CRYRING@ESR
Control System / Applications
Operators training

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28.04.2017

Agenda

- Control System Overview
  - Control System Stack
  - New concepts
- Applications
  - Ion Source Applications
  - Settings Management
  - Device-oriented
  - Measurement Applications
  - Expert tools
- Outlook
  - Scheduling Application
  - Machine overview (incl. Interlock)
  - Page 1

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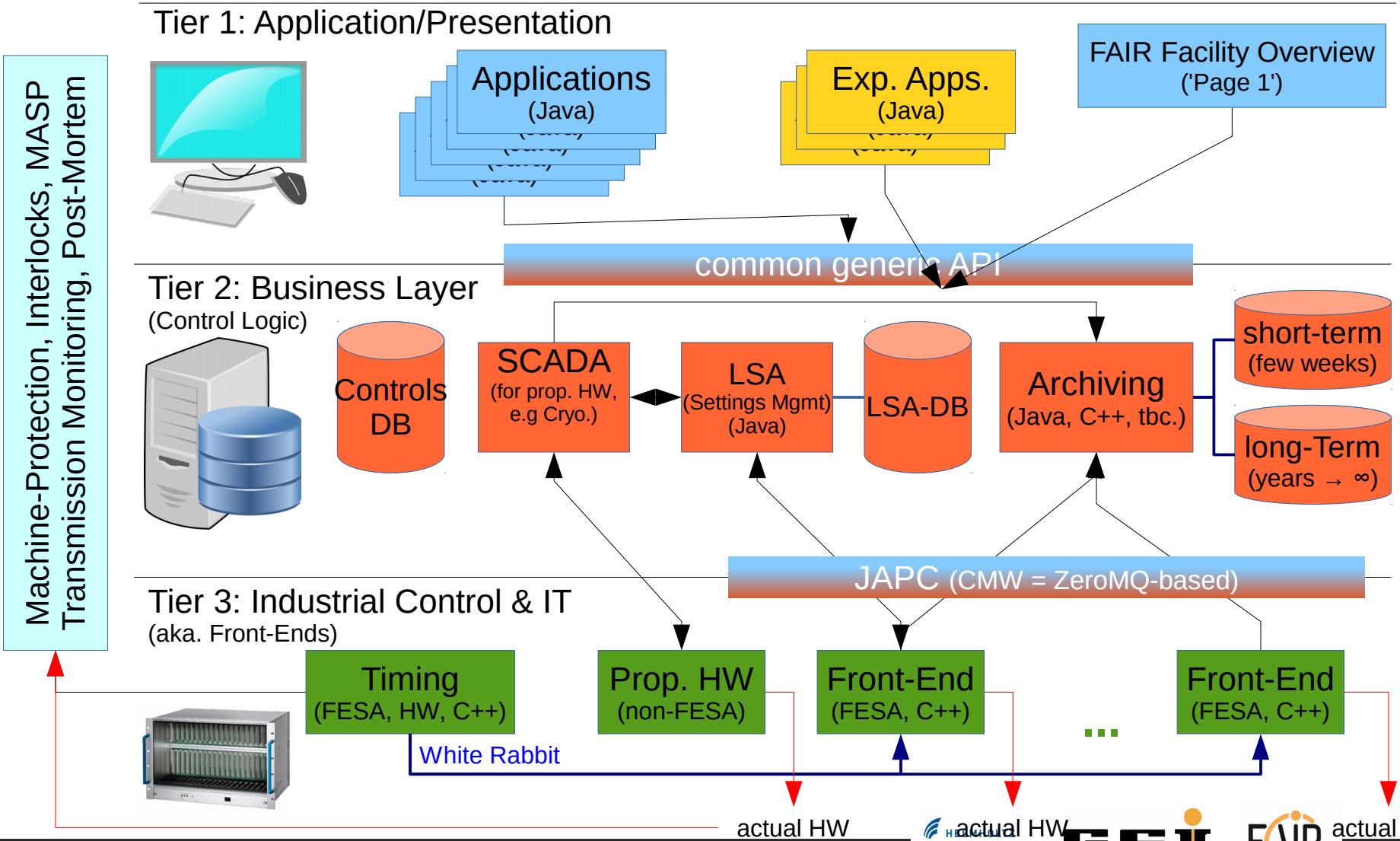
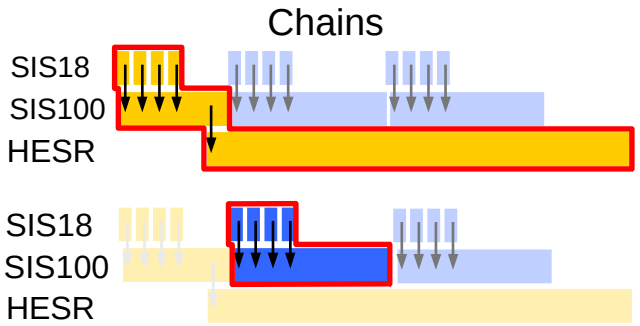
Control System Stack (R. Baer et al.)

