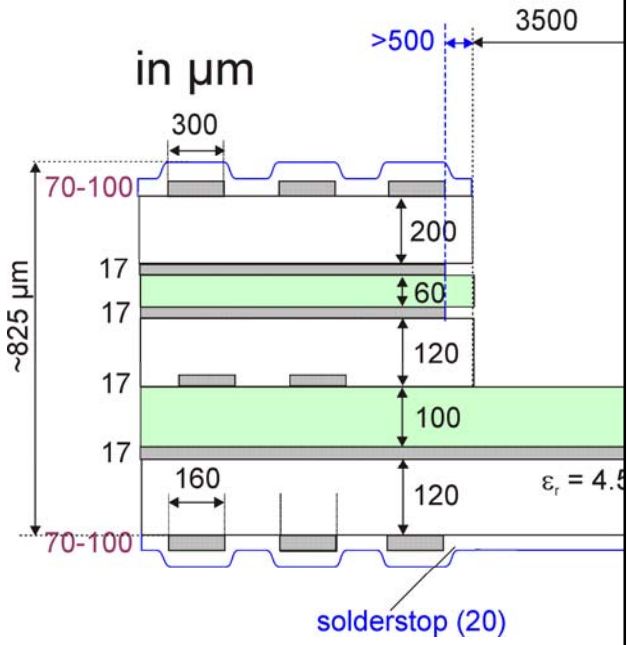


Cutout in PCB (~300µm)

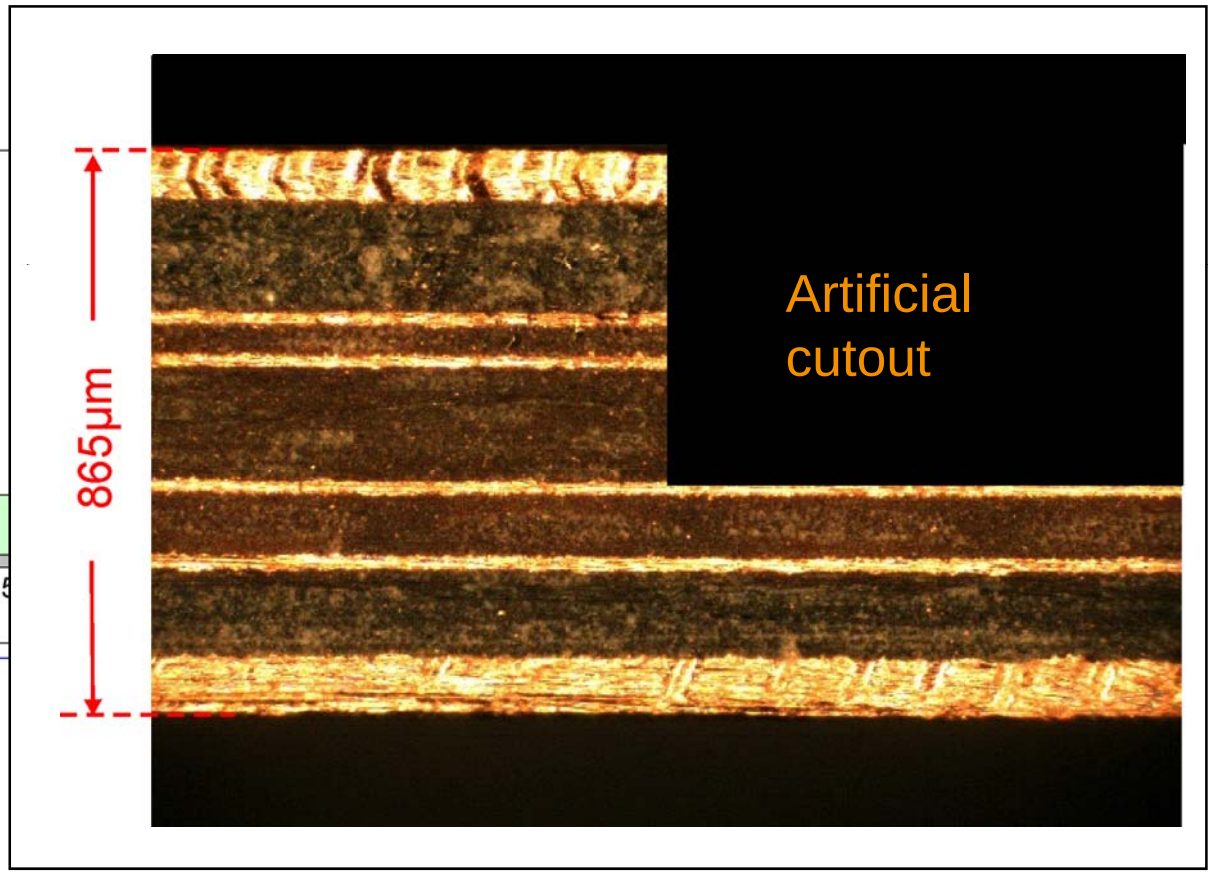
> 3 Boards from 2 suppliers arrived at DESY.
> In assembly right now!

