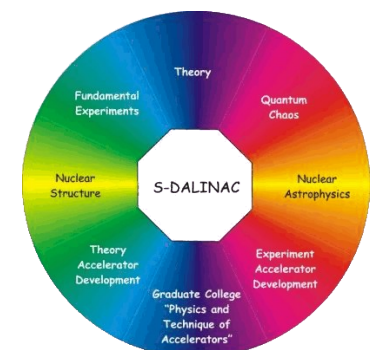# The EPICS-based Control System at the S-DALINAC*

Thomas Schösser

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DARMSTADT

Thomas Schösser, Jonny Birkhan, Uwe Bonnes, Christoph Burandt, Florian Hug, Martin Konrad, Norbert Pietralla
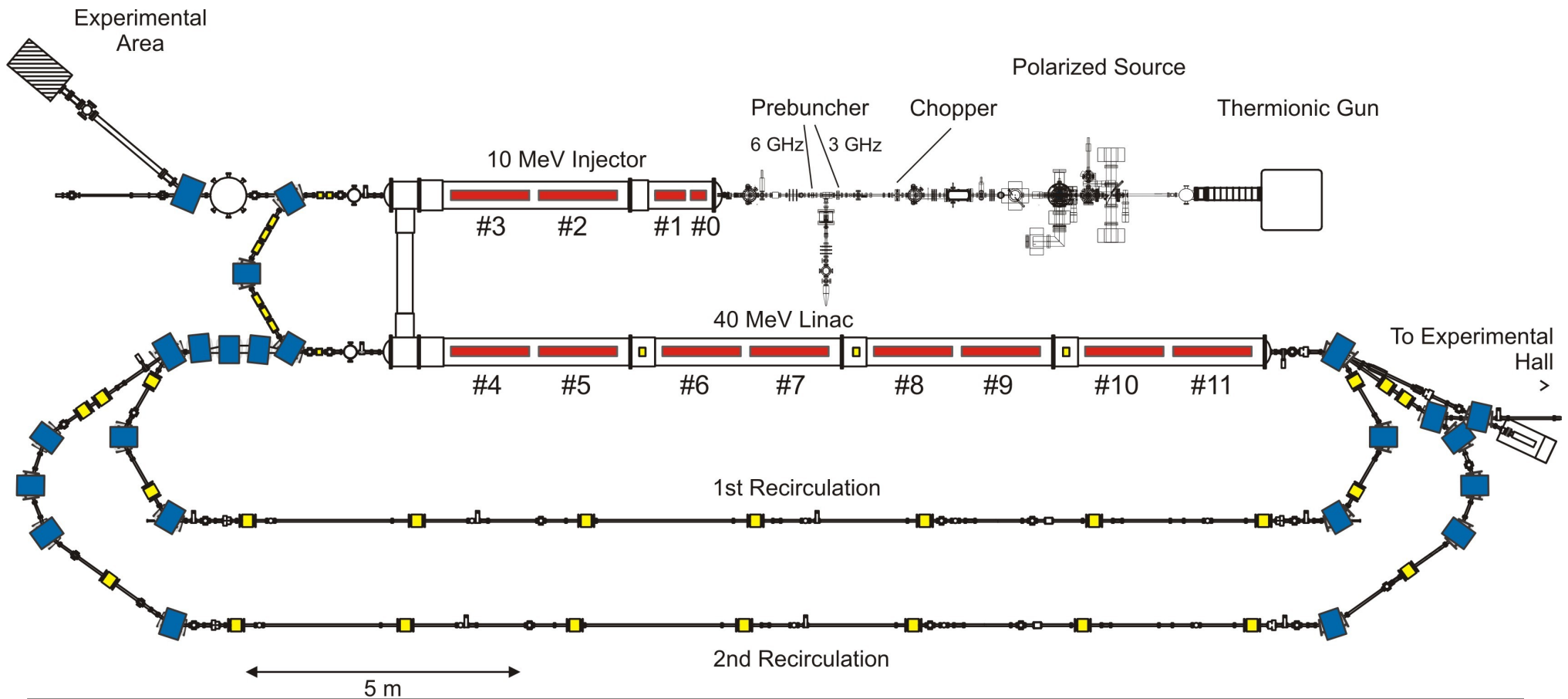
Overview

