Libera Status at SOLEIL

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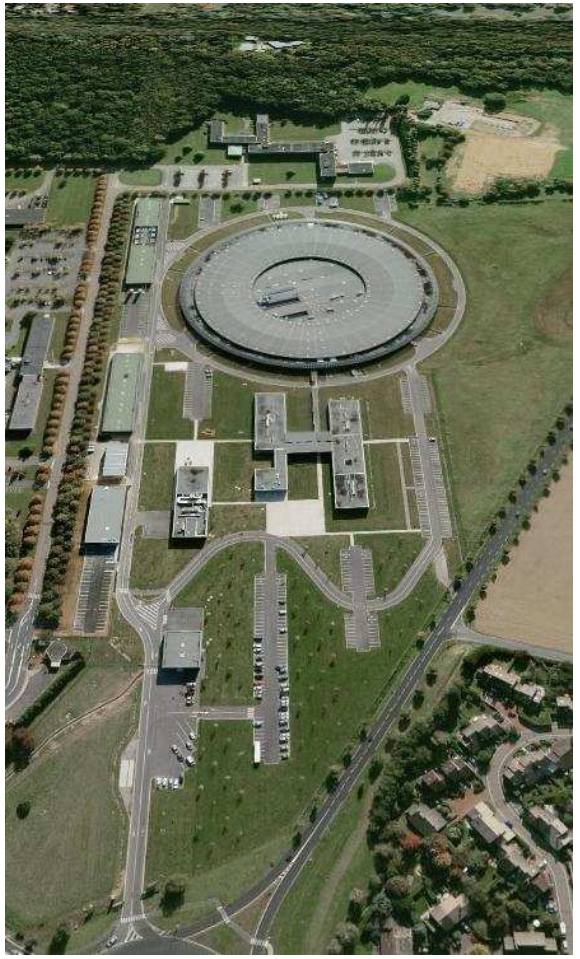
On behalf of Diagnostics group

SOLEIL and Liberas Status

- Synchrotron SOLEIL
  - 3rd generation light source delivering photons since January 2007
  - 2.75 GeV
  - 18 Beamlines in operation
  - 300 mA for users operation, 500 mA already achieved during machine tests.
  - Top-Up operation since March 2009



- 161 units of Libera Electron
  - Delivered in 2005
  - In operation since July 2005
  - Distribution:
    - Storage ring = 120 (BPMs) +1(tune) units
    - Booster = 22 units
    - TL2 = 3 units
    - TL1 = 1 unit
    - Spares and tests = 14 units

Libera Configuration

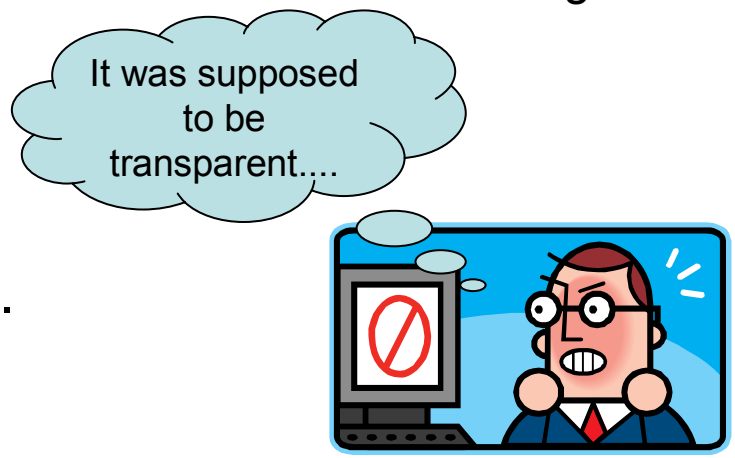
- Users operation:
  - Data sources:
    - SA => To monitor and correct the orbit (slow orbit feedback)
    - FA => To correct the orbit (fast orbit feedback) and monitor noise spectrum
  - Interlock
    - Vertical plane:
      - 46 BPMs involved
      - Thresholds between ± 1mm (bending magnets) down to ±0.3 mm (IR mirrors)
    - Horizontal plane:
      - 8 BPMs involved
      - Threshold at ±0.8 mm (IDs)
    - Gain dependant (Inhibited if gain < -40 dBm)
  - Automatic Gain Control always activated
  - Post-Mortem on all BPMs (16 ksamples)
    - Triggered by the Machine Interlock Signal
  - Detuning of ~9 kHz of sampling frequency (offset tune = 220)
  - External source for switching

- Machine studies:
  - Additional data source:
    - TT: still with standard filter (difficulties with the MAF filter on Libera electron)

Release status

- Liberas running **release 1.82** with modified FPGA design for dedicated Fast Orbit Feedback application.

