



Libera Status at SOLEIL

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Synchrotron SOLEIL

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

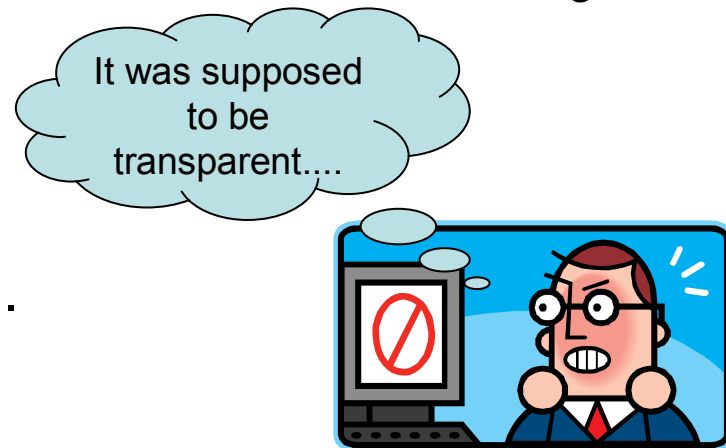
- Users operation:
 - Data sources:
 - SA => To monitor and correct the orbit (slow orbit feedback)
 - FA => To correct the orbit (fast orbit feedback) and monitor noise spectrum
 - Interlock
 - Vertical plane:
 - 46 BPMs involved
 - Thresholds between ± 1 mm (bending magnets) down to ± 0.3 mm (IR mirrors)
 - 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

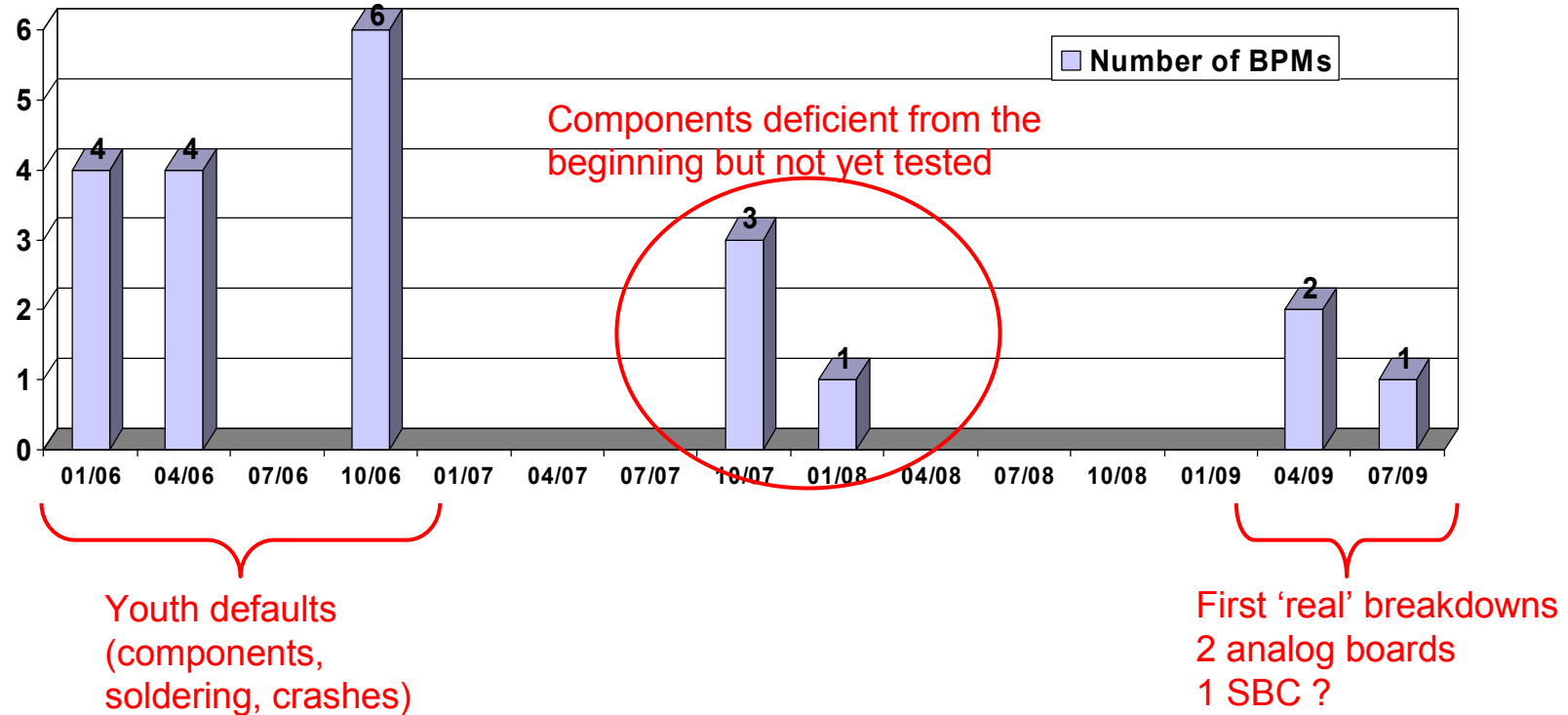
- Liberas running **release 1.82** with modified FPGA design for dedicated Fast Orbit Feedback application.
- Large amount of work for each upgrade
 - Upgrade process can be very long if Linux system is updated (1.46 to 1.60 and 1.82 to 2.0)
 - Integration and testing of FOFB application in the new FPGA design
 - Testing of all functionalities ?