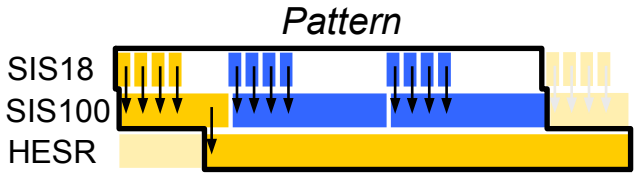


New Concepts

- *Beam-Production-Chain:*
  - organisational structure to manage parallel operation and beam transfer through FAIR accelerator facility
  - defines sequence and parameters of beam line from the ion-source up to an experimental cave (e.g. APPA, CBM, SuperFRS, ...)
  - definition of target beam parameters (set values): isotope, energy, charge, peak intensity, slow/fast extraction, …



- *Beam Pattern*:
  - grouping of beam production-chains that are executed periodically
  - Pattern can be changed within few minutes (target, requires automation for beam-based retuning)



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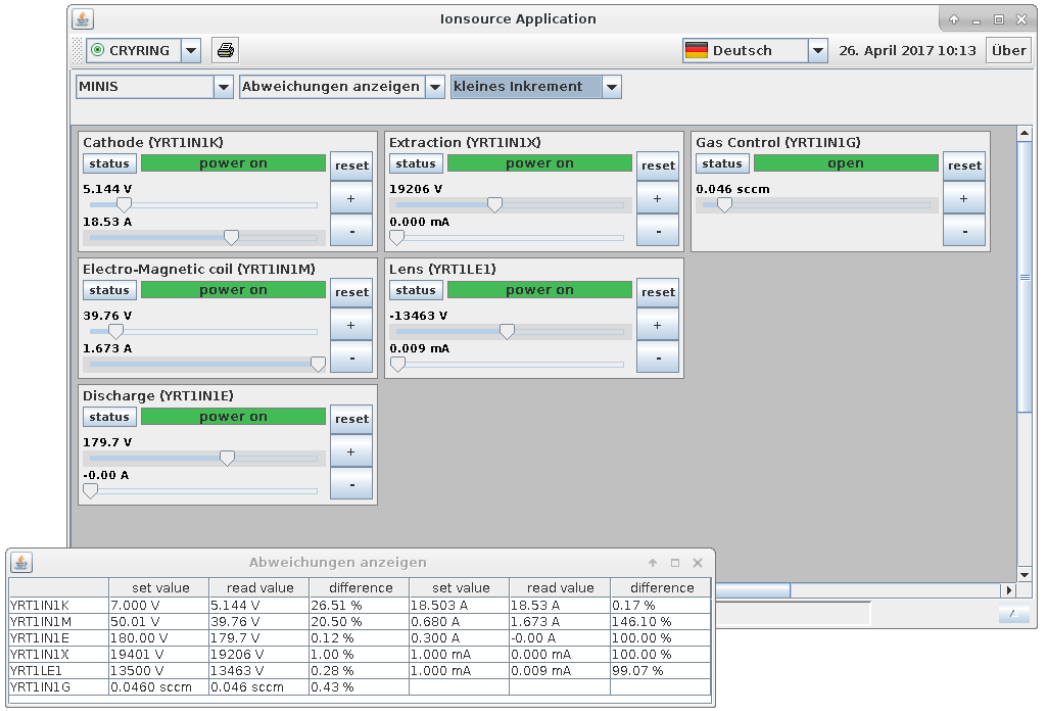
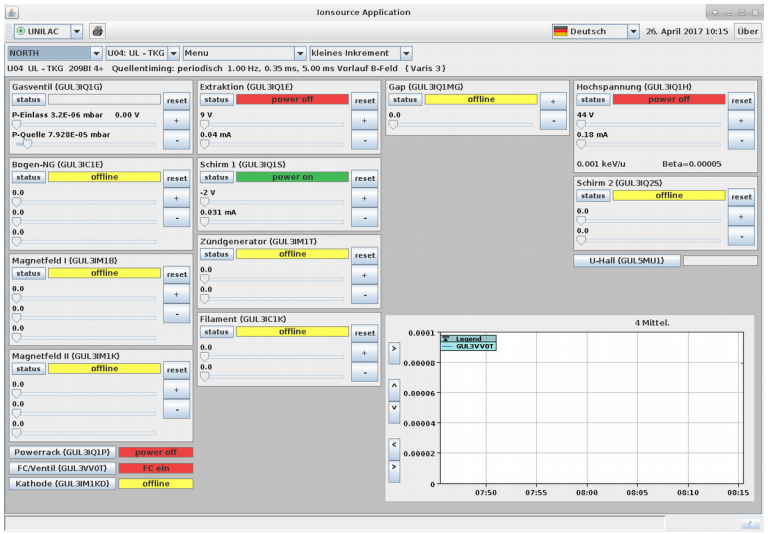
Applications – Ion Source Program

- Generic Ion Source Program for FAIR,
  used at Cryring (operational) and Unilac North/South (as prototype)

