microIOC-LR-BPM Beam Position Monitoring Solution

bergoz Instrumentation

WEP016

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**cosylab** CONTROL SYSTEM LABORATORY

System overview

☑ MicroIOC LR-BPM is a complete beam position monitoring solution with hardware and software integration into control system.

☑ Commprises of Bergoz Instrumentation BPM Rack and LR- BPM-SH cards and of Cosylab microIOC ADA unit and has been developed for beam position detection of single-pass bunches.
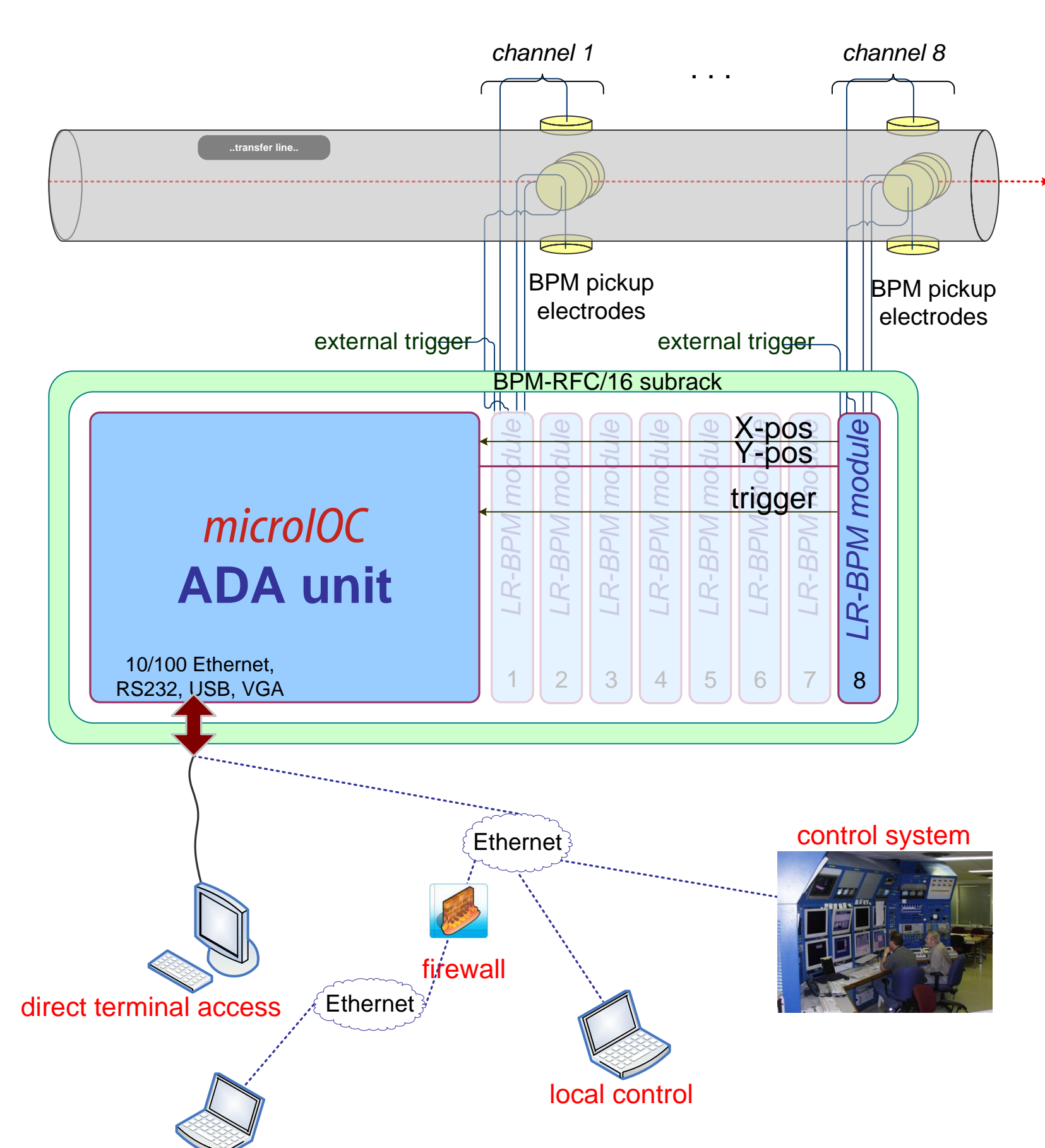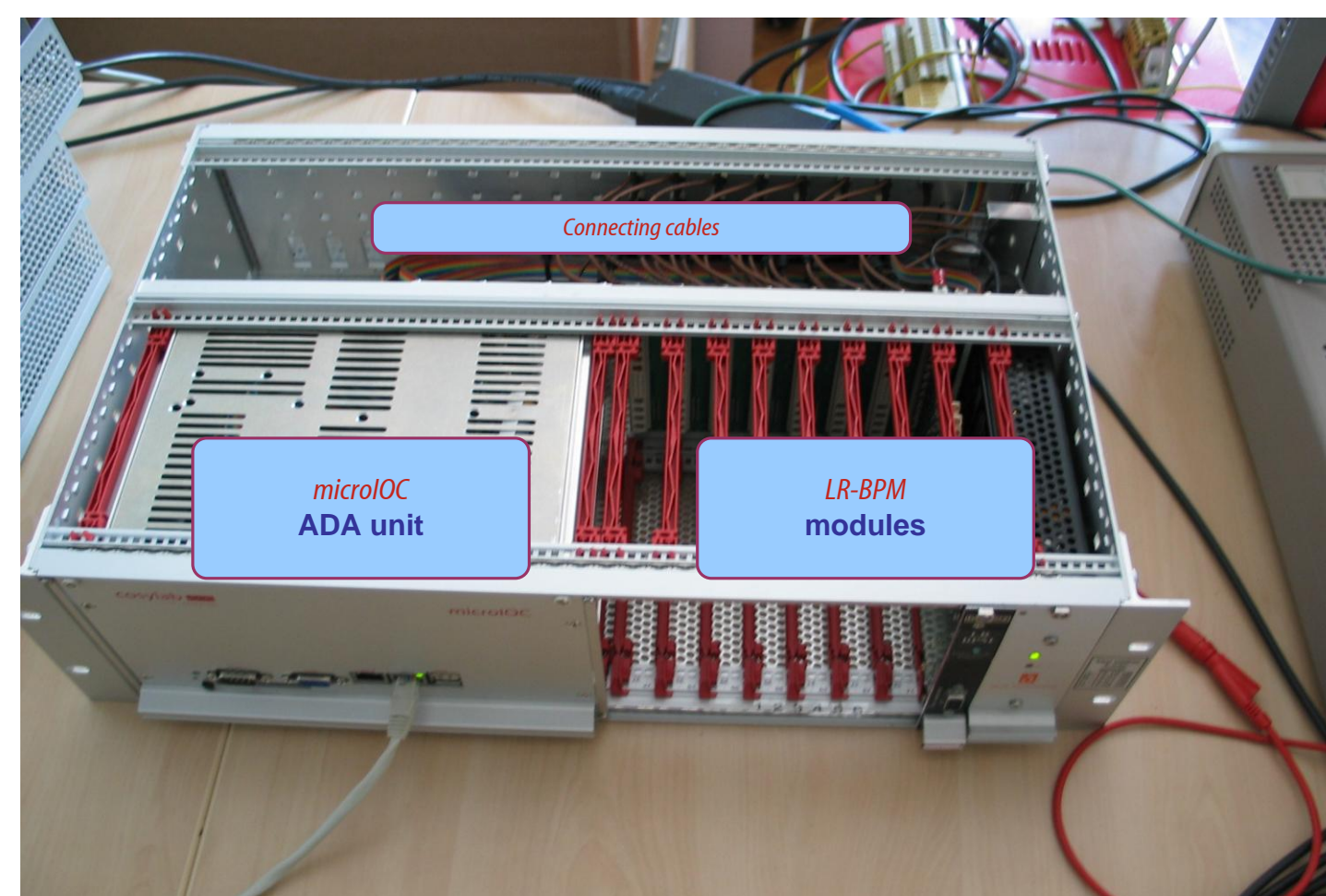
☑ Bergoz LR-BPM modules capture and process the beam pickup signals. Each LR-BPM module outputs two analog signals (vertical and horizontal).

