Status of the European Spallation Source ESS

Torsten Bögershausen
SW Engineer
Motion Control and Automation Group

www.europeanspallationsource.se
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Max IV and ESS

- MAX IV synchrotron (2016)
- ESS neutron source (2019)
- Ideon and Medicon Village business incubators
- Malmö University
- Lund University
- Copenhagen University
- Cph airport
- Science Village Scandinavia
Sweden and Denmark:
47.5% Construction
15-20% Operations
Cash ~100%

Partner Countries:
52.5% Construction
80-85% Operations
IKC/Cash ~ 70% / 30%

1843 M€ construction
140 M€/yr operations
Time Structure of the Neutron Beam

14 Hz rep rate
71.4 ms cycle time
2.86 ms pulse time
4% duty cycle
200 – 2000 m/s
Inside the tunnel
More tunnel to come
EPICS within the ESS organization

Machine directorate
• Integrated Control Systems “ICS”
  • EPICS to control the whole facility

Science directorate
• Motion Control and Automation Group “MCAG”
  • EPICS for the new motion control
• Data Management and Software Center “DMSC”
  • Located in Copenhagen
  • Scientific computing
  • Instrument control
• More EPICS users:
  • Choppers, Sample environment, Detectors
  • In kind partners
Some EPICS decisions

- EPICS for controls in the whole site, from accelerator to neutron instruments
- Plan to benefit from EPICS V4: pvAccess everywhere
- CS-Studio as the generic user interface tool: control room, subsystem developers, etc.
- Databases (configuration, cable, RBAC, ...)
- Probably python to control scientific instruments
- Work together with the EPICS community
Fast real time I/O

beam diagnostics and Low Level RF
Synchronized with the 14 Hz pulse
> Megabyte/sec
Controls hardware: Non real time IO

Non real time
  E.g. Vacuum
  Reliable
  < 10 Hz, “Slow”
Mid range

Synchronized with the 14 Hz pulse

1 Hz .. 10 kHz, max 100 kHz

real time
Hardware standards, the whole spectrum

- Fast real time I/O
  MicroTCA 4

- Mid range
  Real time industrial I/O
  EtherCAT

- Slow non real time I/O
  PLCs
ESS Motion Control and Automation Group (MCAG)

- select a motion control solution for the whole facility (Accelerator, Scientific Instruments)

Scope includes also
- Integration of the new motion control with EPICS
- Robotics
Motion platforms

Motion controller – HW
• Temporary solution: DeltaTau GeoBrick
• Evaluating
  • DeltaTau Power PMAC
  • Beckhoff TwinCAT (different talk: EPICS – TwinCAT)
  • ESRF ICEPAP
ESS building has started for real
   Commissioning of the accelerator will start in 2 years

Control system effort is ramping up
   Moving to design decisions
   EPICS V4: pvAccess everywhere
   Come to Sweden?
   Hiring people – (watch our web pages)

Motion control evaluation ongoing
   EPICS integration part of the evaluation

Need to bring EPICS to the Science Directorate in ESS, in kind partners
Staff March 2015
Thank you

Questions ?