PAUL SCHERRER INSTITUT

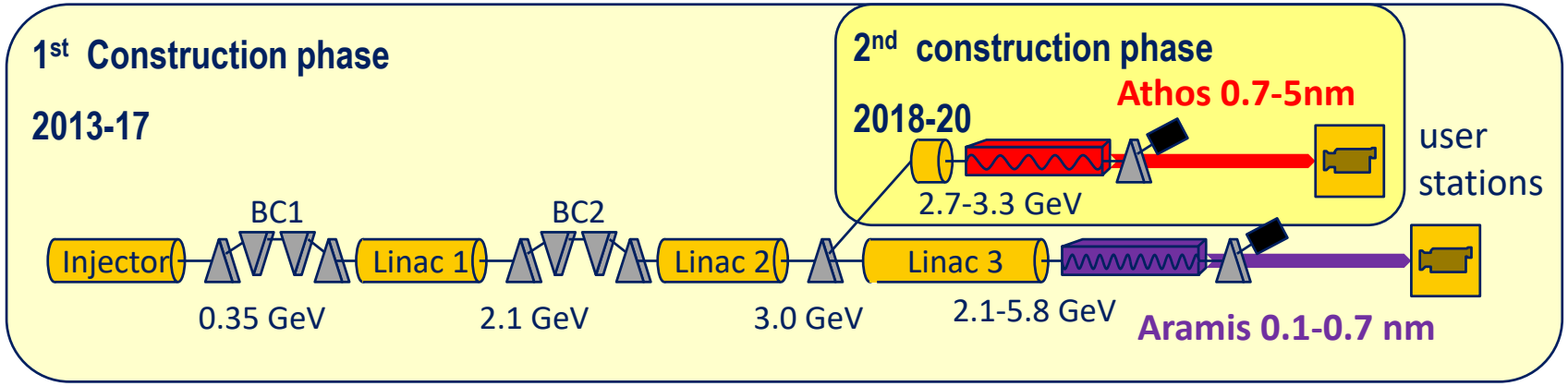
PSI

Elke Zimoch :: Controls :: Paul Scherrer Institute

SwissFEL Control System
Overview, Status, and Lessons Learned

ICALEPCS 2017, Barcelona, Spain

SwissFEL Facility

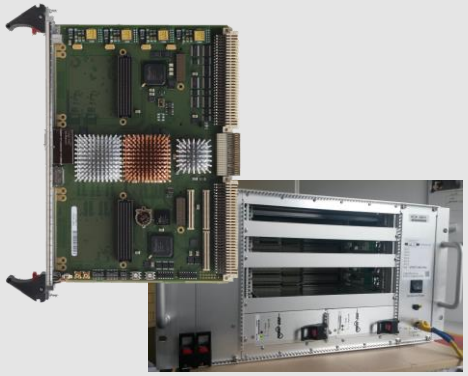


24. August 2016	First electrons from the gun with 7.9 MeV
11. November 2016	First beam transport up to main beam dump
2. December 2016	First lasing at 380 MeV, 24 nm
30. August 2017	lasing at 1620 MeV, 1.3 nm
31. August 2017	First FEL photons in optics hutch

Design Parameter:

Length: 720 m
Energy: 5.8 GeV
Rate: 100 Hz
Photons: 0.65 – 5 nm

SwissFEL Control System



VME based systems

Motion Controller

EPICS

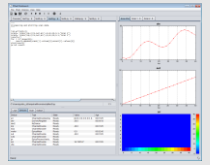
Version R3.14.12

caQtDM

GUIs on consoles

GitLab

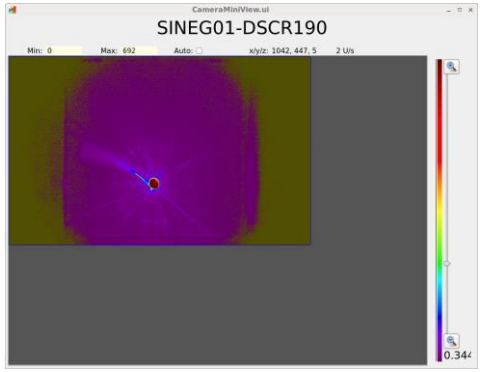
Consoles, development, and repository



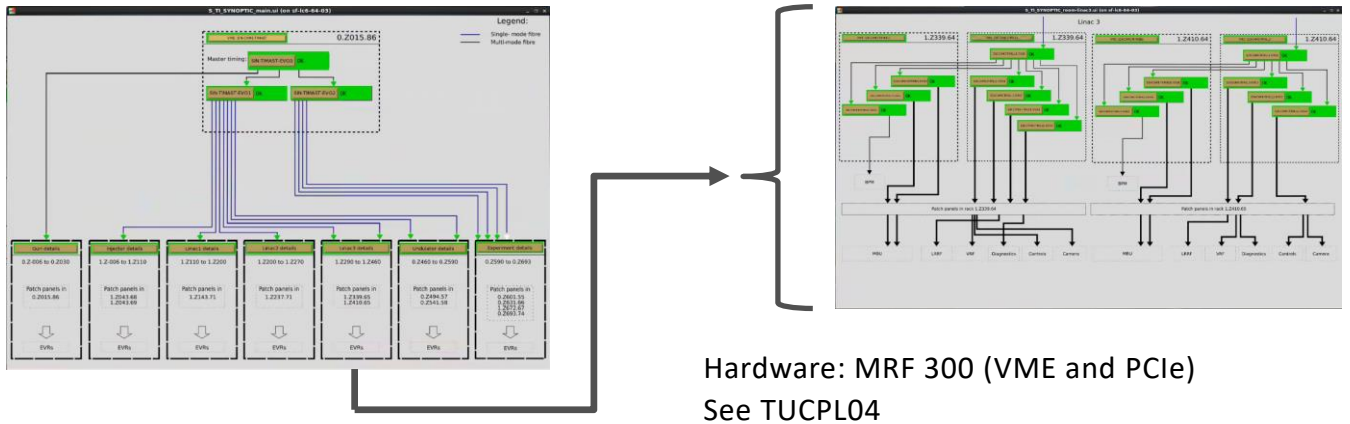
Pshell – experiment scipting

- 2009: (plan) copy everything from SLS
- 2011: (experience with SITF) new hardware and new software needed
- 2016: first electrons displayed with working control system

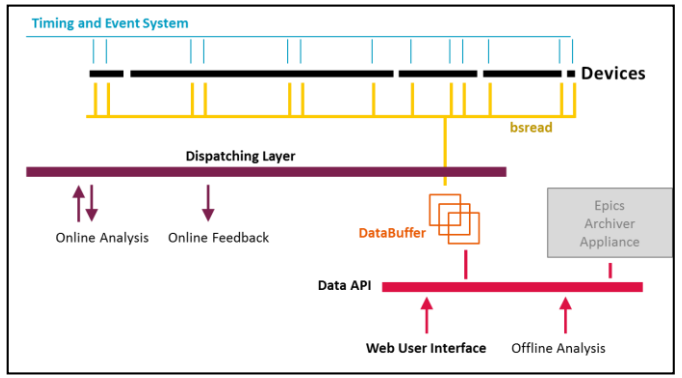
The control system is the last system finished/working (cabling)
and the first needed for commissioning



