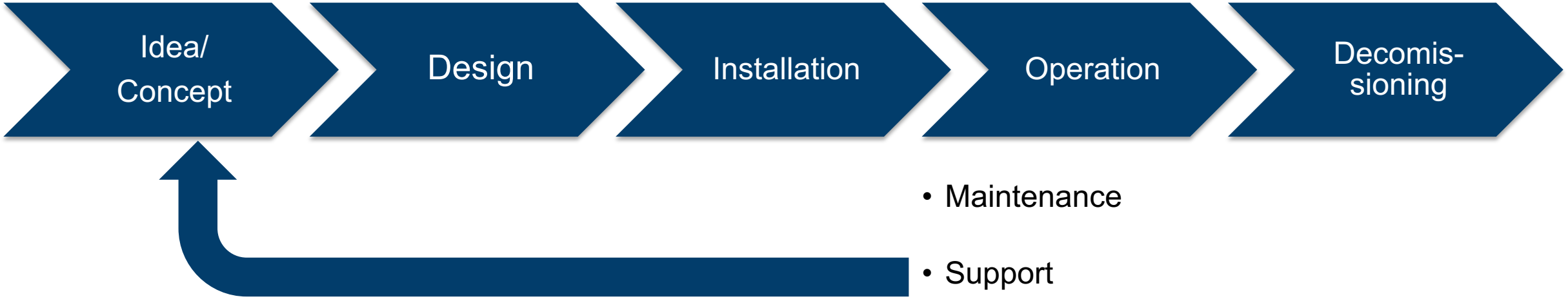
WHAT DOES THE INSTRUMENT TECHNOLOGY DO?

10.3.2022 I JÖRG VOIGT

Our Mission: “Best Instruments at Best Sources”

Continuous Effort to serve users and our science



Developing and building Instruments and Methods

- Instrument Simulation
- Instrument Design
- Motion control and automation
- Control systems for neutron instrumentation
- Neutron detection and data acquisition
- Neutron polarization handling
- Sample Environment
- Instrument operation
- Data tools

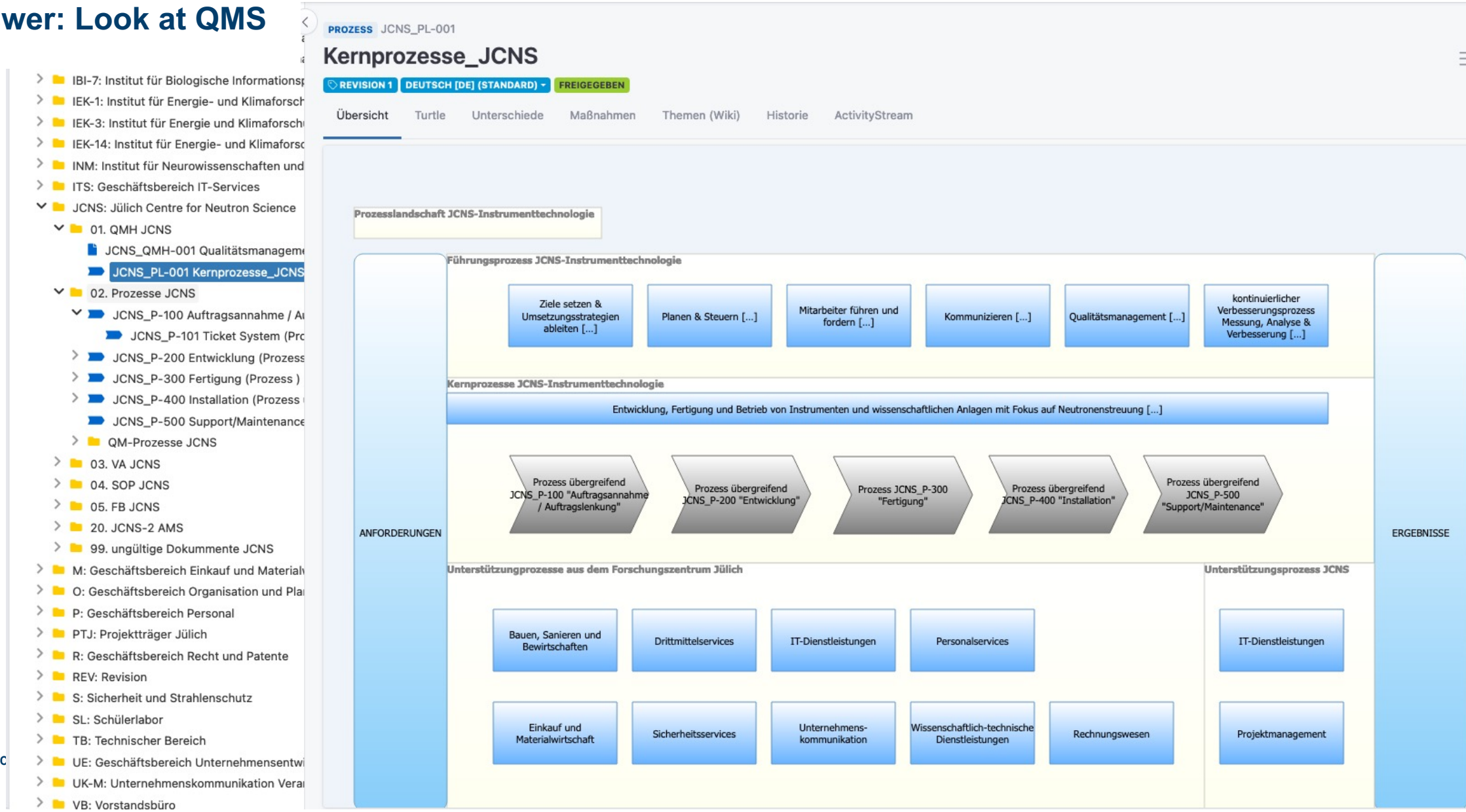
Developing and building Instruments and Methods