- No plan for upgrade at the moment....



Hardware Failure History

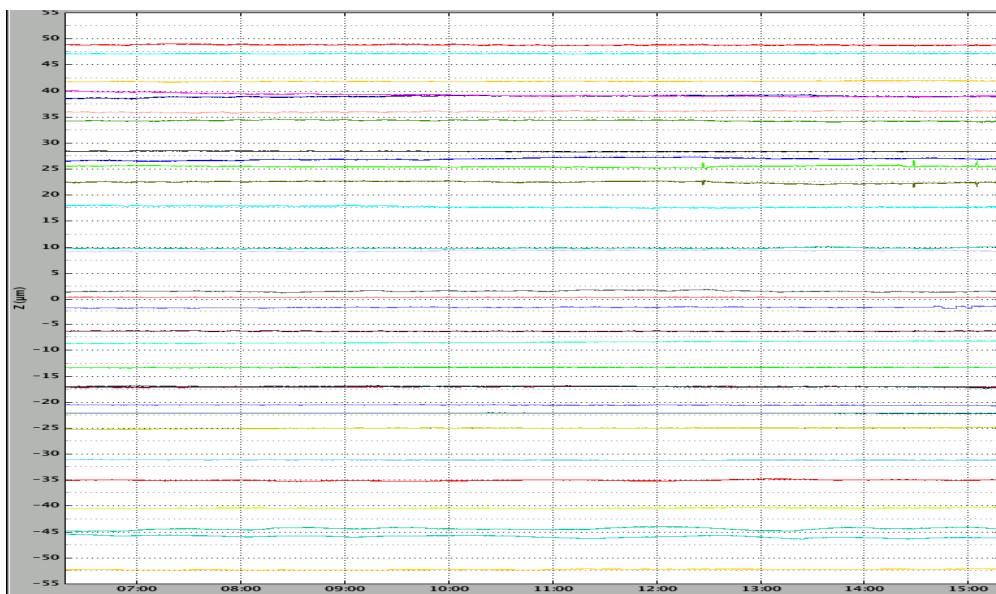
- 21 modules over 161:



Libera and Orbit Feedbacks

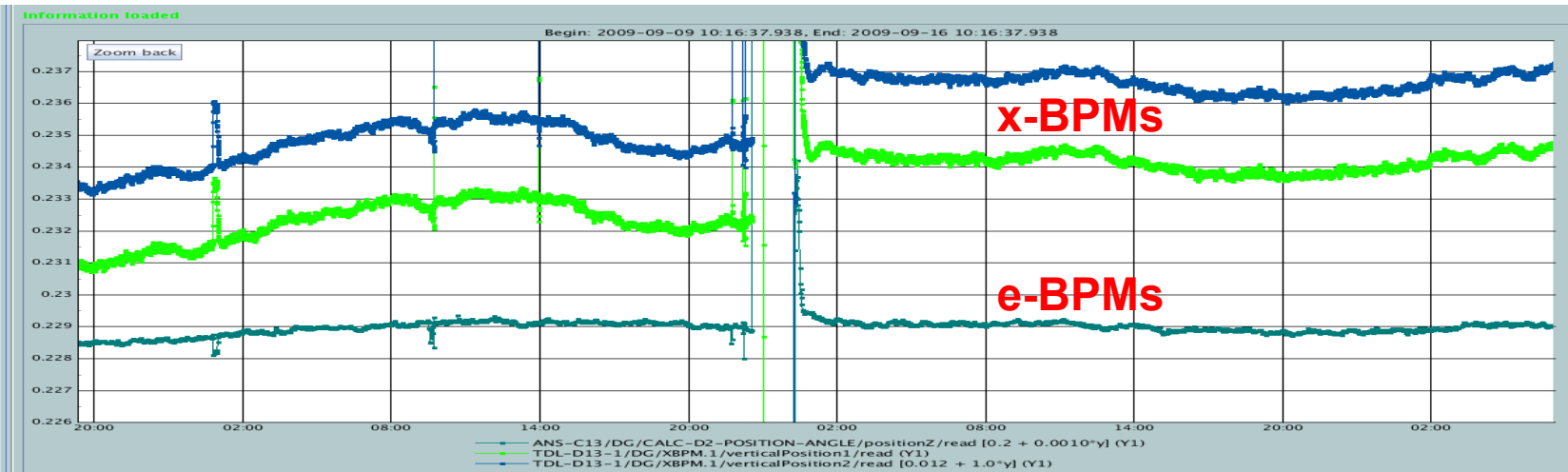
- SOLEIL Fast Orbit Feedback System is embedded in the Libera Modules:
 - DIAMOND Communication Controller
 - FOFB Algorithm
 - Power supply driver (RS 485 links)
- Since 2009 both Slow and Fast Orbit Feedback are running together down to DC.
- Plans for 2010:
 - Integrate bending magnets photon BPMs in the loop. Task could be facilitated by the use of Libera photon including the Communication Controller.