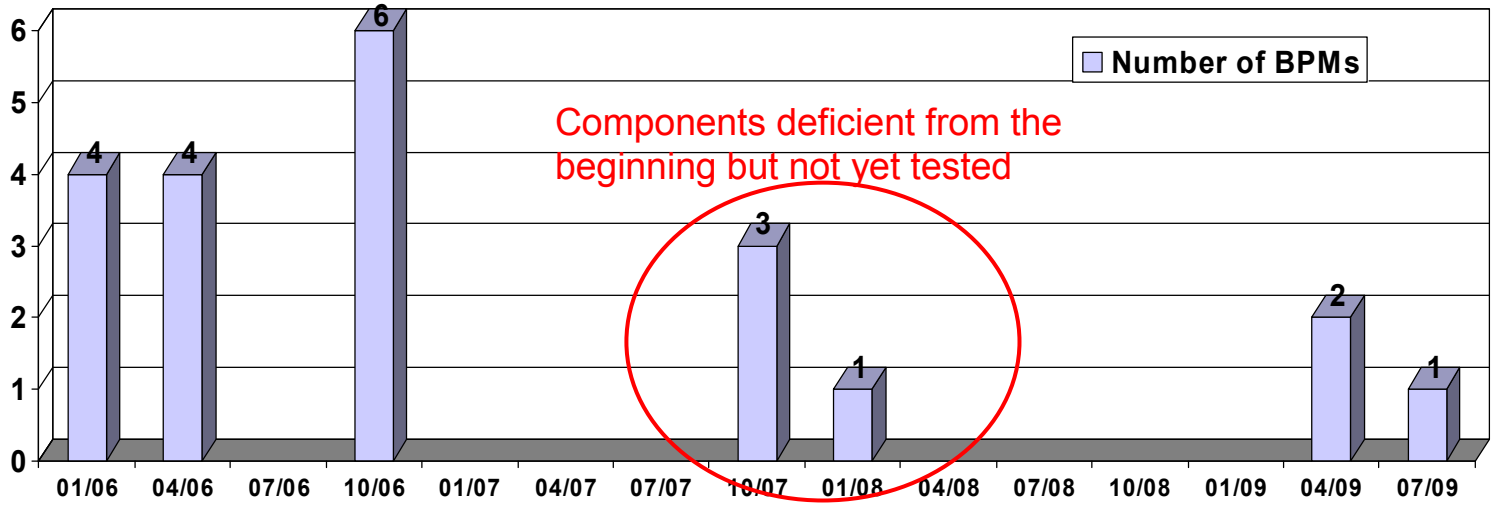
- Large amount of work for each upgrade
  - Upgrade process can be very long if Linux system is updated (1.46 to 1.60 and 1.82 to 2.0)
  - Integration and testing of FOFB application in the new FPGA design
  - Testing of all functionalities ?



- No plan for upgrade at the moment….

Hardware Failure History

- 21 modules over 161:



Youth defaults (components, soldering, crashes)

First 'real' breakdowns
2 analog boards
1 SBC ?