- Instrument Simulation

- Motion control and automation
- Control systems for neutron instrumentation

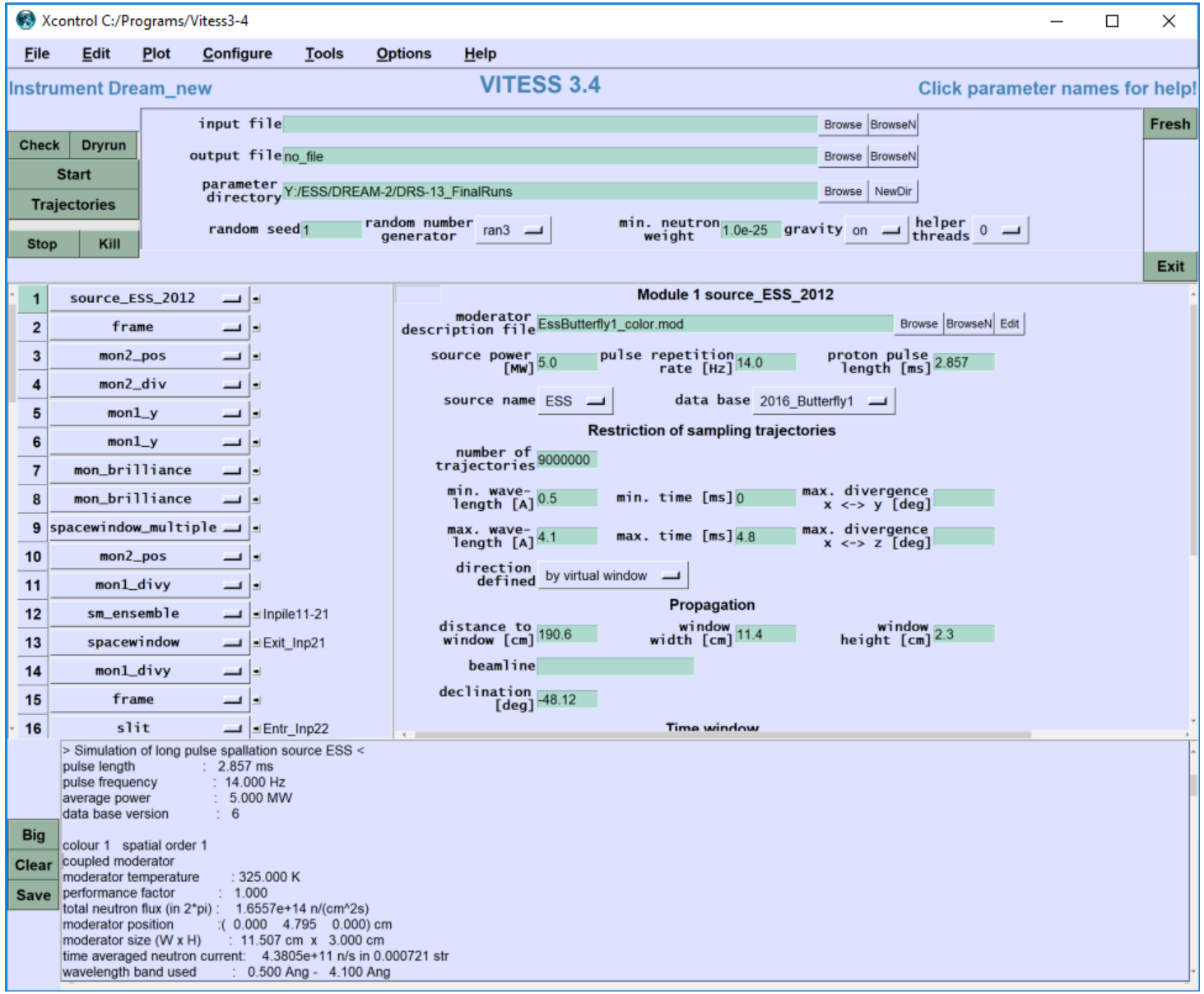
- (Data tools)