Libera and Orbit Feedbacks



Vertical position at source points (e-BPMs)

- ANS-C01/DG/CALC-D2-POSITION-ANGLE/positionZ [-39.0 + 1.0 μ y] (Y1)
- ANS-C01/DG/CALC-SDL-POSITION-ANGLE/positionZ [22.0 + 1.0 μ y] (Y1)
- ANS-C02/DG/CALC-D1-POSITION-ANGLE/positionZ [-44.0 + 1.0 μ y] (Y1)
- ANS-C02/DG/CALC-SDC-POSITION-ANGLE/positionZ [47.0 + 1.0 μ y] (Y1)
- ANS-C02/DG/CALC-SDM-POSITION-ANGLE/positionZ [94.0 + 1.0 μ y] (Y1)
- ANS-C03/DG/CALC-D1-POSITION-ANGLE/positionZ [214.0 + 1.0 μ y] (Y1)
- ANS-C03/DG/CALC-SDC-POSITION-ANGLE/positionZ [19.0 + 1.0 μ y] (Y1)
- ANS-C03/DG/CALC-SDM-POSITION-ANGLE/positionZ [-44.0 + 1.0 μ y] (Y1)
- ANS-C04/DG/CALC-D2-POSITION-ANGLE/positionZ [41.0 + 1.0 μ y] (Y1)
- ANS-C04/DG/CALC-SDM-POSITION-ANGLE/positionZ [19.0 + 1.0 μ y] (Y1)
- ANS-C05/DG/CALC-D2-POSITION-ANGLE/positionZ [19.0 + 1.0 μ y] (Y1)
- ANS-C05/DG/CALC-SDL-POSITION-ANGLE/positionZ [25.0 + 1.0 μ y] (Y1)
- ANS-C06/DG/CALC-SDC-POSITION-ANGLE/positionZ [21.0 + 1.0 μ y] (Y1)
- ANS-C06/DG/CALC-SDM-POSITION-ANGLE/positionZ [-6.0 + 1.0 μ y] (Y1)
- ANS-C07/DG/CALC-SDC-POSITION-ANGLE/positionZ [-48.0 + 1.0 μ y] (Y1)
- ANS-C07/DG/CALC-SDM-POSITION-ANGLE/positionZ [19.0 + 1.0 μ y] (Y1)
- ANS-C08/DG/CALC-SDM-POSITION-ANGLE/positionZ [13.0 + 1.0 μ y] (Y1)
- ANS-C09/DG/CALC-D2-POSITION-ANGLE/positionZ [-13.0 + 1.0 μ y] (Y1)
- ANS-C09/DG/CALC-SDL-POSITION-ANGLE/positionZ [-5.0 + 1.0 μ y] (Y1)
- ANS-C10/DG/CALC-SDC-POSITION-ANGLE/positionZ [-27.0 + 1.0 μ y] (Y1)
- ANS-C10/DG/CALC-SDM-POSITION-ANGLE/positionZ [10.0 + 1.0 μ y] (Y1)
- ANS-C11/DG/CALC-SDC-POSITION-ANGLE/positionZ [-47.0 + 1.0 μ y] (Y1)
- ANS-C11/DG/CALC-SDM-POSITION-ANGLE/positionZ [-63.0 + 1.0 μ y] (Y1)
- ANS-C12/DG/CALC-SDM-POSITION-ANGLE/positionZ [-40.0 + 1.0 μ y] (Y1)
- ANS-C13/DG/CALC-D2-POSITION-ANGLE/positionZ [-46.0 + 1.0 μ y] (Y1)
- ANS-C13/DG/CALC-SDL-POSITION-ANGLE/positionZ [43.0 + 1.0 μ y] (Y1)
- ANS-C14/DG/CALC-SDC-POSITION-ANGLE/positionZ [-49.0 + 1.0 μ y] (Y1)
- ANS-C14/DG/CALC-SDM-POSITION-ANGLE/positionZ [-11.0 + 1.0 μ y] (Y1)
- ANS-C15/DG/CALC-SDC-POSITION-ANGLE/positionZ [14.0 + 1.0 μ y] (Y1)
- ANS-C15/DG/CALC-SDM-POSITION-ANGLE/positionZ [-7.0 + 1.0 μ y] (Y1)
- ANS-C16/DG/CALC-SDM-POSITION-ANGLE/positionZ [-58.5 + 1.0 μ y] (Y1)



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

17-18/09/2009

Libera Workshop 2009