Lesson 1 – NOT Another Storage Ring



Hardware: MRF 300 (VME and PCIe)
See TUCPL04



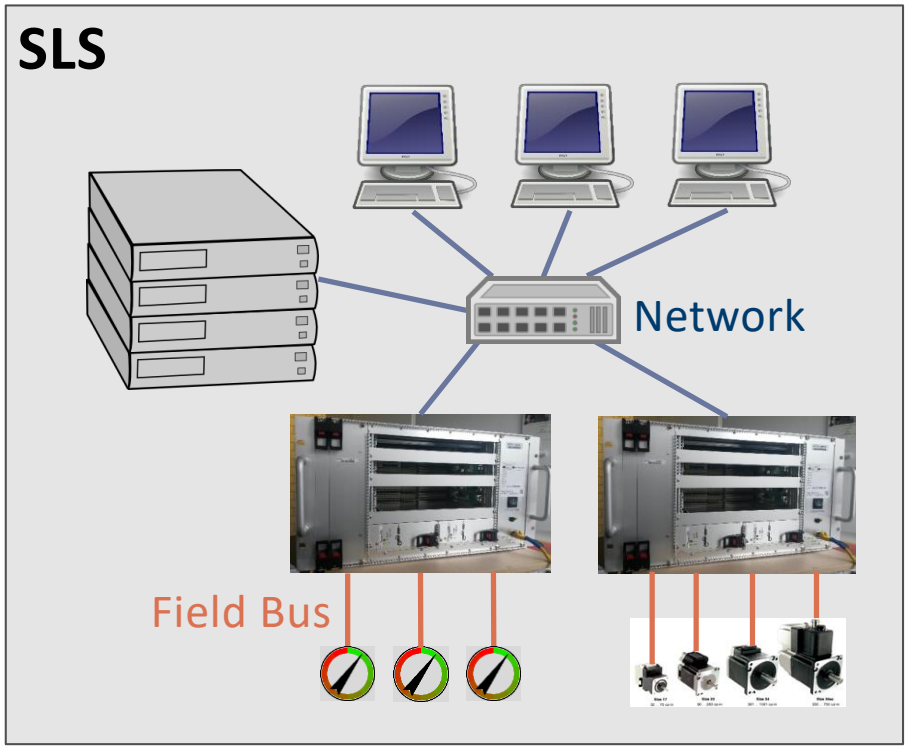
Beam Synchronous Data Aquisition System
See TUCPA06

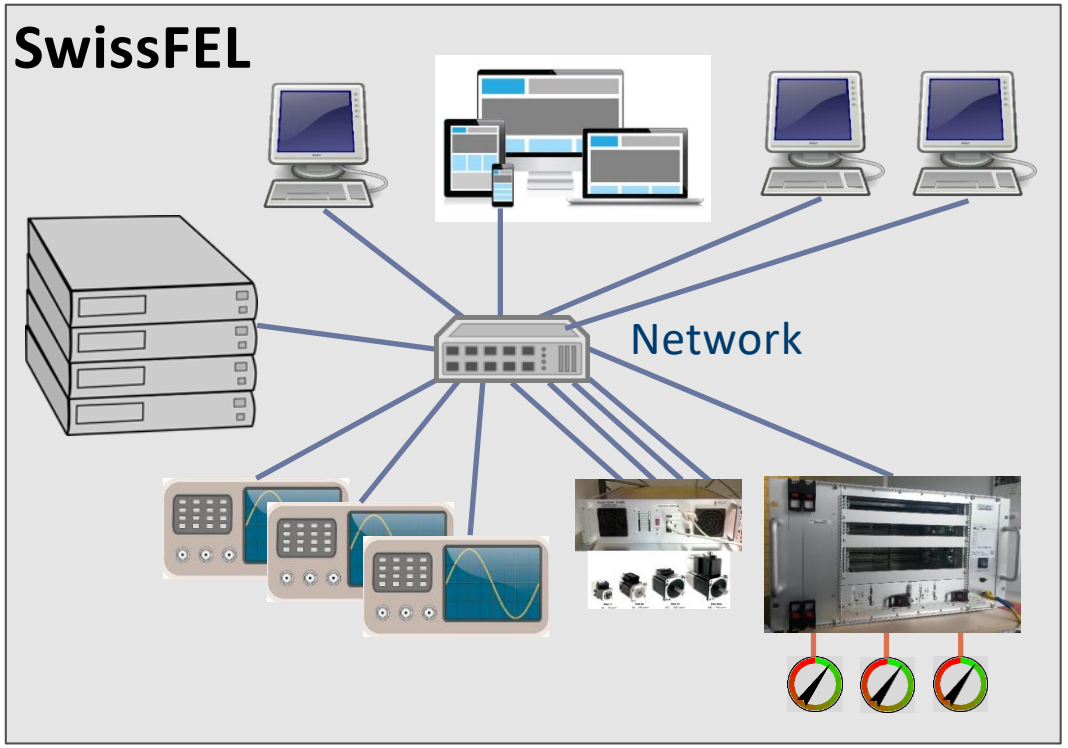
- FEL = Pulsed Beam = Timing and Event System is crucial
  - Nearly all devices need trigger
  - Additional flags needed: beam-ok signal