HBU0

HBU0 Cross Section: Concept and Reality:

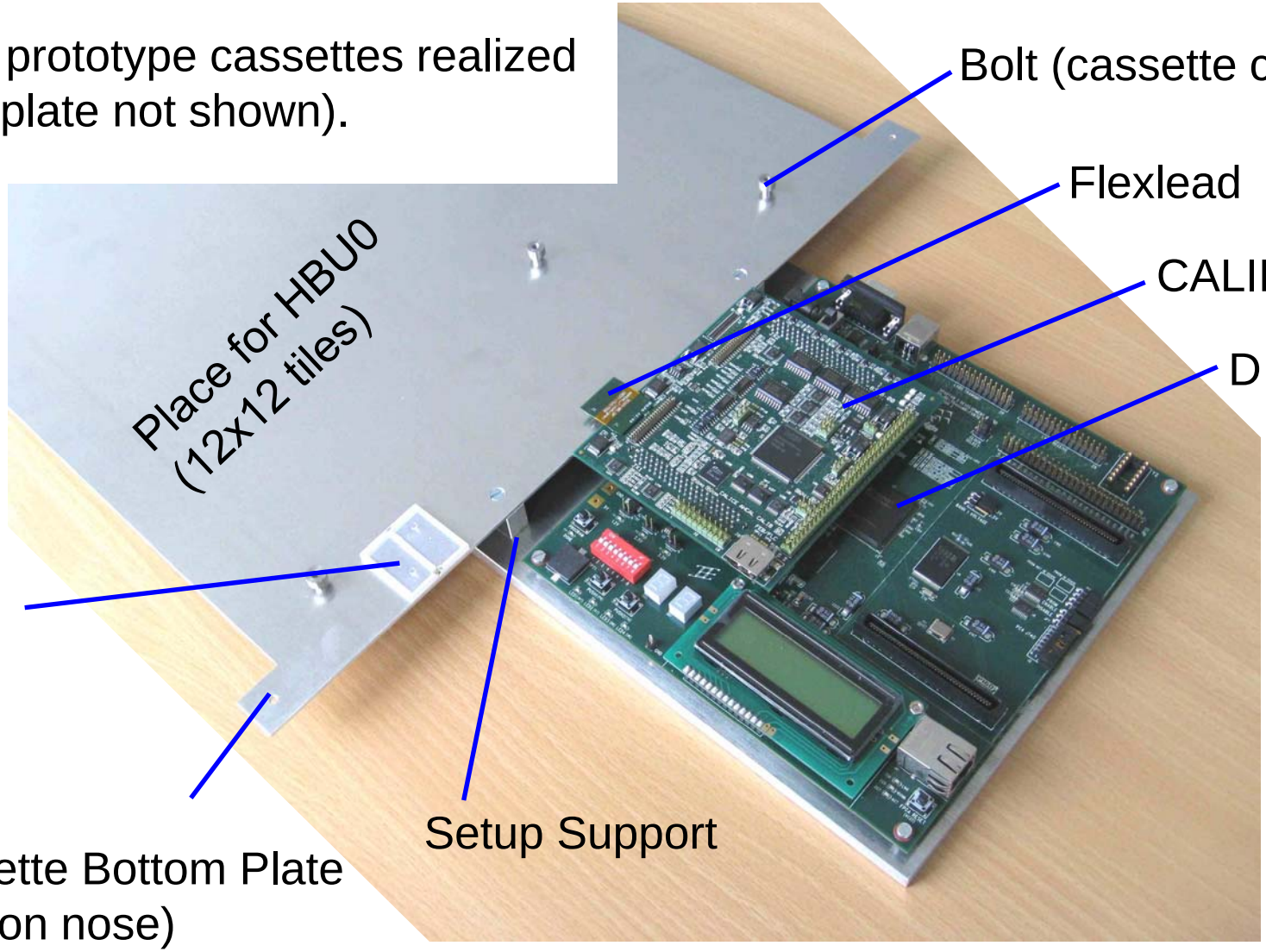


Not in scale!!