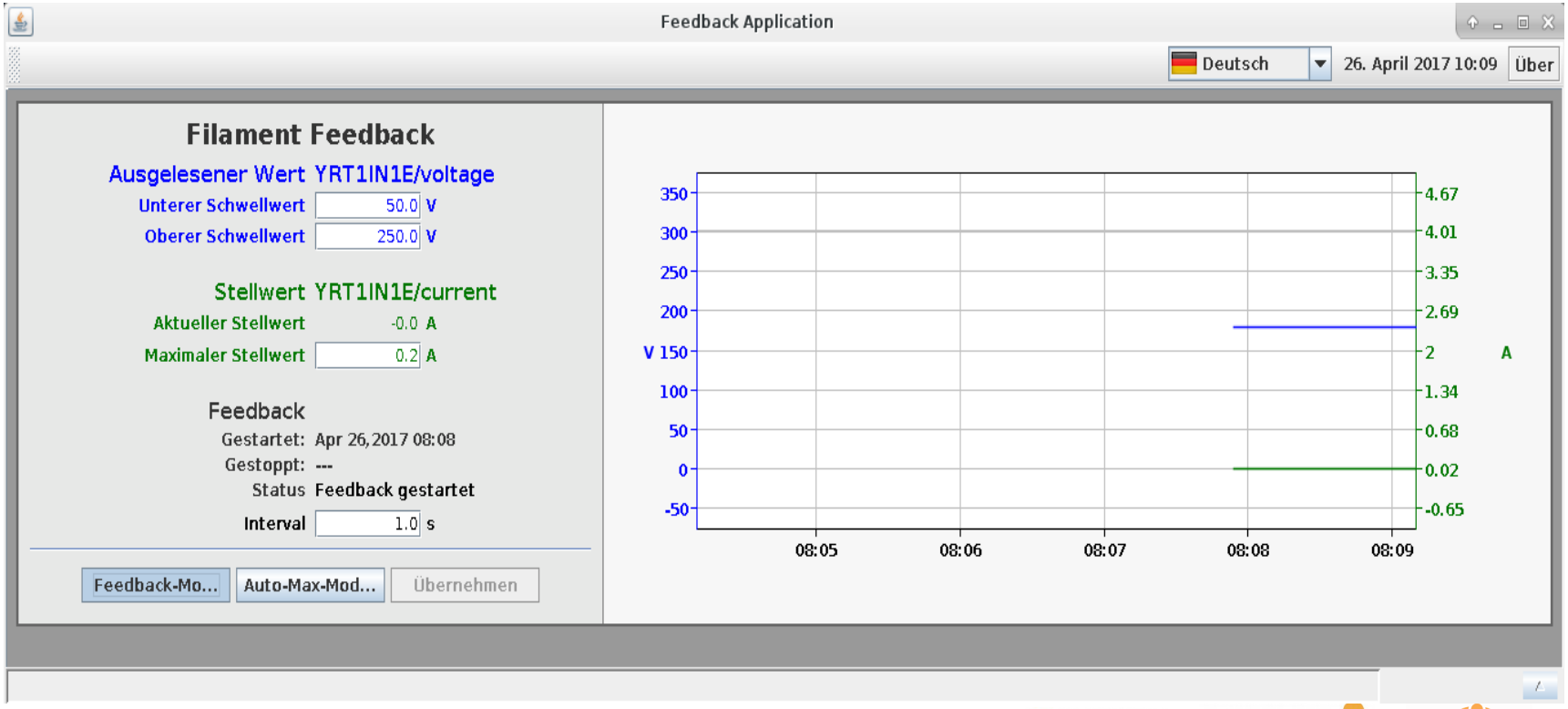


	set value	read value	difference	set value	read value	difference
YRT1IN1K	7.000 V	5.144 V	26.51 %	18.503 A	18.53 A	0.17 %
YRT1IN1M	50.01 V	39.76 V	20.50 %	0.680 A	1.673 A	146.10 %
YRT1IN1E	180.00 V	179.7 V	0.12 %	0.300 A	-0.00 A	100.00 %
YRT1IN1X	19401 V	19206 V	1.00 %	1.000 mA	0.000 mA	100.00 %
YRT1LE1	13500 V	13463 V	0.28 %	1.000 mA	0.009 mA	99.07 %
YRT1IN1G	0.0460 sccm	0.046 sccm	0.43 %			



