SwissFEL Control System
Overview, Status, and Lessons Learned
ICALEPCS 2017, Barcelona, Spain
24. August 2016  First electrons from the gun with 7.9 MeV
11. November 2016  First beam transport up to main beam dump
2. December 2016  First lasing at 380 MeV, 24 nm
30. August 2017  Lasing at 1620 MeV, 1.3 nm
31. August 2017  First FEL photons in optics hutch

Design Parameter:
- Length: 720 m
- Energy: 5.8 GeV
- Rate: 100 Hz
- Photons: 0.65 – 5 nm
• 2009: (plan) copy everything from SLS
• 2011: (experience with SITF) new hardware and new software needed
• 2016: first electrons displayed with working control system

The control system is the last system finished/working (cabling) and the first needed for commissioning
Lesson 1 – NOT Another Storage Ring

• FEL = Pulsed Beam = **Timing and Event System is crucial**
  – Nearly all devices need trigger
  – Additional flags needed: beam-ok signal

• FEL = Pulsed Beam = **Beam Synchronous DAQ needed**
  – Tag all data with pulse id
  – Collect data with same pulse id for measurements
• 5 to 10 times more network ports needed than estimated ...
• Current assumptions about control system architecture need revision
Lesson 3 – Test Systems

... and all those sites needed a working control system with consoles, network, timing, and support
• SwissFEL Control System is working and supporting accelerator and beamline commissioning

• Watch out
  – for Timing and Synchronization (Beam Synchronous Data)
  – for a huge increased number of network devices
  – for test setups with need for support and maintenance
My thanks go to

- all PSI Controls people working for SwissFEL
- Cosylab people working for SwissFEL
- Dach Consulting
- PSI IT department
- all our users who help with debugging and tests