- FEL = Pulsed Beam = Beam Synchronous DAQ needed
  - Tag all data with pulse id
  - Collect data with same pulse id for measurements

Archiver Appliance and BS-DAQ Web Interface

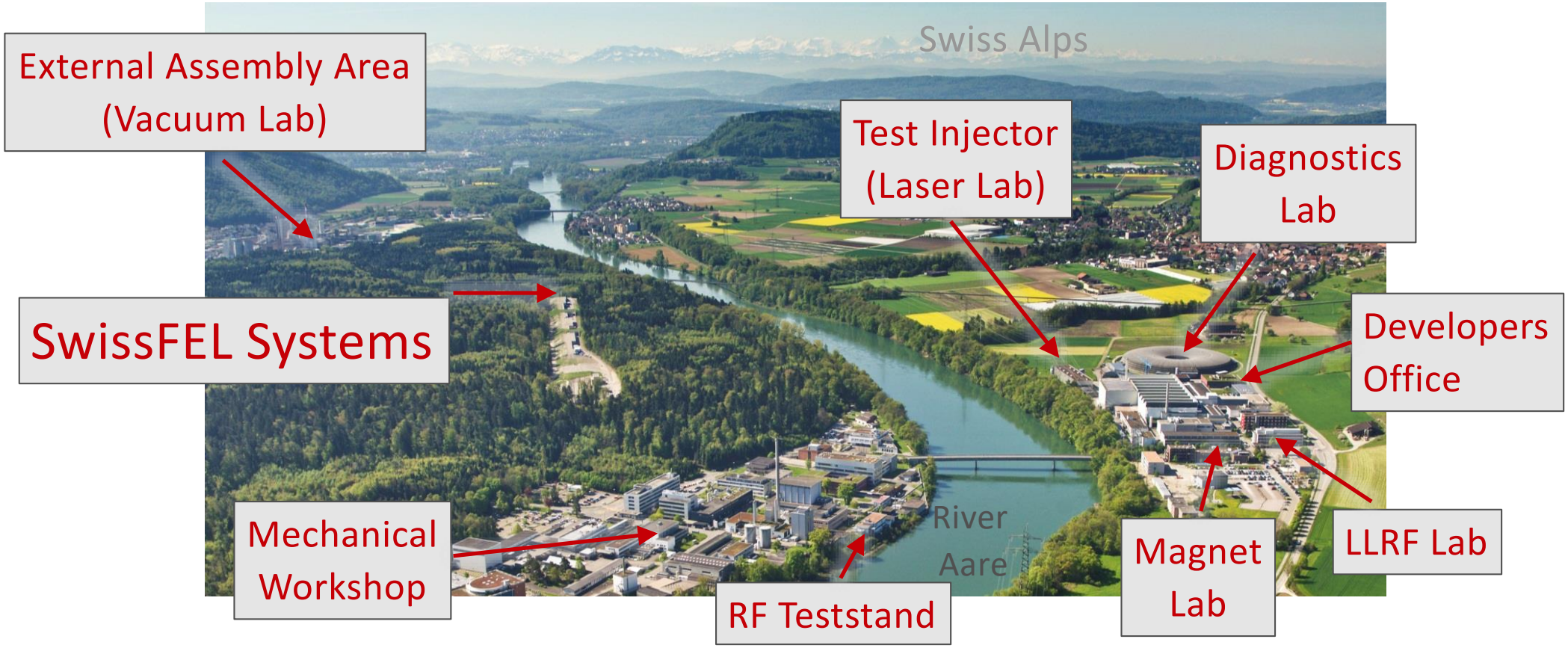
Lesson 2 – Network Devices





- 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

Summary

- 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