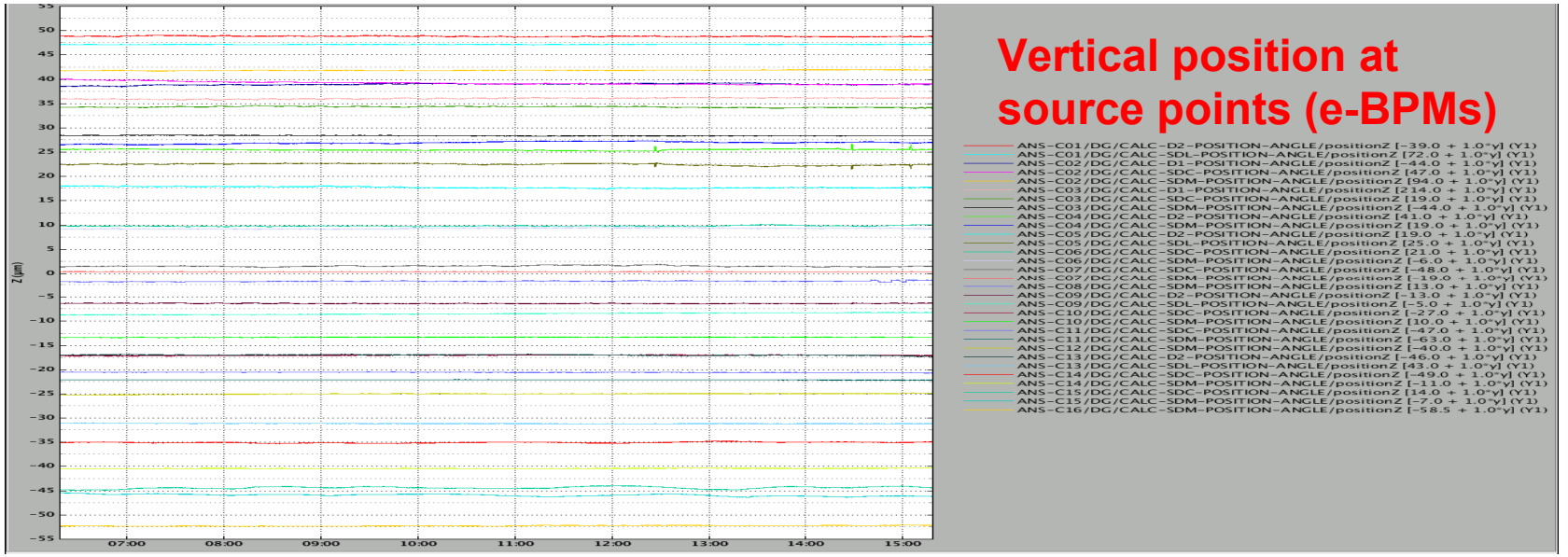
Libera and Orbit Feedbacks

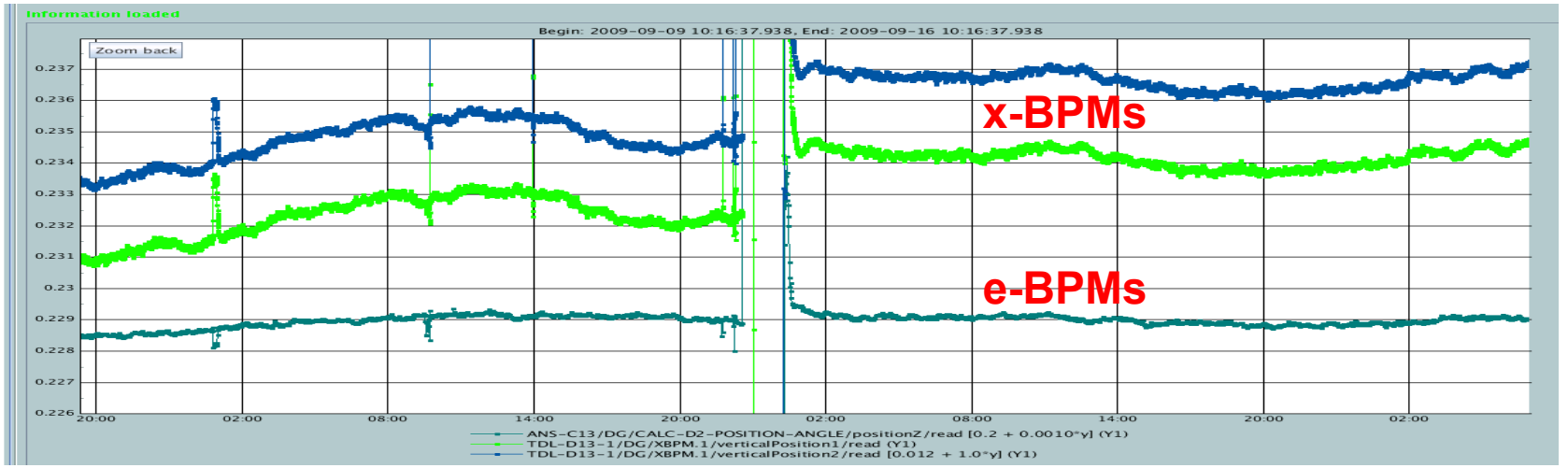
- SOLEIL Fast Orbit Feedback System is embedded in the Libera Modules:
  - DIAMOND Communication Controller
  - FOFB Algorithm
  - Power supply driver (RS 485 links)

- Since 2009 both Slow and Fast Orbit Feedback are running together down to DC.