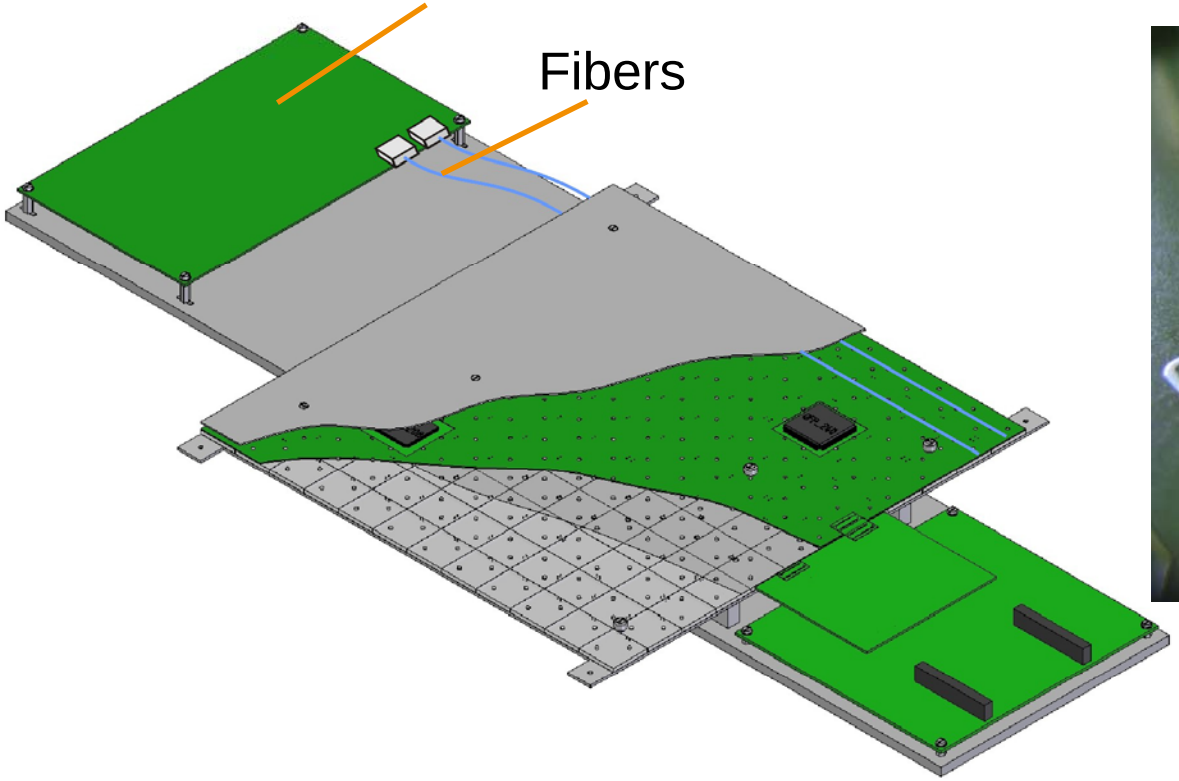
Mechanical setup (Prototype)

Two prototype cassettes realized
(top plate not shown).