The short answer: Look at QMS



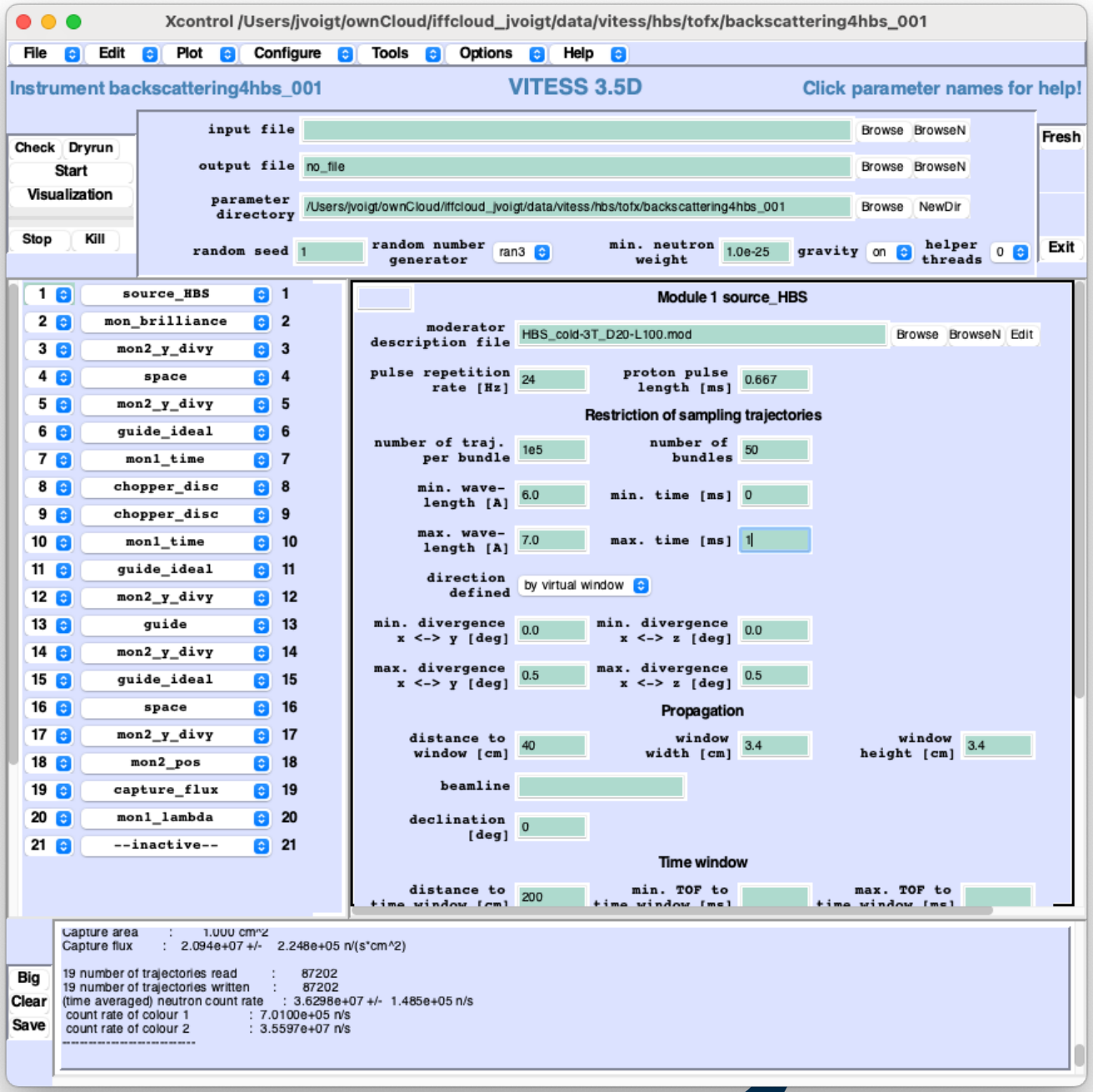
Simulation tools

- Instrument simulation
  - Concept evaluation
  - Education
  - Digital Twins: Interface to NICOS
    Neutron SimLab
- Neutronic simulation
  - Source performance
  - Radiological layout
  - Input for Instrument simulation



Vitess Development

- Including HBS moderators
- New components
- Neutron bundles
- Preparations for digital twins
- 4.0
  - New GUI
  - New file format (.yaml)



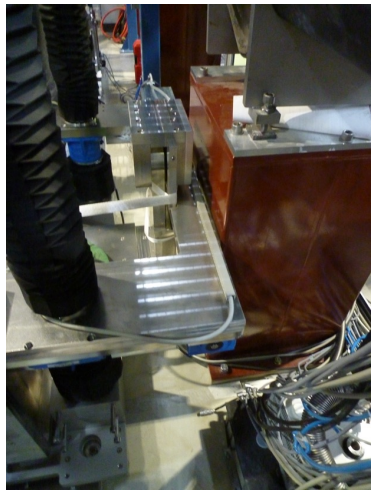
Interface to Mechanics

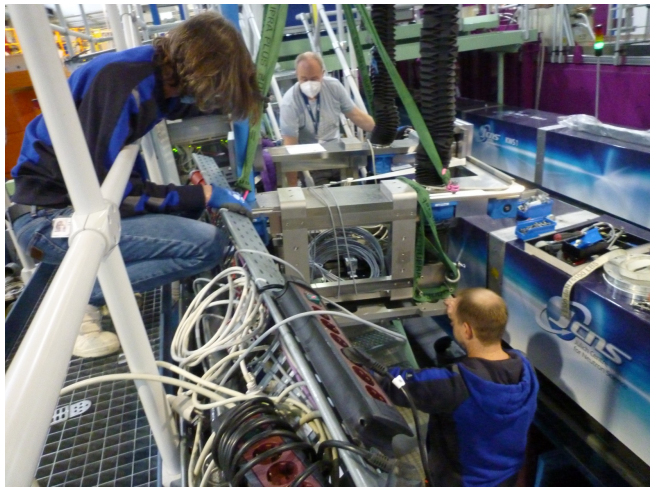
Recent project: KWS3 Upgrade

- New construction and manifacturing of new sample- and detector tables (ZEA-1)
- Renewal of electronic racks and new E-Drawings (JCNS-Insttech, -Garching, -TA)
- Renewal of the vacuum software (JCNS-Insttech)
- E-construction of additional electronic racks (JCNS-TA)
- Mechanical tests in Jülich with preliminary motion control (ZEA-1/ T-ELI / JCNS)
- Demounting existing racks in Garching (JCNS-Garching), transport to Jülich
- Building and adaption of all racks (T-ELI)
- Commissioning of the racks in Jülich (JCNS)
- Installation of new mechanics in Garching (ZEA-1)
- Installation of the racks and re-wiring in Garching (T-ELI)
- On-site commissioning (JCNS-Insttech and Garching)
  - 40+ automated axes
  - Safety system
  - Vacuum system
- Unlisted work at the detector and PC system (JCNS-Garching)