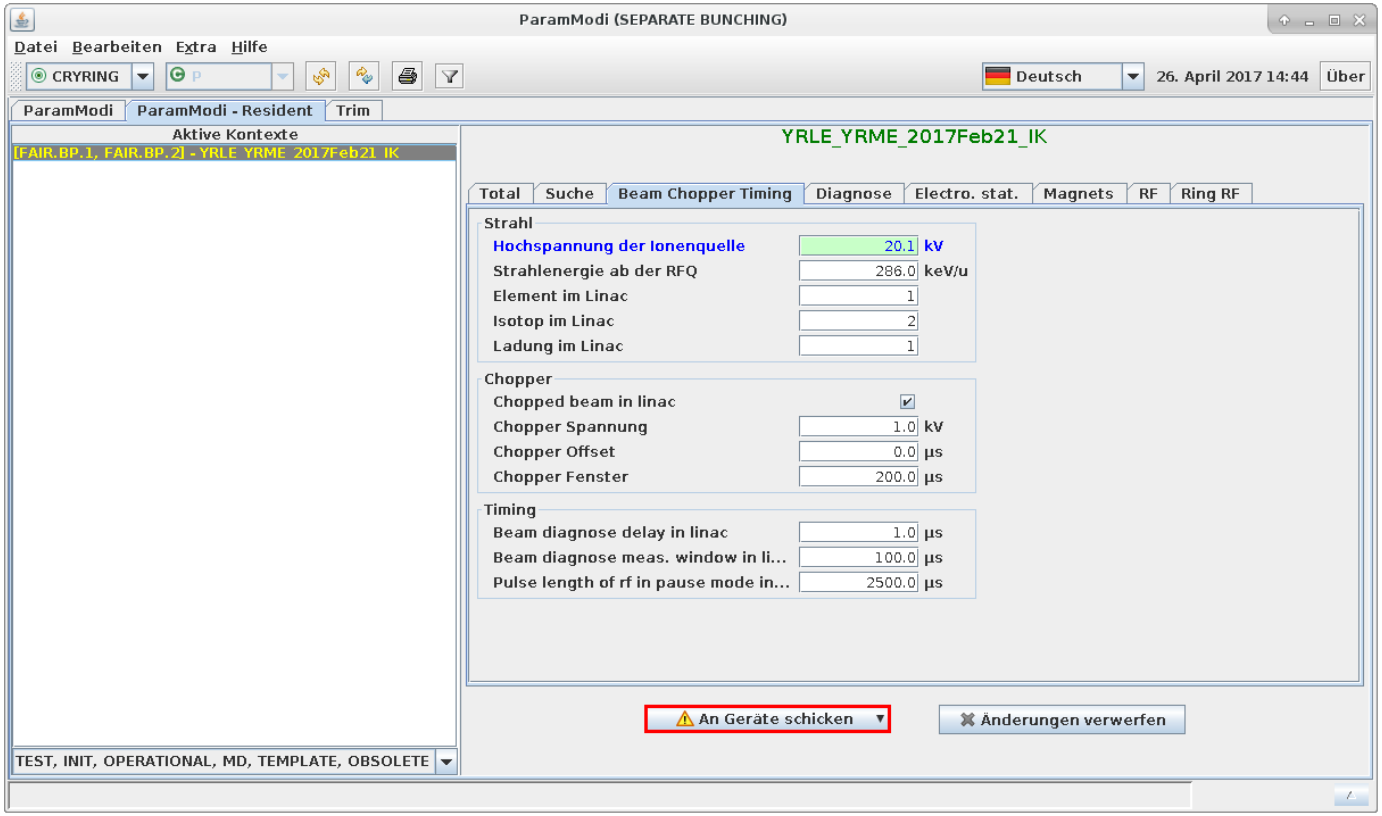
Applications – Feedback for Ion Source

- Remake of an existing Cryring Ion Source Feedback Program from Sweden
- Collect ideas for a more generic feedback program for other ion sources