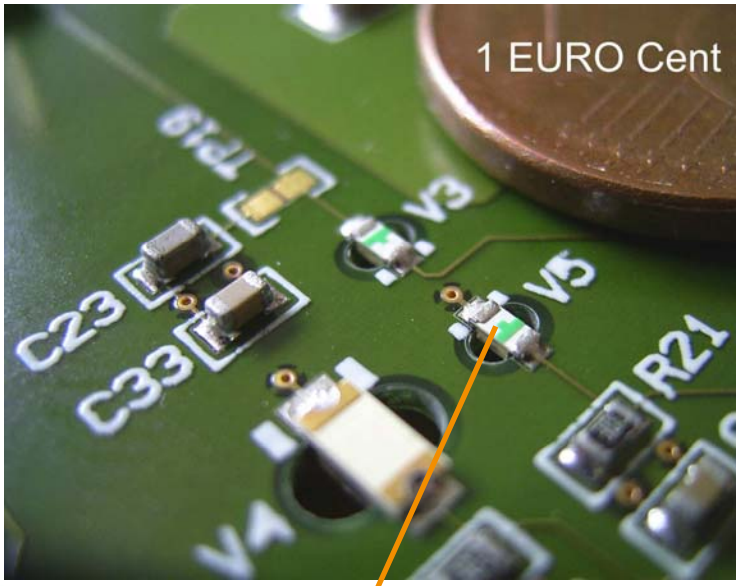


LED Light Calibration Systems (2 concepts)

‘Notched’ Fiber-Based:
QRLD6x board (**ASCR Prague**):



‘Integrated’ LED Based
(**Uni Wuppertal**)



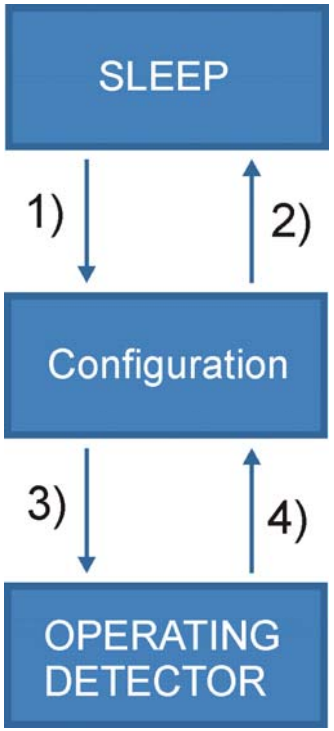
UV LED ‘0603’

Uniformity, Dynamic Range, Crosstalk

DIF

DIF Firmware (preliminary):
> Top Level FSM done.
> Interface to Labview done.
> First sequences to ASICs done.