UPDATE 2. SAMPLE STAGE KWS3

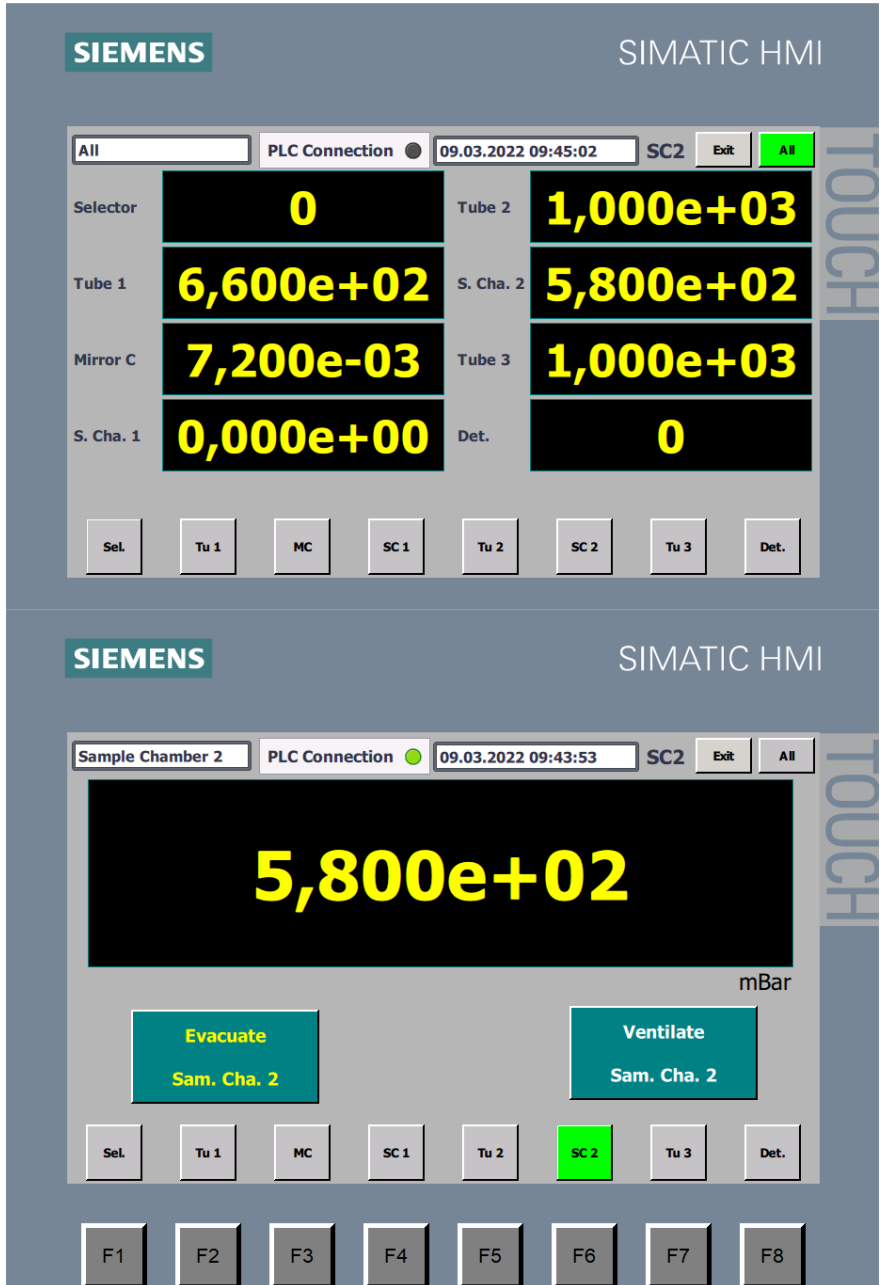
MECHANICAL ASSEMBLY IN GARCHING 04.10-14.10.21 BY ZEA-1 AND JCNS-GARCHING

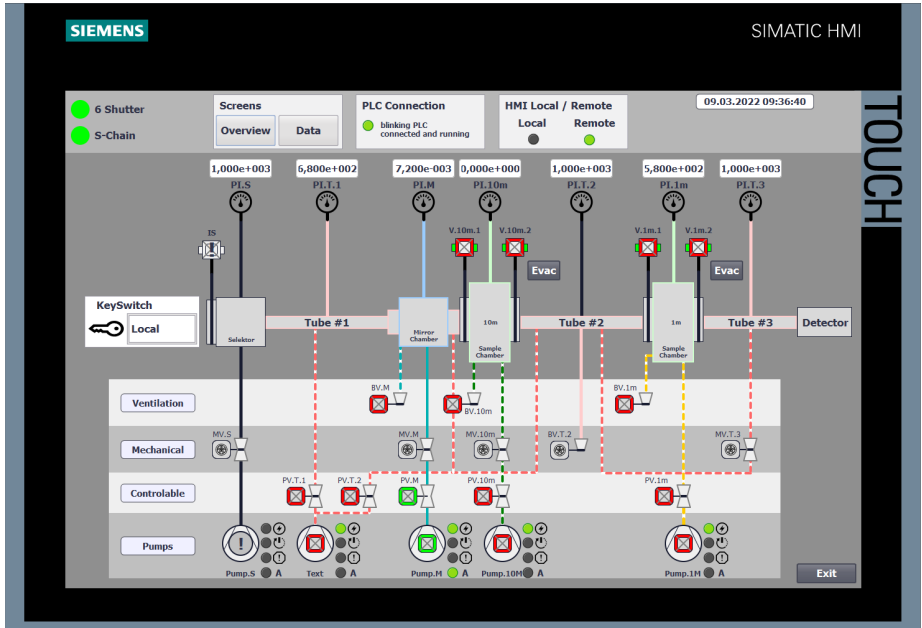


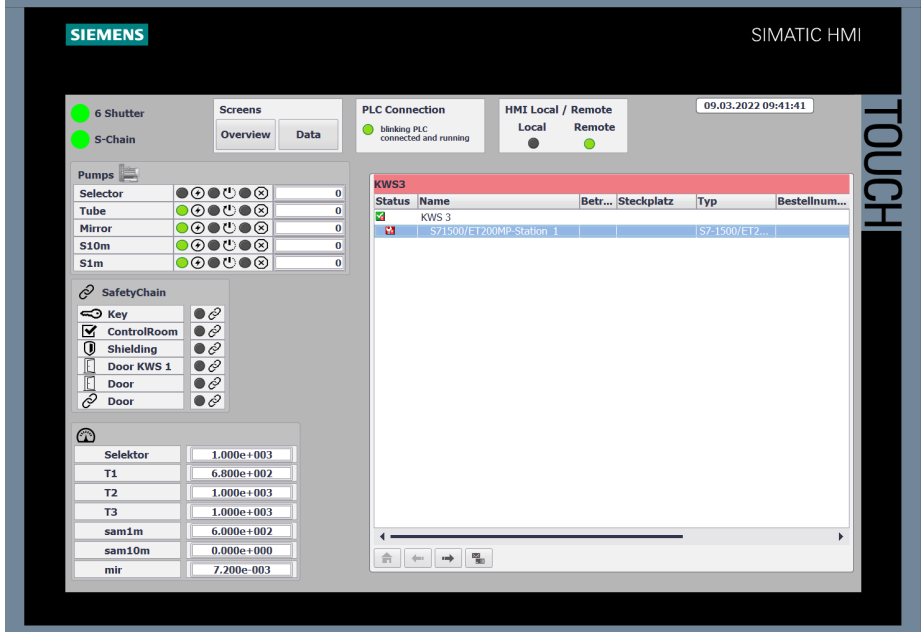


- New electronics
- New vacuum control software
- On-site commissioning