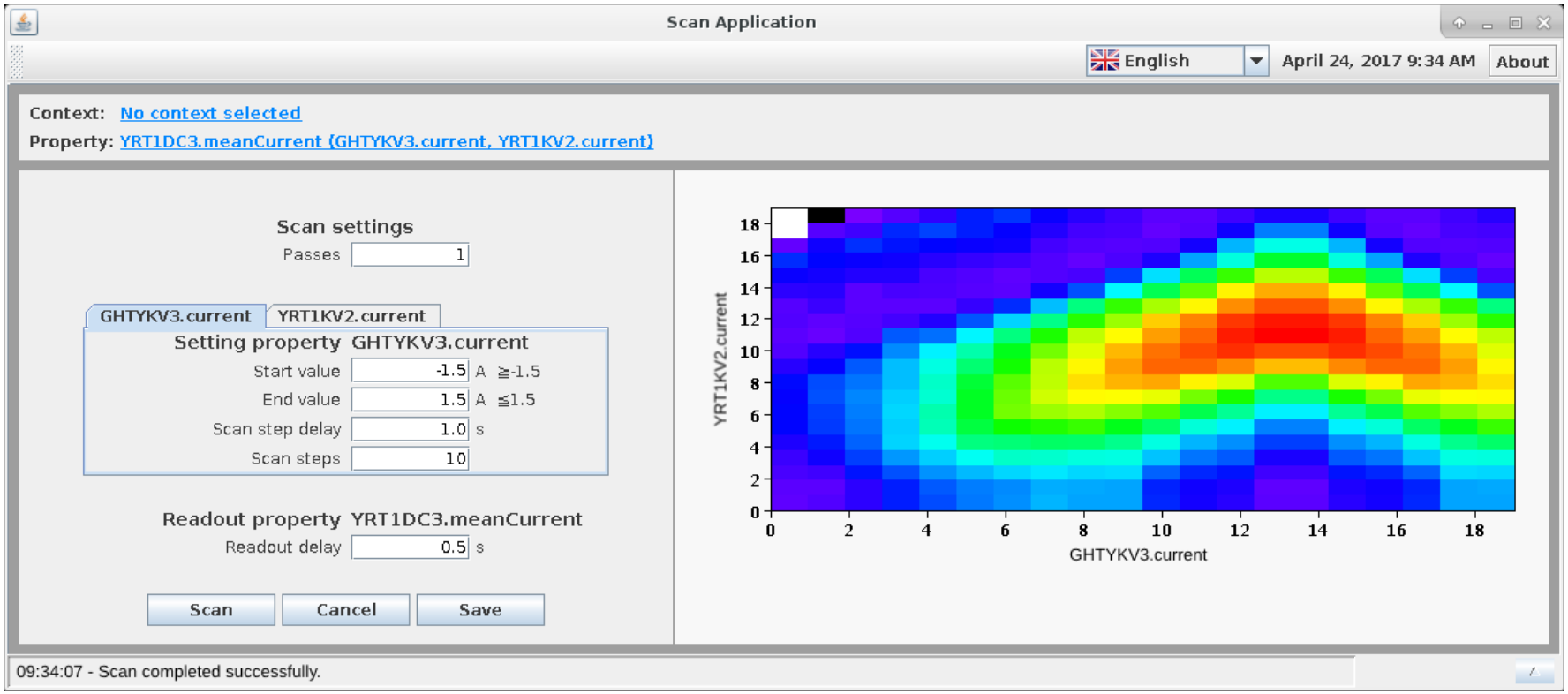
Applications: ParamModi

- Central Application for trimming set values
- View the settings on all levels of the hierarchy (plus expert trim)