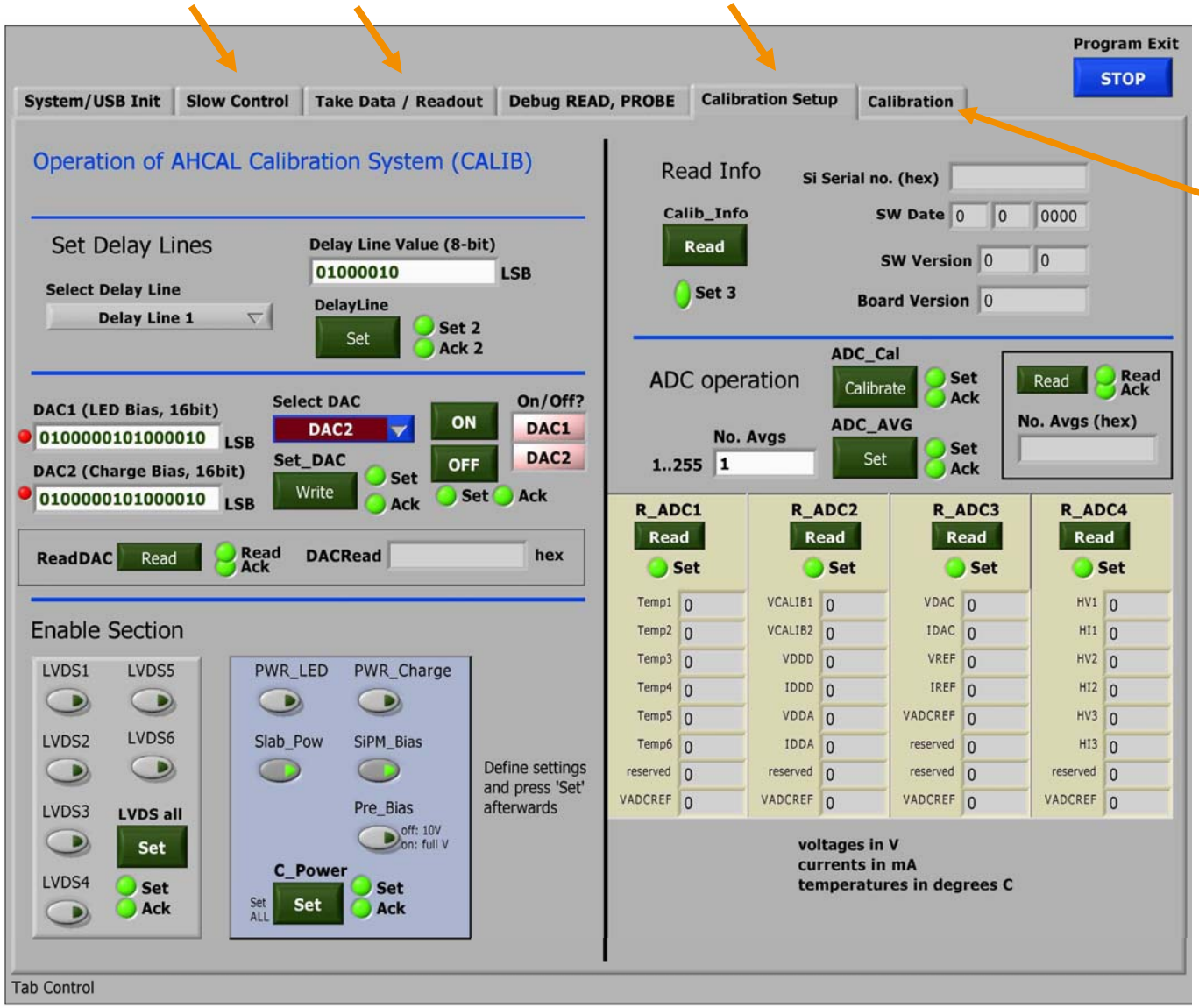
Missing (next steps):
> Interface to Calibration System
> Automatic Sequencing (e.g. for measurements)
> Tests with the actual HBU!



Development in close coordination within the DIF task force (quite a lot communication / discussion).

DIF firmware: F. Krivan (AHCAL)

Labview Control of the Prototype System



4 of 6 tabs filled

AHCAL: Focus on:

> USB Interface
> Slow-Control
> Take Data
> Readout

> First CALIB commands

Labview: Slow Control Data Generation / Status

- Slow control data (703 bits):
  - generated by Labview
  - stored ASIC-wise in ASCII file (8-bits per line). Readback from file possible.
- Labview Control software:
  - takes data from file (+transfer to ASICs).
- Solution for CALICE DAQ:
  - Files for ASICs / Slabs / Layers? But: Files!

Status Labview Control software:

Connection Labview => USB => DIF (in- and output) established.

Basic operations ready, following DIF task force command list, vers. 1.11.

Main work: complex DIF firmware (Frantisek Krivan).