  - 40+ axes
  - 2+ weeks by

    JCNS Insttech+Garching







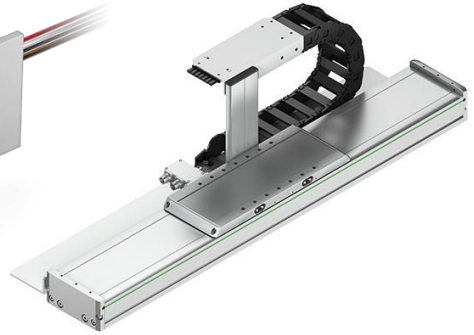
ESS collaboration

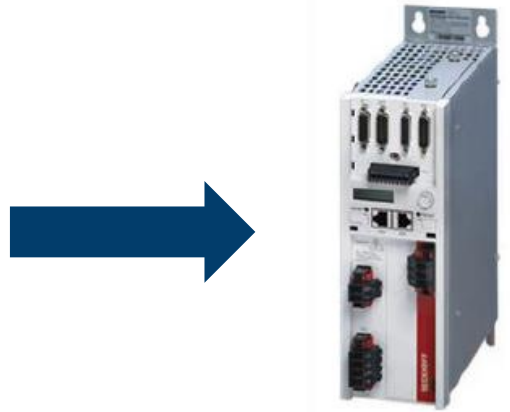
- Linear and rotative motion
- Template cabinets
- Heavy Shutter control
- Robotics

LinMot PS10-70x80U;

Tecnotion UVM12, S-Winding;

HIWIN HT150-L;