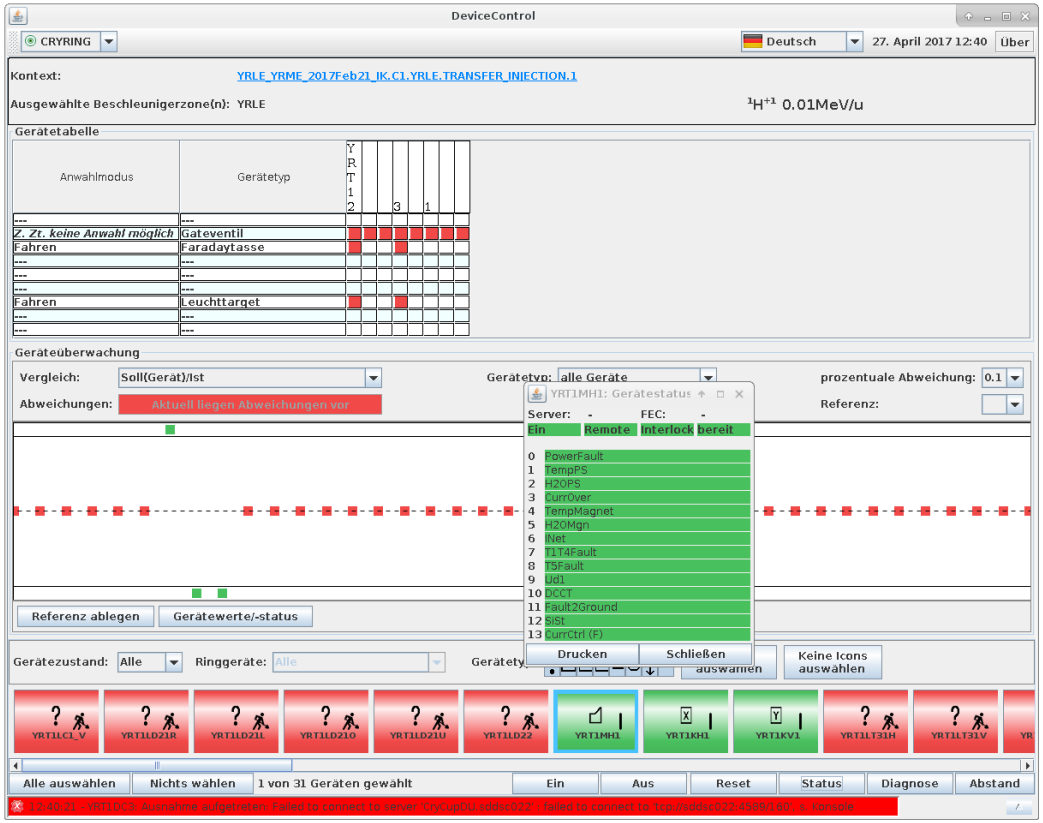
Applications – Scan Application

- Prototype of a generic scan application
- 1-/2d Parameterscan



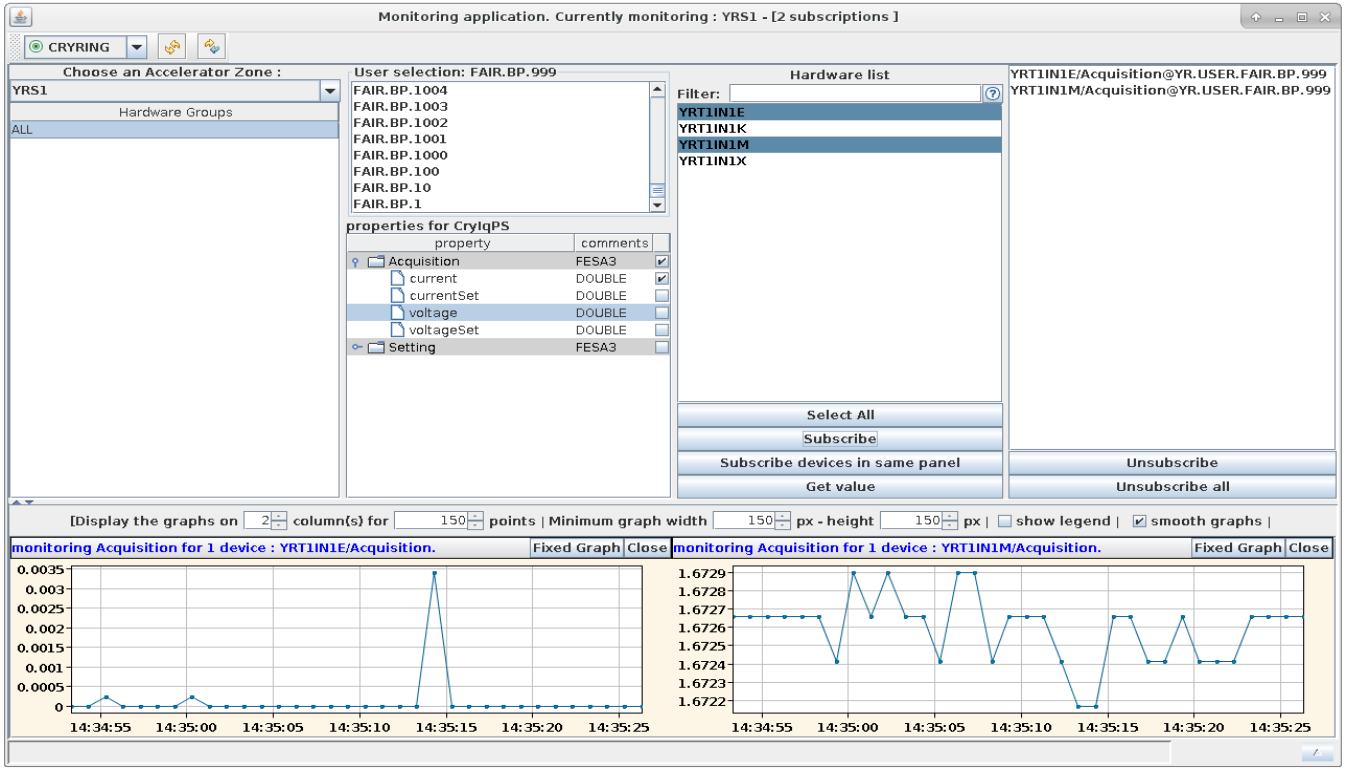
Applications – Device Control

- Control on Device Level:
  Status, Set-Actual-Value comparison, Switch on / off, drive