- S-DALINAC

- control system

- knobboards

S-DALINAC

Superconducting

   recirculating

Darmstädter

   electron

LINear

ACcelerator

S-DALINAC

S-DALINAC - perfect education machine

- 3 MeV – 130 MeV

- 1 nA – 60 µA
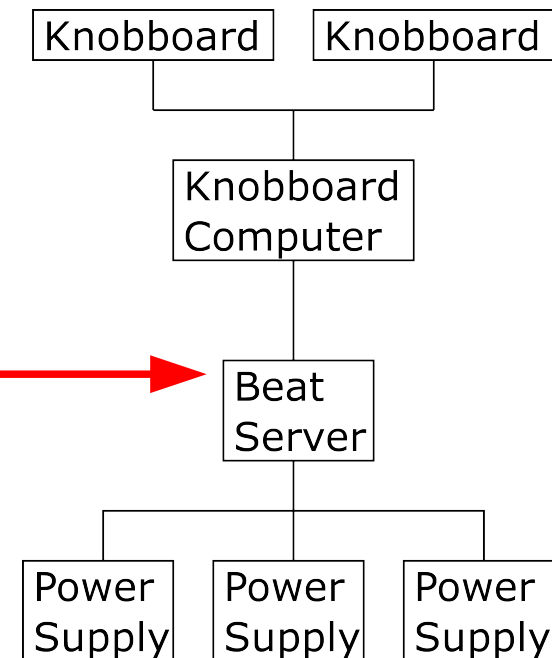
  – 20 µA recirculating

- two recirculations

  – third recirculation planned

- few hundred devices

  – still increasing

- some ten thousand PVs

- so: EPICS is a very good idea

Control Systems at S-DALINAC

- three different control systems

  - target cameras

    - analogous signal

  - EPICS

    - RF control

    - CSS interface

  - BEAT server

    - magnet power supply

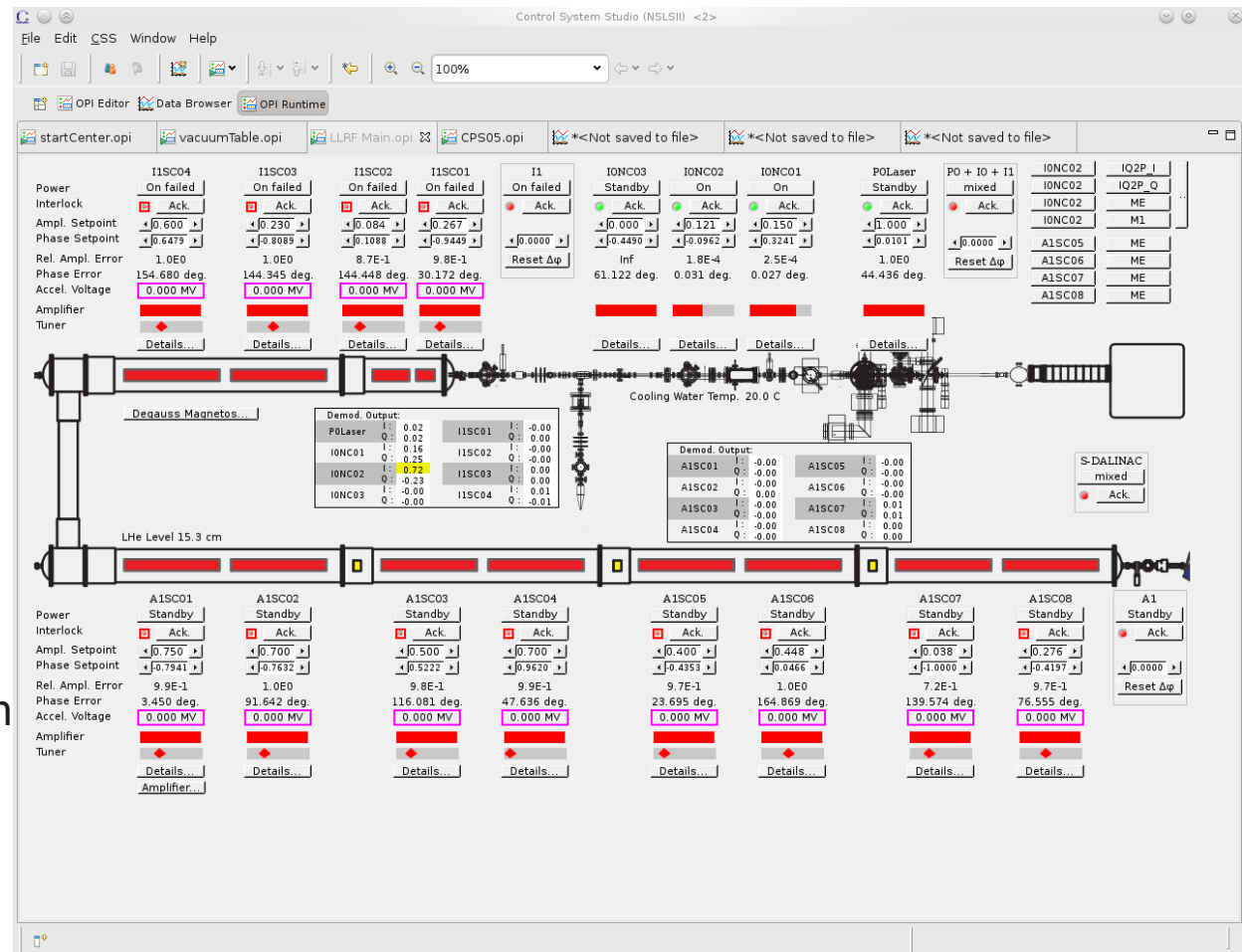   - knobboards

CSS Interface

- RF control

- advantages

  – EPICS

  – user friendly interface design

- disadvantages

  – visible contact needed

  – tedious adjustment with mouse

  – knobboards not implemented in CSS

Operator Interface at S-DALINAC

Operator Interface at S-DALINAC