☑ microIOC ADA unit digitizes and processes these analog outputs.

☑ To synchronize with the beam transition triggered measurement is provided.

☑ Sampling is done with 16-bit resolution ADC cards with 8 differential inputs each, sampling at 250k samples/sec.

☑ Samples for each channel are averaged in order to filter out mains noise

☑ Up to 8 LR-BPM modules can be used and processed by this system.


Key Features

☑ turnkey solution for quick beam position monitoring – attach to the BPM pickup electrodes and read data in control system

☑ control system SW and graphical user interface supplied

☑ compact design; installed into single 3U high chassis

☑ complete monitoring with averaging of position signals from LR-BPM units (X, Y)

☑ 16-bit resolution sampling @250kHz

☑ sampling synchronization with Bergoz LR-BPM card built-in trigger or external trigger
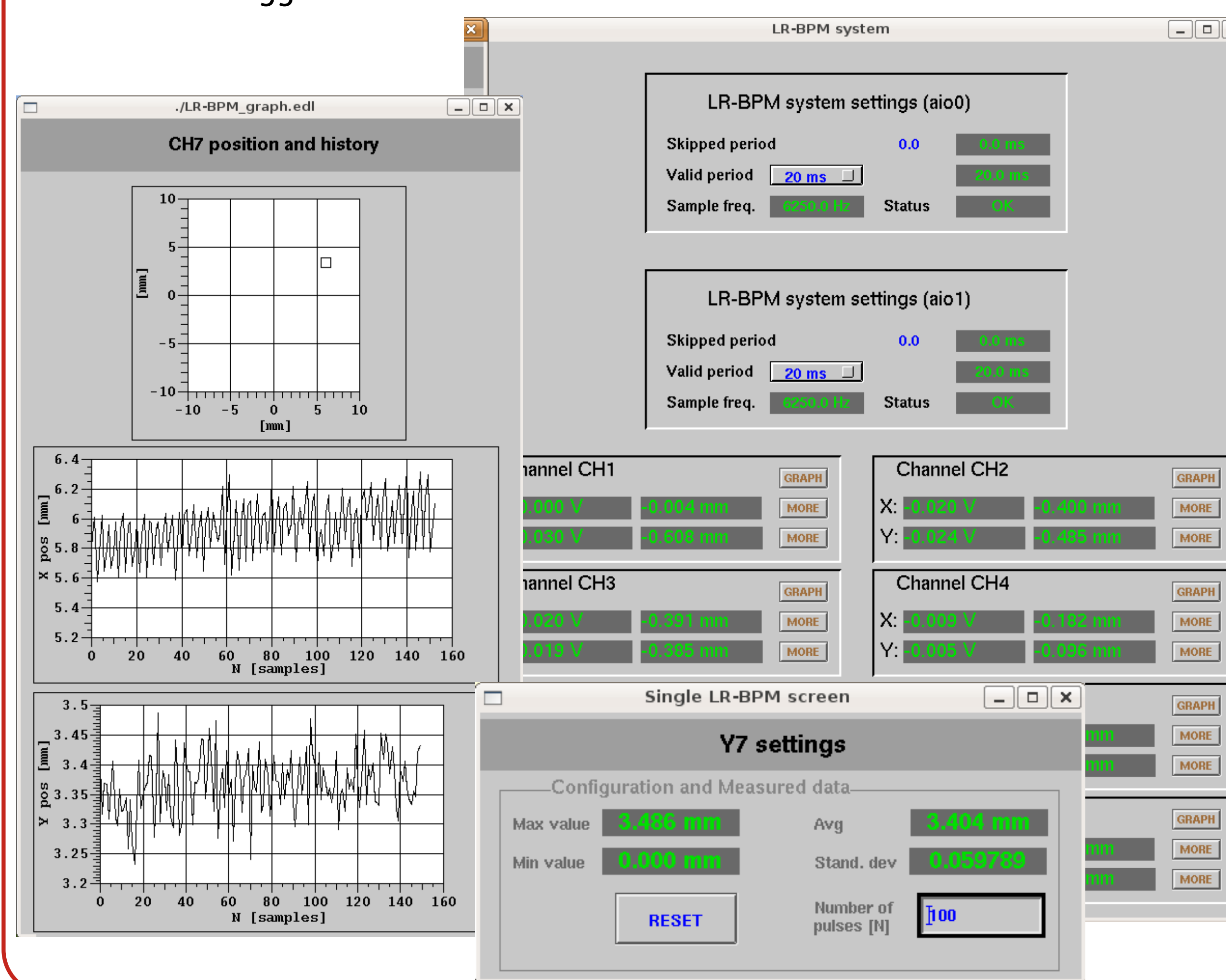
Testing in Soleil, May 2008