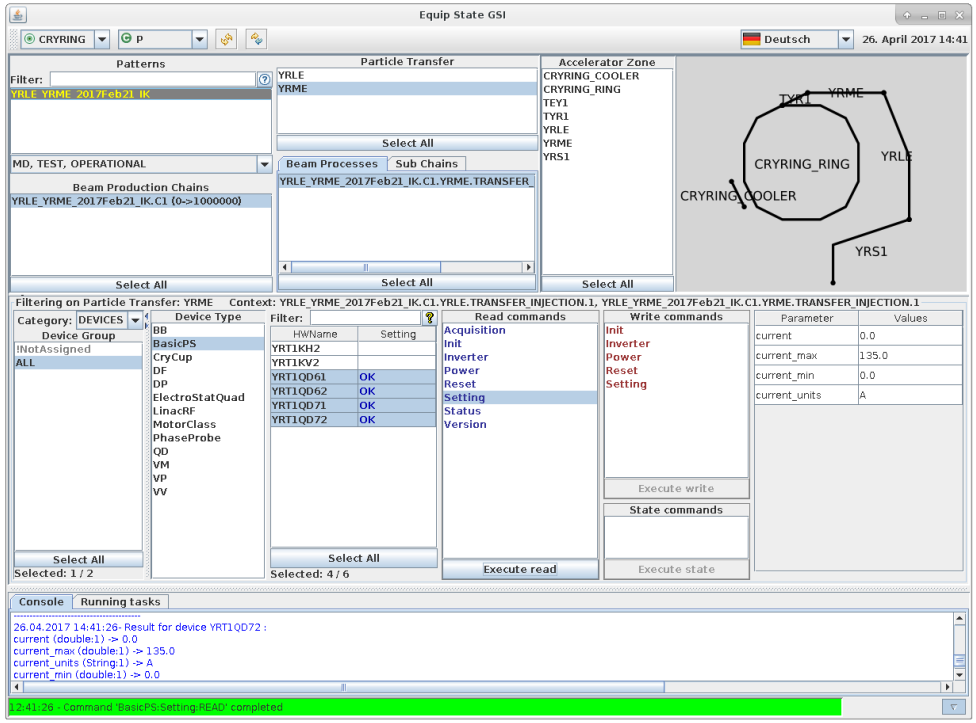
Application – EquipMonitor

- EquipMonitor: Subscribe to all properties of the devices
- Will be replaced in the future by the Archiving System GUI



Applications – Expert Tools

- EquipState: Set/Read all properties of the devices (analog to the FESA explorer)
- Timing Master stop (Cryring only)



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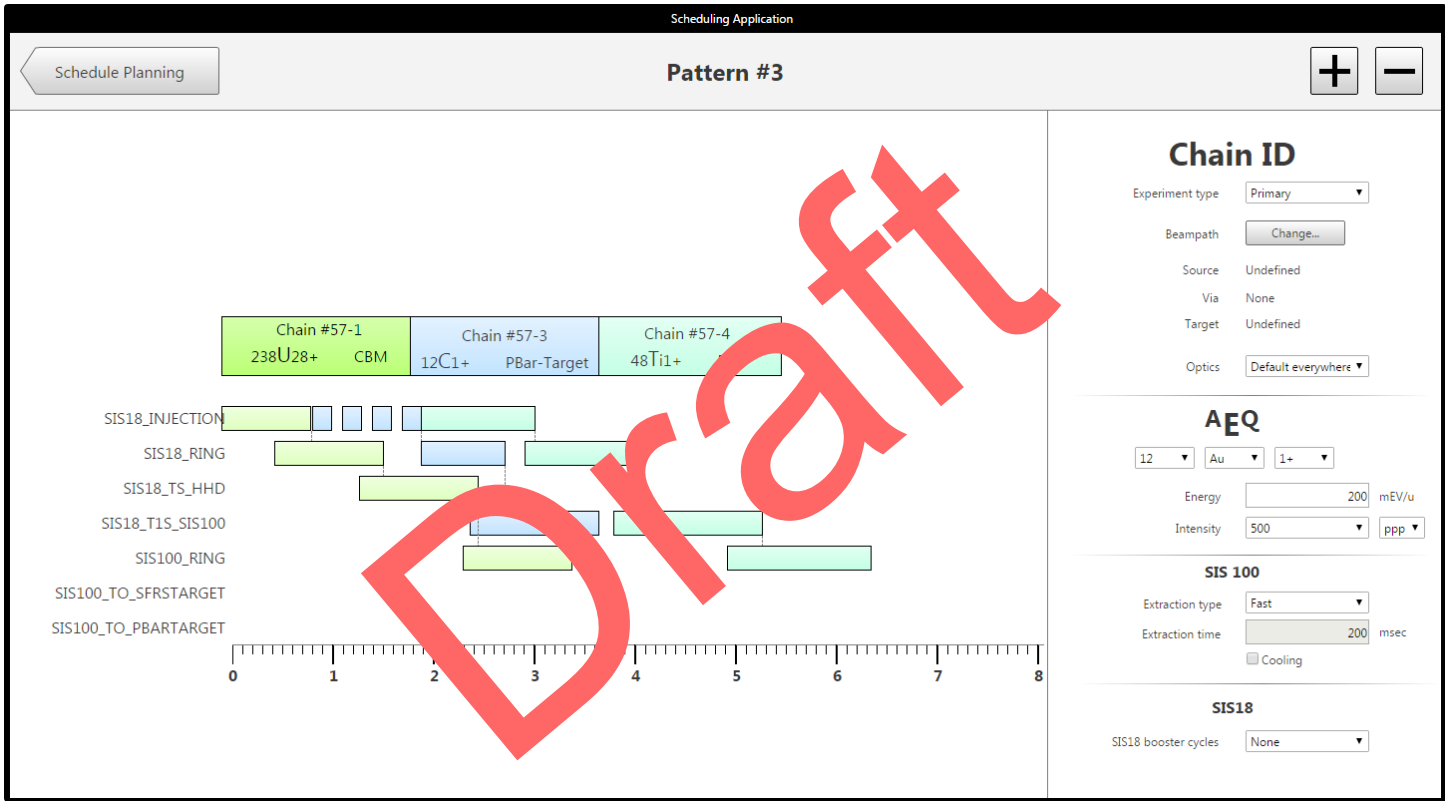
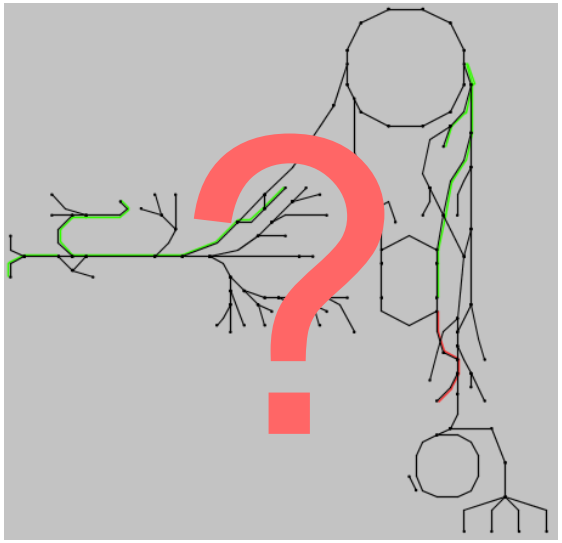
Outlook on Application: Scheduling Application

