

# Motion control @ ESS

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# Overview

- Hardware
- Software
- Collaboration
- Work to be done

- All motion today is EtherCAT based
- Different motor terminals covering a range of:
- Stepper 8..50V 3.5 A (rms)
- .....
- Servo 100..480V 6A

# More hardware

- Most work is done outside ESS, "in kind":  
List with recommendations
- Level A: first choice
- Level B: second choice
- Neither A nor B: "special"
- <https://confluence.ess.lu.se/display/MCAG/Motion+control+electronics>

- 3 layers:
  - High level (CSS, NICOS with scan engine)
    - EPICS with motor
    - SW running in the motion controller.

# SW platforms Motion Controller

- Commercial : Beckhoff TwinCAT  
"Industrially proven"  
International working group (.de, .uk, .se)
- Open Source : "ECMC" under Linux  
Motion controller & EPICS IOC on same CPU  
"works very well"

- Some patches done @ ESS:
  - All configuration is done in TwinCAT:  
The IOC reads it into the motorRecord fields
  - Allow the record to be configured  
NOT to stop the motor on a limit switch
  - Better connection handling ("late connect"):  
IOC is started before controller
- ACCS field for acceleration  
Better debug prints ("SPAM" field)

# Challenges @ ESS

- Common HW list
- E-plan drawings, PIN layout
- Common code for TwinCAT
- Automated testing
- TwinCAT – EPICS IOC communication
  - "dig out all configuration from MCU"
  - "Motor position every 10 msec"

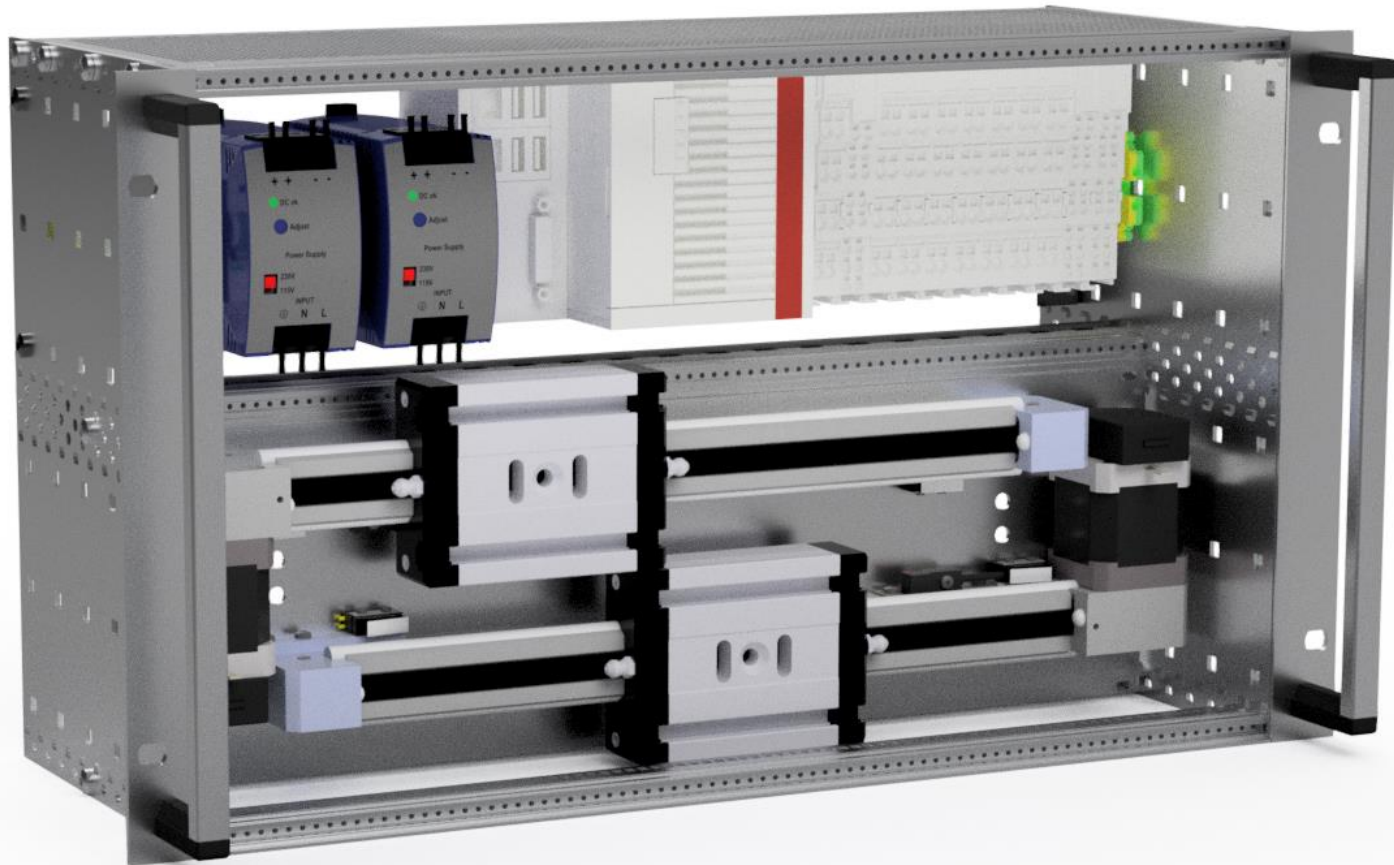


# Hardware @ ESS

- HW has been build outside ESS :-)
- Motion control (hardware) standards:  
<https://confluence.esss.lu.se/display/MCAG/Motion+Control+Hardware+Standards>
- EtherCAT HW catalogue:  
<https://confluence.esss.lu.se/display/MCAG/Motion+control+electronics>

- Training material
- TwinCAT:  
<https://confluence.ess.lu.se/display/MCAG/Commissioning+Workflow+TwinCAT>
- ECMC:  
<https://indico.ess.lu.se/event/1156/>

# Test crate



# Thanks



Merci & Thanks