target monitors

EPICS interface

knobboards
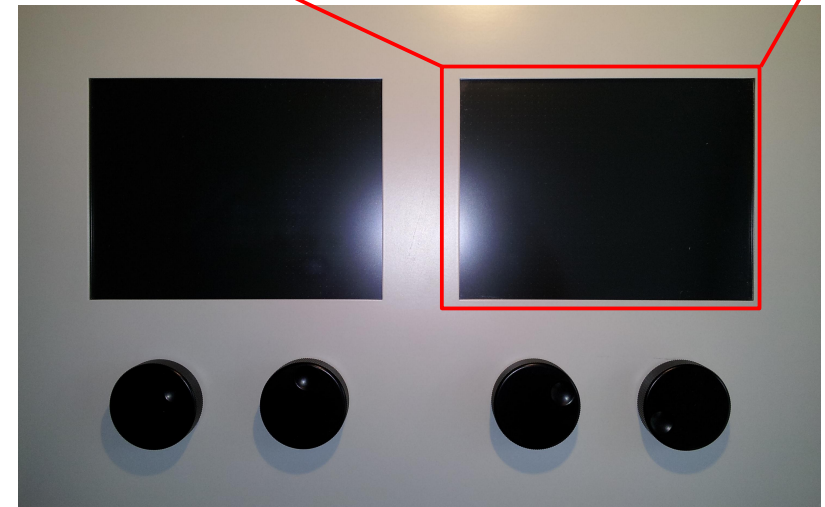
Current Knobboard Design

- 2 touchscreens and 4 knobs for each device

- advantages

  - blind handling

  - good haptic

  - automatic check range of values

  - temporary save values

- disadvantages

  - incompatible with EPICS

  - single PC for all knobs

    - single point of failure

  - depends on OS (Windows)

Knobboard Hardware

USB output

FTDI[1]

FPGA[2]

4 knobs

[1]FTDI – Future Technology Devices International
[2]FPGA – Field Programmable Gate Array

New Control System Design

- 4 knobboards

  - 4 knobs each

  - touchscreen monitor

    - integrated computer

  - connected to EPICS

New Control System Design

- 4 knobboards

  - 4 knobs each

  - touchscreen monitor

    - integrated computer

  - connected to EPICS

- no single point of failure

Knobboard	Knobboard	Knobboard	Knobboard
Touchscreen computer	Touchscreen computer	Touchscreen computer	Touchscreen computer