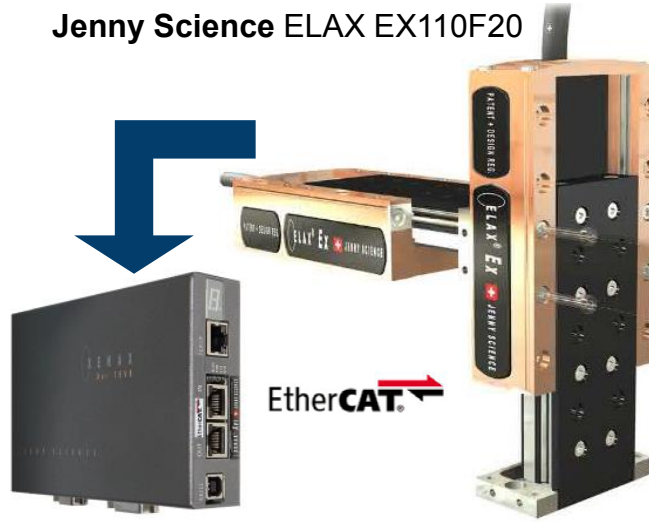




SmarAct SLLV42-600-S-HV

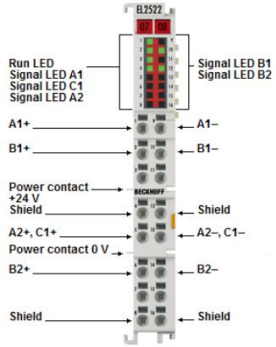
H2W LSS-016-04-006-01A-ME

Jenny Science ELAX EX110F20

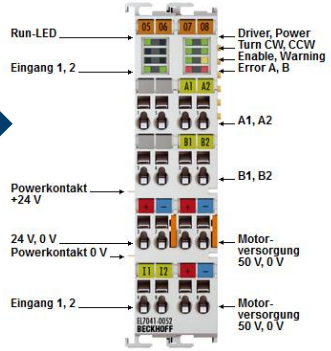


SmarAct SDC2

Beckhoff EL2522



Beckhoff EL7041-0052

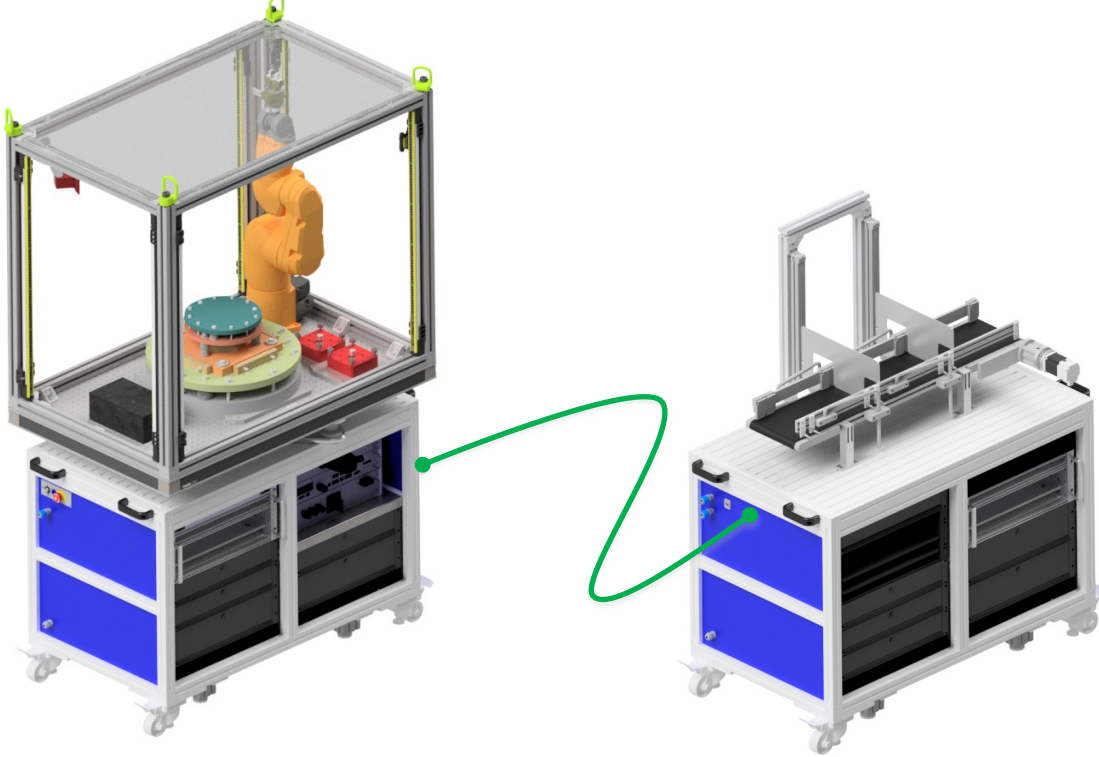


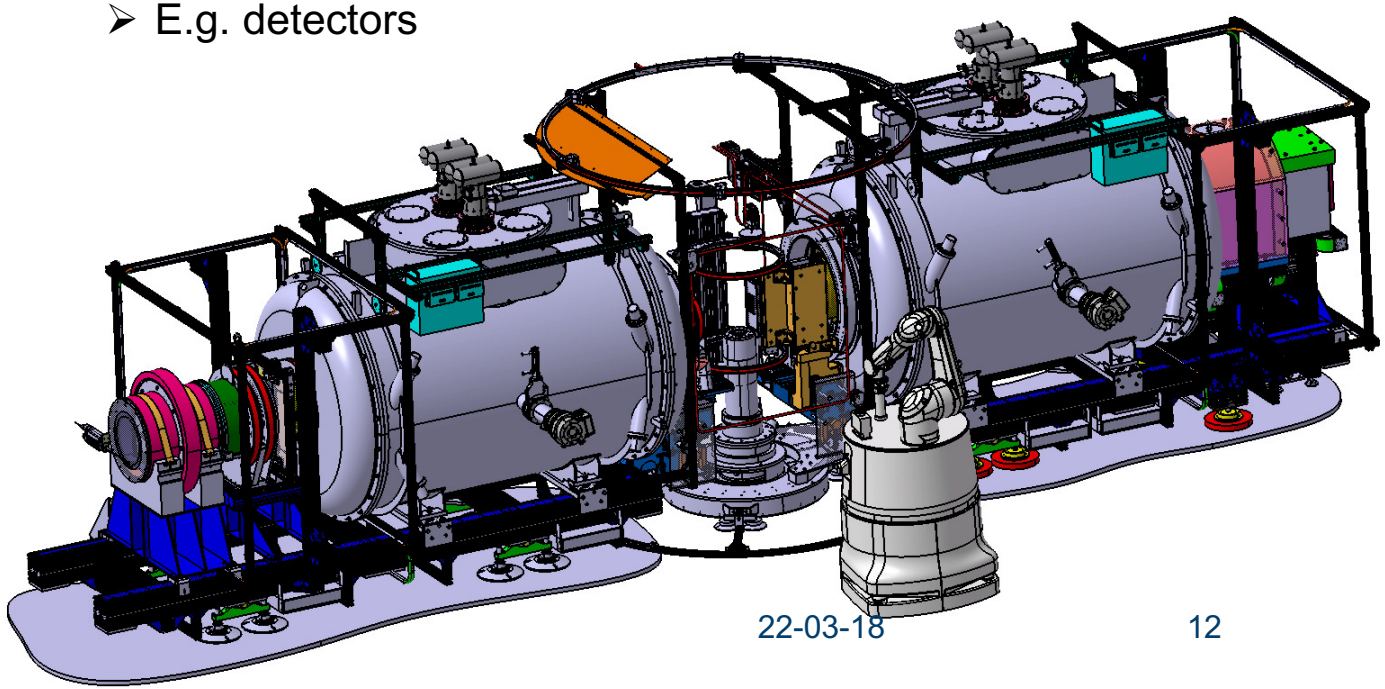
EtherCAT

Jenny Science XENAX Xvi 75V8

New Opportunities: Robotics

- 24/7 sample proliferation
  - ➢ Put sample in sample environment
  - ➢ Manipulate sample in the beam
- Flexibility
- Move heavy equipment
  - ➢ E.g. detectors





Addressed questions:

- Precision in position and angle
- Safety (Person and machine)
- Development effort

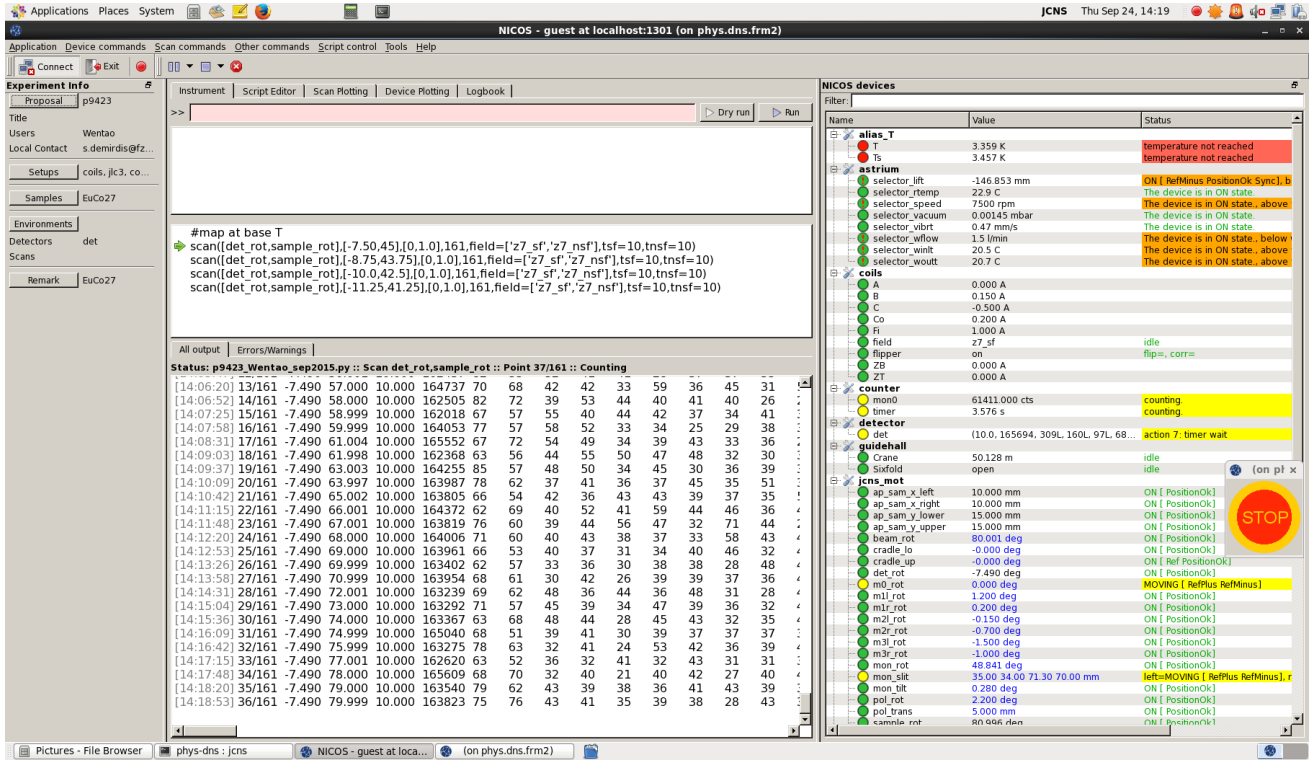
JÜLICH Forschungszentrum

NICOS

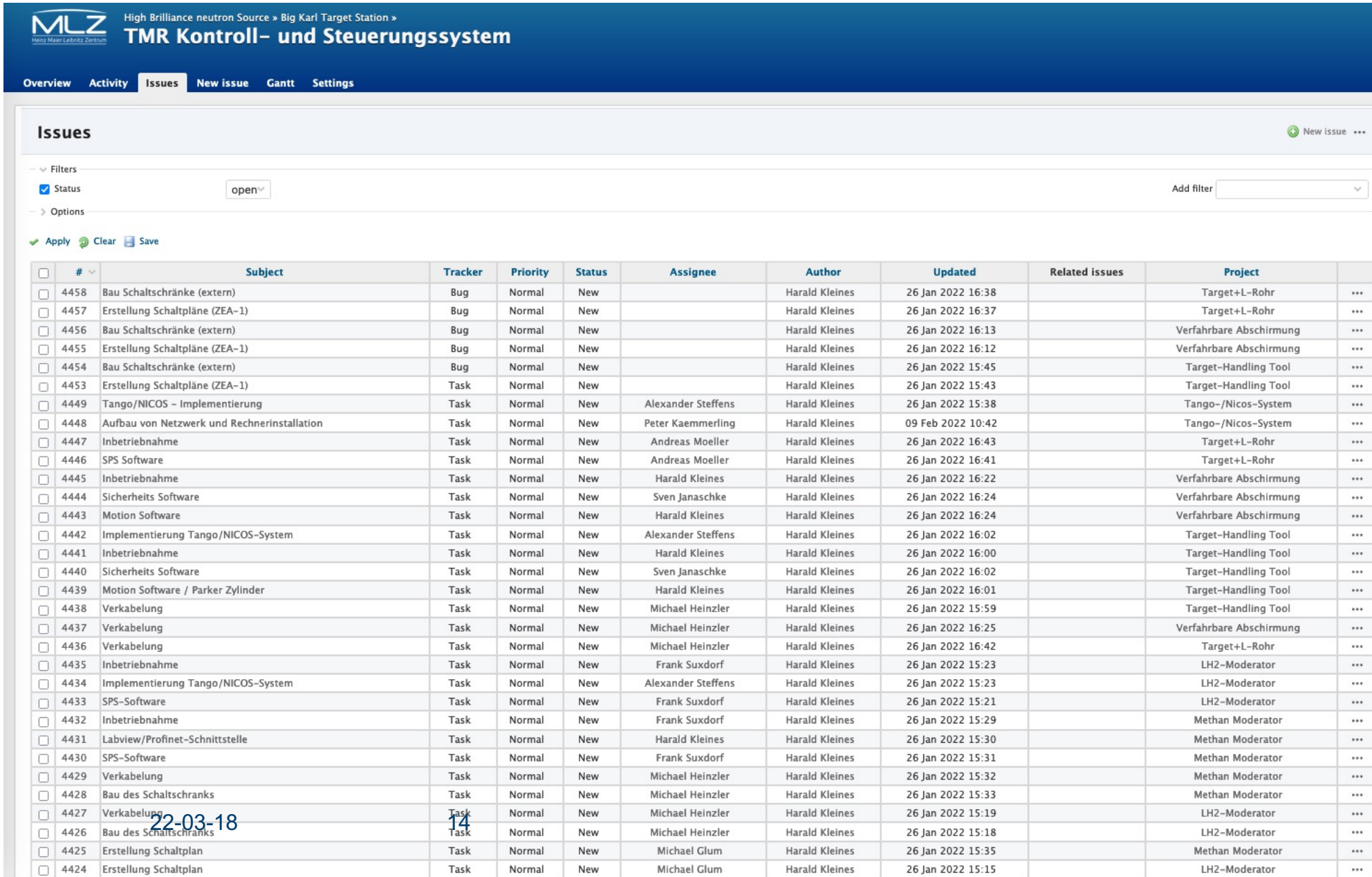
Developed at MLZ,Adapted at PSI, ESS

Communication with

- users
- sample enviroment
- instrument drives and encoders
- detectors and monitors



- Taking care of instrument network and PC infrastructure
- Tango-control extensions
- EPICS (Experimental Physics and Industrial Control System) software for ESS instruments (and COSY)



#	Subject	Tracker	Priority	Status	Assignee	Author	Updated	Related issues	Project
4458	Bau Schaltschränke (extern)	Bug	Normal	New		Harald Kleines	26 Jan 2022 16:38		Target+L-Rohr
4457	Erstellung Schaltpläne (ZEA-1)	Bug	Normal	New		Harald Kleines	26 Jan 2022 16:37		Target+L-Rohr
4456	Bau Schaltschränke (extern)	Bug	Normal	New		Harald Kleines	26 Jan 2022 16:13		Verfahrbare Abschirmung
4455	Erstellung Schaltpläne (ZEA-1)	Bug	Normal	New		Harald Kleines	26 Jan 2022 16:12		Verfahrbare Abschirmung
4454	Bau Schaltschränke (extern)	Bug	Normal	New		Harald Kleines	26 Jan 2022 15:45		Target-Handling Tool
4453	Erstellung Schaltpläne (ZEA-1)	Task	Normal	New		Harald Kleines	26 Jan 2022 15:43		Target-Handling Tool
4449	Tango/NICOS - Implementierung	Task	Normal	New	Alexander Steffens	Harald Kleines	26 Jan 2022 15:38		Tango-/Nicos-System
4448	Aufbau von Netzwerk und Rechnerinstallation	Task	Normal	New	Peter Kaemmerling	Harald Kleines	09 Feb 2022 10:42		Tango-/Nicos-System
4447	Inbetriebnahme	Task	Normal	New	Andreas Moeller	Harald Kleines	26 Jan 2022 16:43		Target+L-Rohr