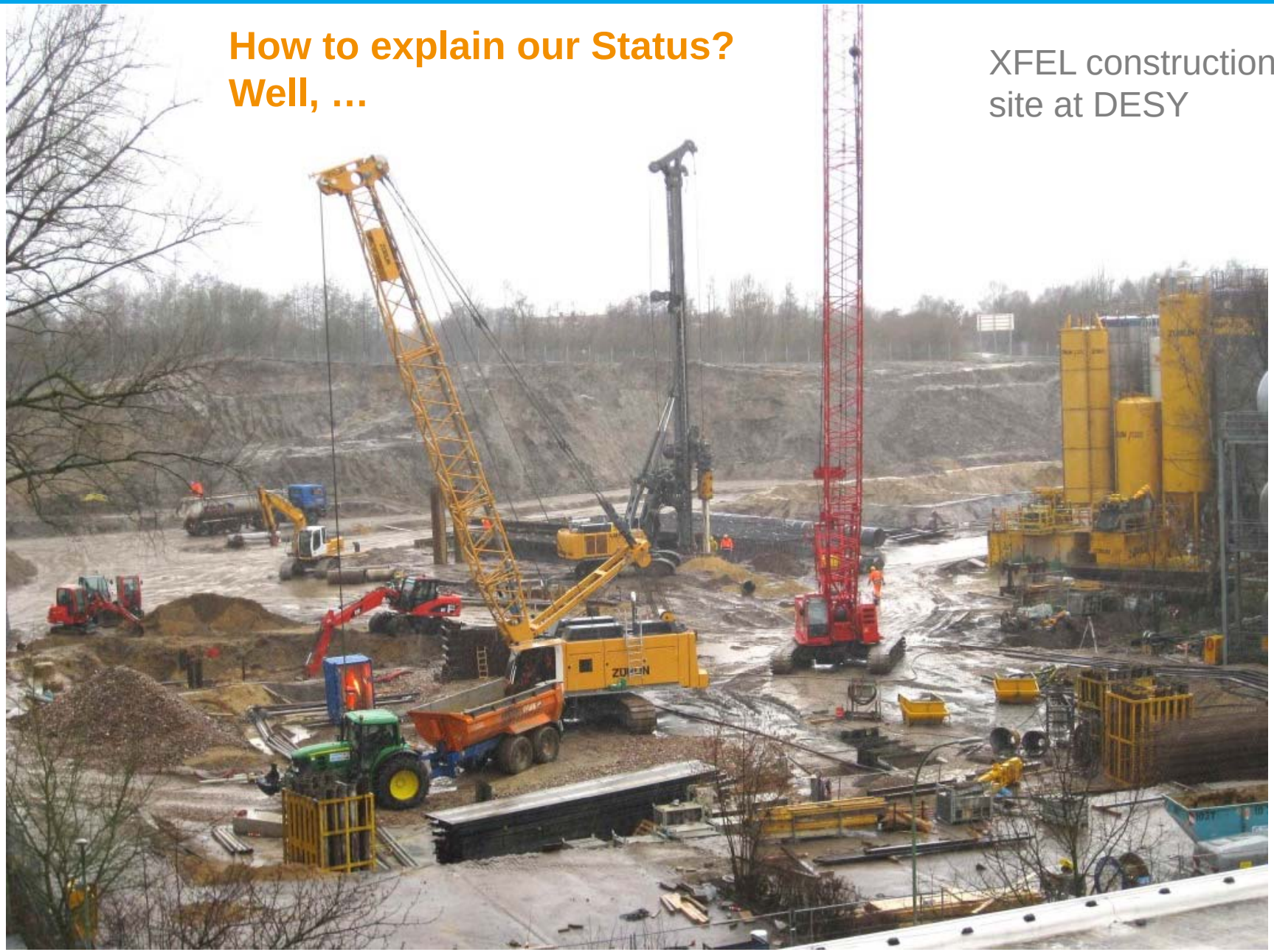
Commissioning of the Prototype System

Status: Huge Stack of 'untested' hard- and soft-, and firmware.

- Timeline is challenging. First steps (SPIROC1):
  - Connect everything together and look for smoke.
  - Try basic accesses to the ASICs (SPIROCs) and look with scope.
- Highest priority is the operation of the ASICs:
  - Write slow-control data
  - Measure / Readout
  - Signal degradation on the long lines.
- Operate Calibration System / Power module

Commissioning of the Prototype System

How to explain our Status?
Well, …



XFEL construction site at DESY

Redesigns for the EUDET module

Minimum redesign effort: HBU, (DIF), ((POWER))

- Redesign Preconditions :
  - SPIROC Pinout and Tile Dimensions (needed beginning June 09)
  - Experiences from prototype (needed mid May 2009)
  - Only digital-part tests foreseen up to now.
- Prototype tests must go on in parallel to redesigns:
  - DESY FE needs support for the tests (manpower for redesigns needed).
  - First real system tests with CALICE DAQ, LCS tests, **SPIROC2!**
  - What are the most necessary tests?
- Mechanical Cassette (EUDET module) => concept pending!

Conclusions and Outlook

- Timeline is challenging.
- No further delays in module production have to be expected.
  - HBU0 Development
  - HBU delays for DIF and CALIB commissioning
- Tests have already started, we proceed in step-by-step mode.

A lot of work ahead, but

as soon as our prototype system is running, we have

a really impressive system !!