LAN

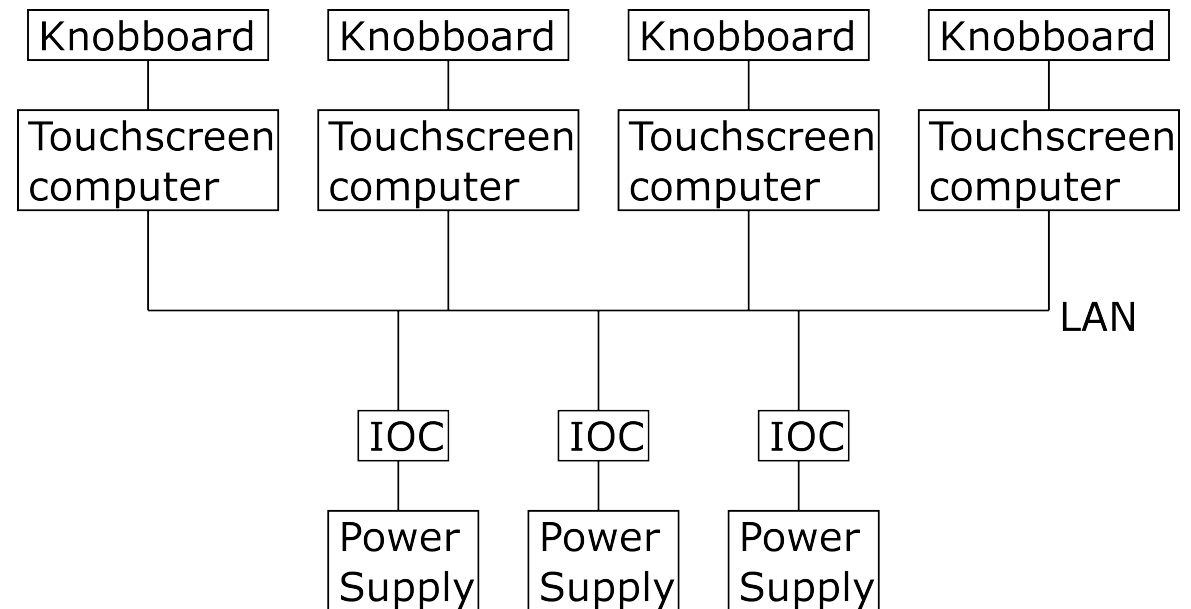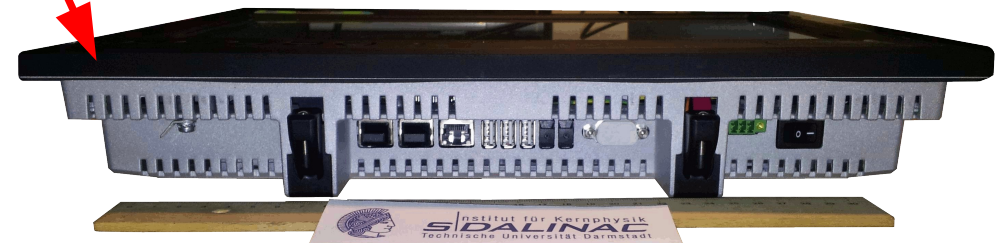| IOC	IOC	IOC
Power Supply	Power Supply	Power Supply

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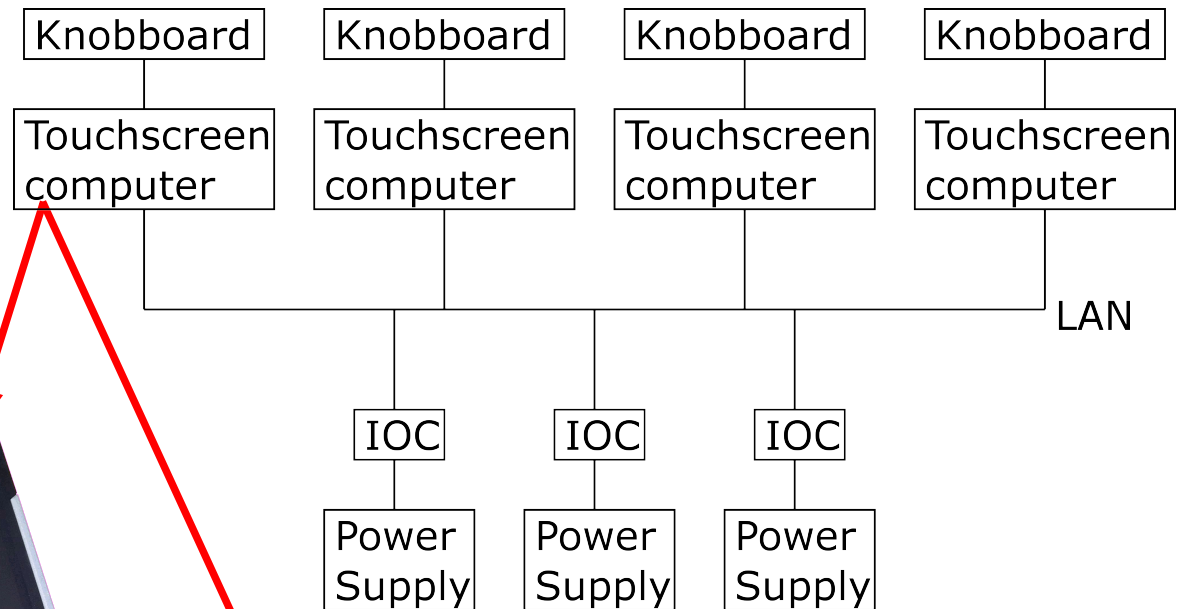| Knobboard	Knobboard	Knobboard	Knobboard
Touchscreen computer	Touchscreen computer	Touchscreen computer	Touchscreen computer

