

PLCs in Laser Systems at DESY

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Free-Electron Lasers at DESY

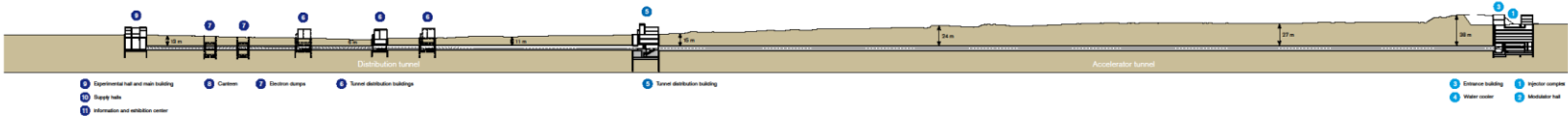
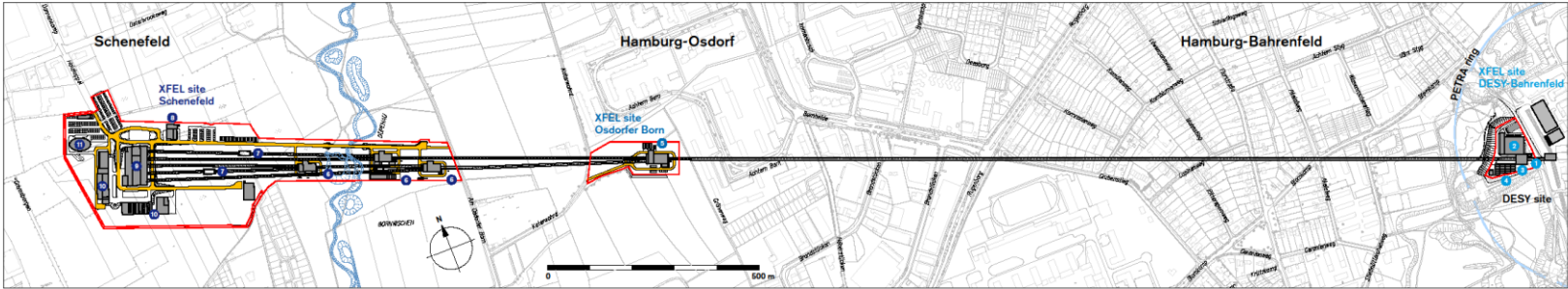
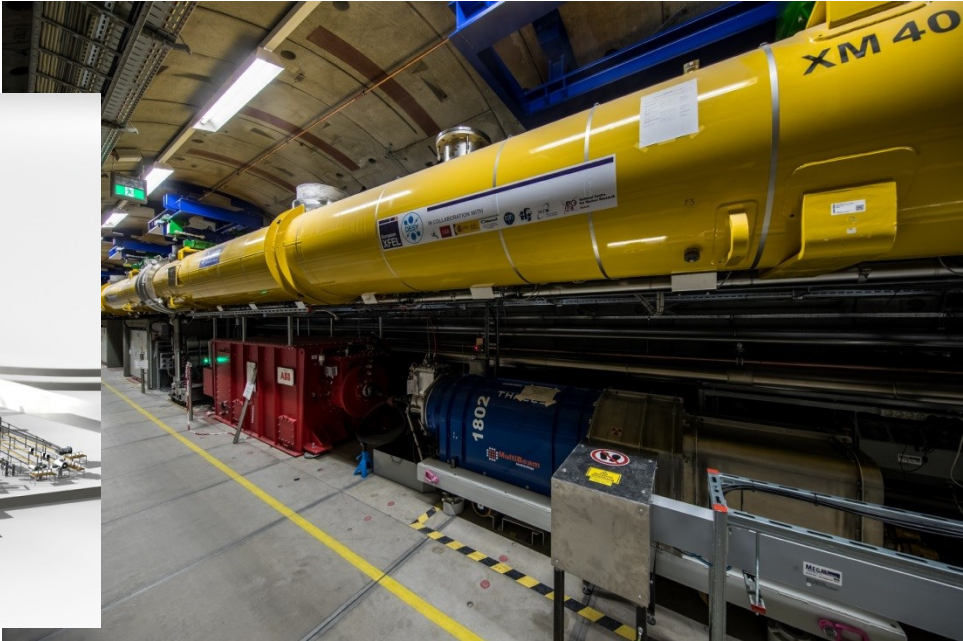
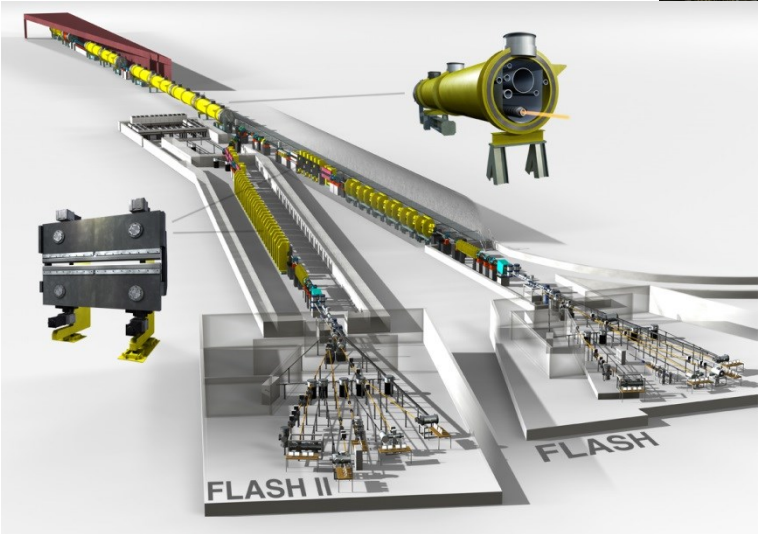
FLASH and European XFEL

Large Free-electron laser facilities

- FLASH: 300m
- European XFEL: 3.4km
- (PETRA Synchrotron)

Optical Lasers:

- Photocathode lasers
- Electron Beam “tuning”
 - Heater
 - Seeding
- Pump-probe lasers
- Laser group develops/operates these systems



PLCs in DESY FEL Facilities

Machine protection system

- Protect the machine from itself
- European XFEL electron beam: 500kW avg. power
- Vacuum valves
- Screens

Personnel Interlock

- Radiation safety
- Laser safety
- Siemens PLCs

Motor Controllers

- Stepper Motors
- Beckhoff PLCs

PLCs in DESY Laser Systems

Our control system is **NOT** based on PLCs

- Goal is to integrate devices into control system
- DOOCS

- PLCs are good to integrate a lot of „small stuff“
- PLCs speak OPC UA
- OPC UA / DOOCS integration is a solved problem
 - Visit my talk/poster on tuesday!

PLCs in DESY Laser Systems

Integration of commercial devices

- Laser amplifier
- „plug-and-play“

Laser protection system

- Protect the laser from itself
- Very short pulses -> very high peak power
 - fs -> GW
- E.g. switch off pump diodes when seed is off

Integration of sensors/actuators into control system

- E.g. Temperatures
- Cooling water flow
- Motorized mirrors