- Plans for 2010:
  - Integrate bending magnets photon BPMs in the loop. Task could be facilitated by the use of Libera photon including the Communication Controller.

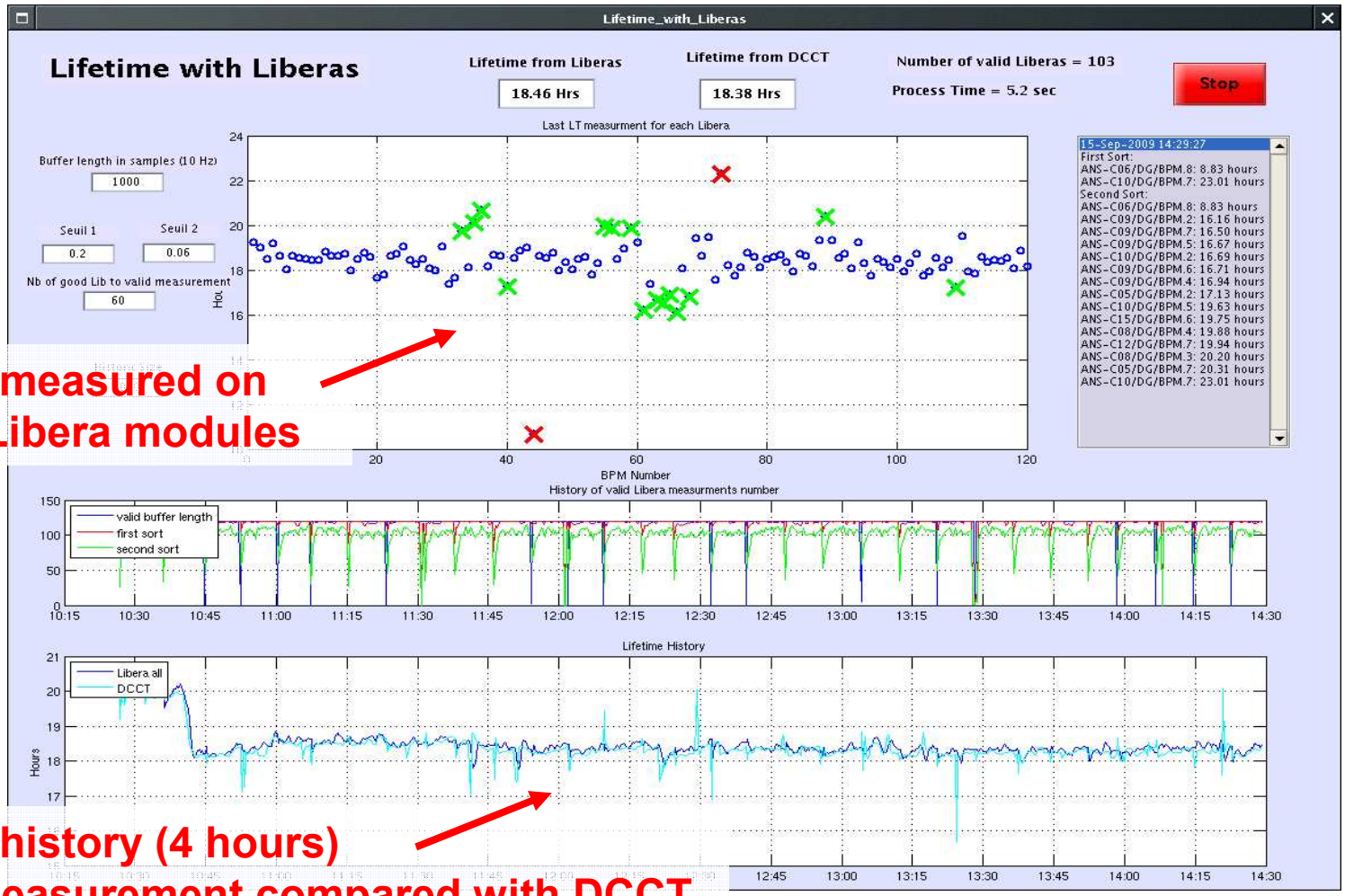
Libera and Orbit Feedbacks





Lifetime measurement

- A Lifetime measurement can be computed with the Libera modules:
  - Calculation of the LT on an history buffer of the Sum of the 4 electrodes for each BPM



Lifetime measured on the 120 Libera modules

Lifetime history (4 hours)
Libera measurement compared with DCCT