☑ Measurements taken on Transfer Lines LT1 (Linac) and LT (Booster -> Storage ring)

☑ Single-bunch mode measurement:
   - Bunch repetition rate: 3 Hz (possible up to 50 Hz)
   - Charge: 0.5 nC per bunch

☑ Multi-bunch mode measurement
   - 104 bunches in one Multi-bunch, length 300 ns
   - Multi-bunch repetition rate: 3 Hz (possible up to 50 Hz)
   - Charge: 2,8 nC per multi-bunch
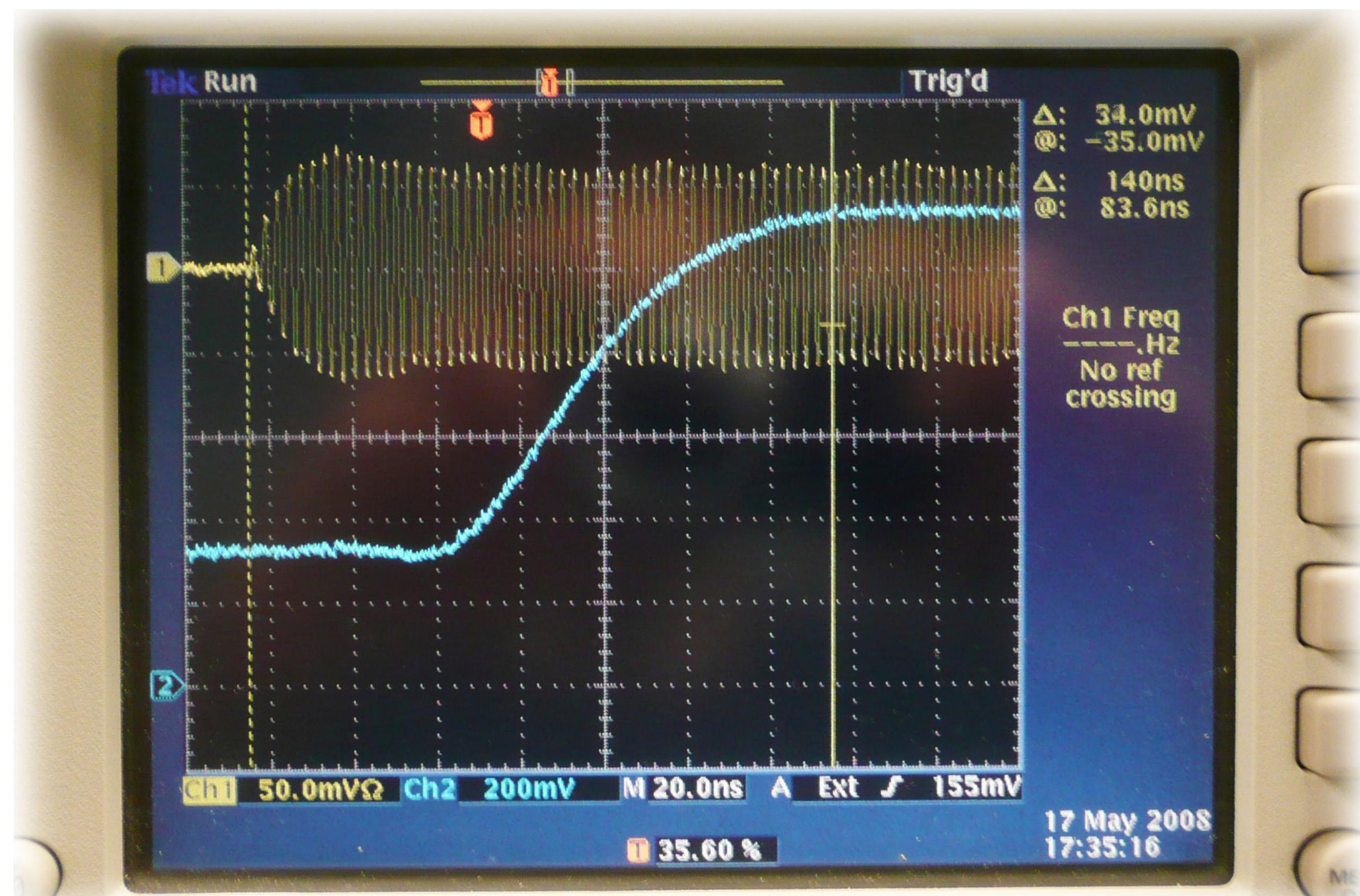
Multi-bunch mode (pickup detector A Channel and LogA output signal)
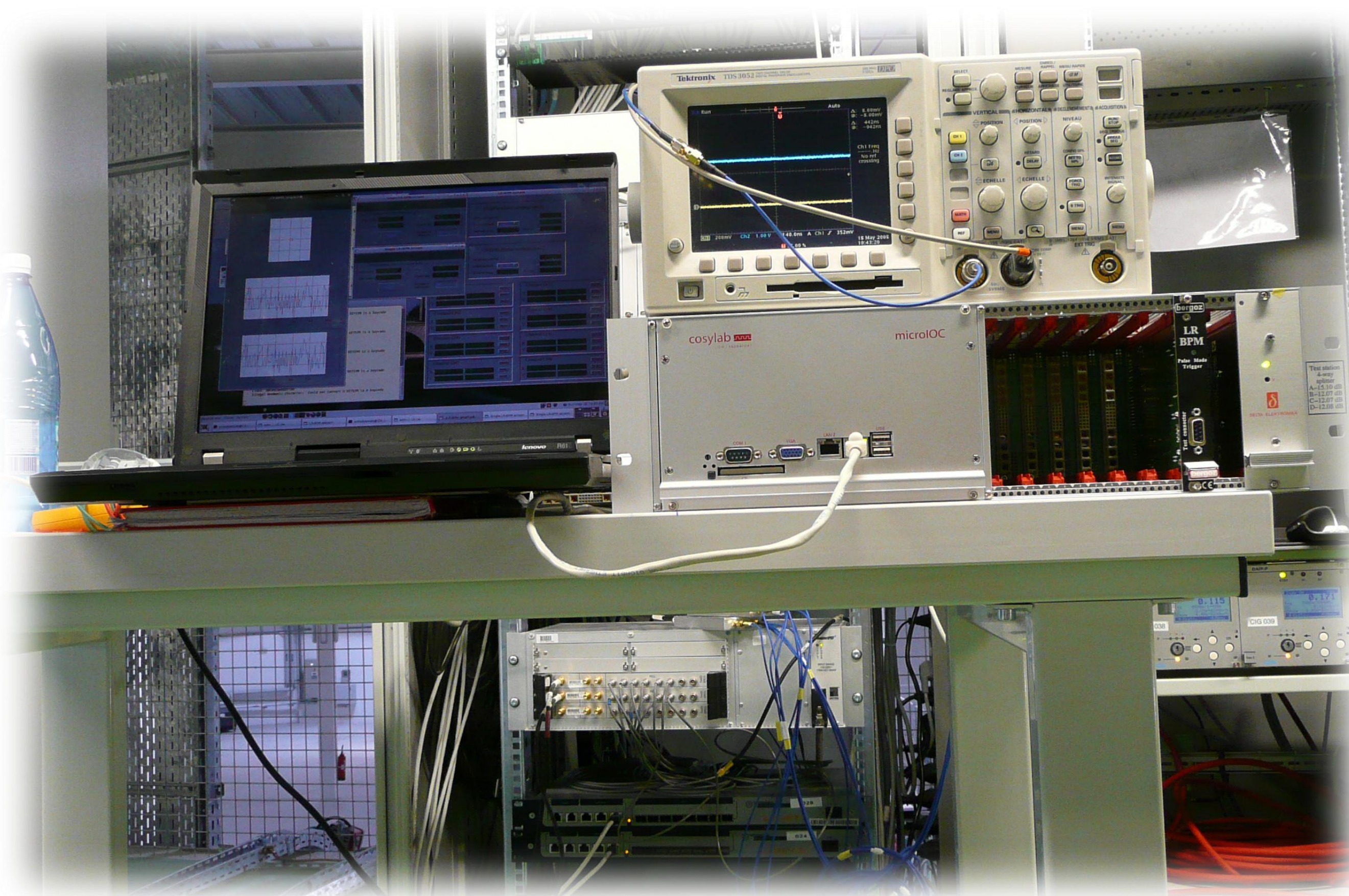
Ideas for future improvements

☑ Remote control over LR-BPM module with use of digital outputs inside the ADA unit (Single/Multi bunch selection)

☑ Upgrading ADC cards inside the ADA unit for better time averaging   of the samples