- Plan and execute patterns, replacement of the "Init" application



Outlook: Status Overview

- Based on the so-called MASP (Master Accelerator Status Processor), display the status of the whole machine with clear indication of current problems
  - Current Status of all machines
  - Interlocks, Alarms, ...
  - Accelerator Modes
  - Clear indication of current problems



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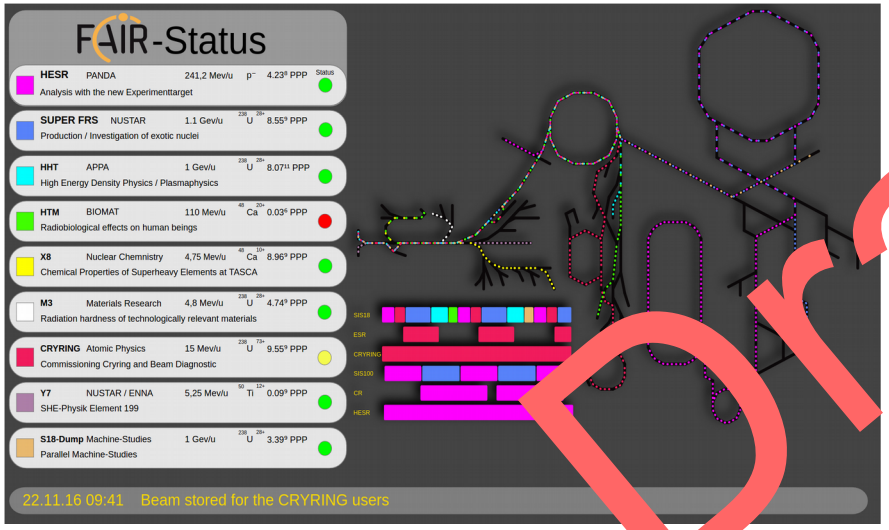
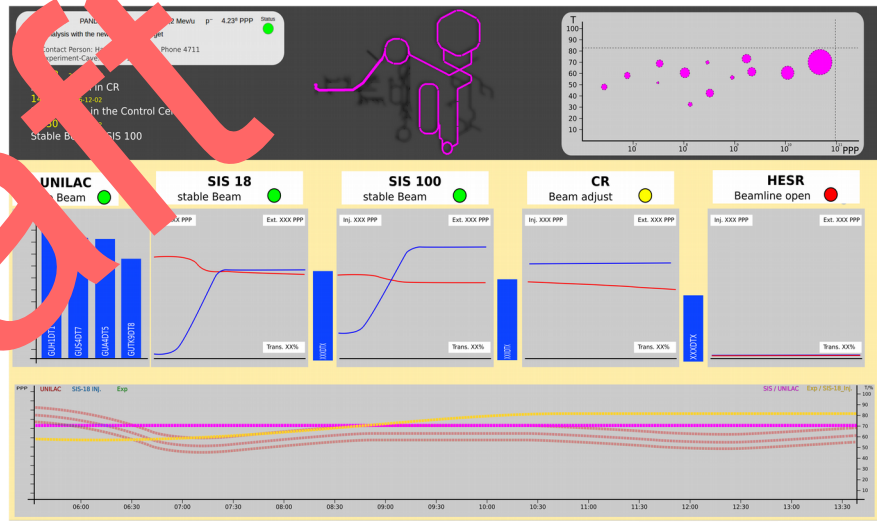
- HKR / FCC Overview Application
  - Which beams are running?
  - What is their status?
  - Transmission, history
  - => fixed / detailed version for the control room,
    short (possibly rotating) version for the canteen





More upcoming applications

- Beam Diagnostics: Easy to use Viewers for Cups, Trafos, Profile Grids, Screens, etc.
- Beam Transmission Monitoring Application (Spec started)
- Beam-based feedbacks together with machine physicists
  - LSA-based Orbit Feedback (proof-of-concept during beamtime 2016)
  - LSA-based Macro-Spill & Harmonics Control (proof-of-concept 2016)
- More to come..

  (next presentation before the dryruns in october)