LAN

IOC	IOC	IOC
Power Supply	Power Supply	Power Supply

Other Projects

- socket CAN device support

  - multiple connections

  - simple and flexible

- archiver

  - CSS archiver with PostgreSQL backend

- FAI

  - fast reinstallation

  - perfect documentation

- virtualization

  - Vbs → ausfallsicherheit

- Nagios monitoring
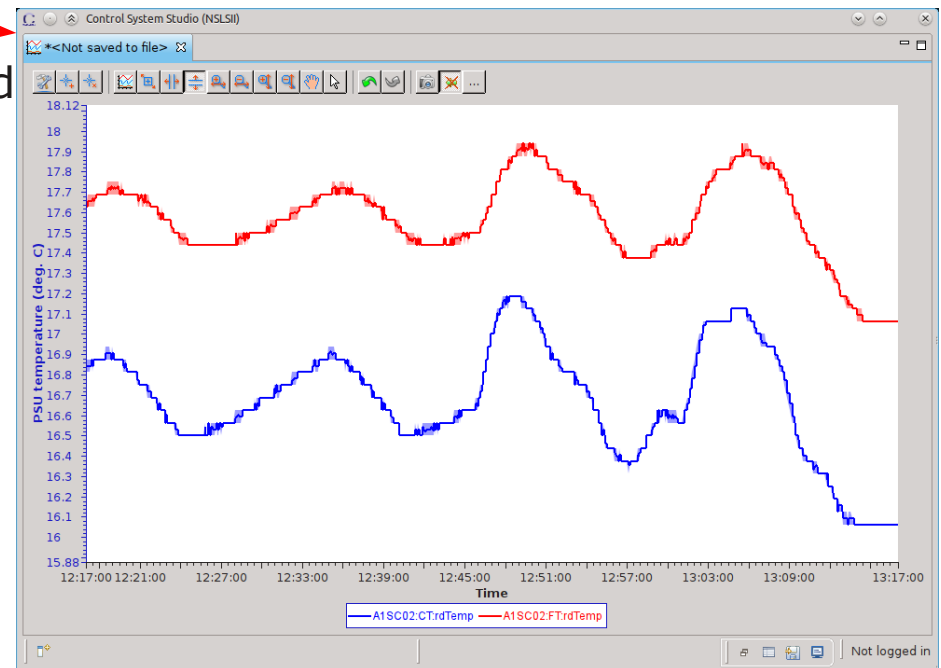
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```
------------------------------------------------
              Fully Automatic Installation  -  FAI

              FAI 3.4.8, 10 May 2011  (c) 1999-2010
              Thomas Lange  <lange@informatik.uni-koeln.de>
------------------------------------------------
PCAN/20-configure    OK.

Executing    shell: EPICS/20-configure_base
EPICS/20-configure_base OK.

Executing    shell: DEVELOP/10-lib64
DEVELOP/10-lib64    OK.

Executing cfagent: NAGIOS/10-configure_nrpe_allowed_hosts
NAGIOS/10-configure_nrpe_allowed_hosts OK.

Executing    shell: NAGIOS/20-configure_nrpe_commands
NAGIOS/20-configure_nrpe_commands OK.

Executing cfagent: NAGIOS/21-add_monitoring_to_hosts_file
NAGIOS/21-add_monitoring_to_hosts_file OK.

Executing    shell: rfcontrol/10-checkout
_
```

Outlook

- control all devices of S-DALINAC via EPICS

  - RF Control

  - power supply of magnets

  - camera signal

- no single point of failure

- OS independent

- …all EPICS advantages…

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Thank you for your attention.