4446	SPS Software	Task	Normal	New	Andreas Moeller	Harald Kleines	26 Jan 2022 16:41		Target+L-Rohr
4445	Inbetriebnahme	Task	Normal	New	Harald Kleines	Harald Kleines	26 Jan 2022 16:22		Verfahrbare Abschirmung
4444	Sicherheits Software	Task	Normal	New	Sven Janaschke	Harald Kleines	26 Jan 2022 16:24		Verfahrbare Abschirmung
4443	Motion Software	Task	Normal	New	Harald Kleines	Harald Kleines	26 Jan 2022 16:24		Verfahrbare Abschirmung
4442	Implementierung Tango/NICOS-System	Task	Normal	New	Alexander Steffens	Harald Kleines	26 Jan 2022 16:02		Target-Handling Tool
4441	Inbetriebnahme	Task	Normal	New	Harald Kleines	Harald Kleines	26 Jan 2022 16:00		Target-Handling Tool
4440	Sicherheits Software	Task	Normal	New	Sven Janaschke	Harald Kleines	26 Jan 2022 16:02		Target-Handling Tool
4439	Motion Software / Parker Zylinder	Task	Normal	New	Harald Kleines	Harald Kleines	26 Jan 2022 16:01		Target-Handling Tool
4438	Verkabelung	Task	Normal	New	Michael Heinzler	Harald Kleines	26 Jan 2022 15:59		Target-Handling Tool
4437	Verkabelung	Task	Normal	New	Michael Heinzler	Harald Kleines	26 Jan 2022 16:25		Verfahrbare Abschirmung
4436	Verkabelung	Task	Normal	New	Michael Heinzler	Harald Kleines	26 Jan 2022 16:42		Target+L-Rohr
4435	Inbetriebnahme	Task	Normal	New	Frank Suxdorf	Harald Kleines	26 Jan 2022 15:23		LH2-Moderator
4434	Implementierung Tango/NICOS-System	Task	Normal	New	Alexander Steffens	Harald Kleines	26 Jan 2022 15:23		LH2-Moderator
4433	SPS-Software	Task	Normal	New	Frank Suxdorf	Harald Kleines	26 Jan 2022 15:21		LH2-Moderator
4432	Inbetriebnahme	Task	Normal	New	Frank Suxdorf	Harald Kleines	26 Jan 2022 15:29		Methan Moderator
4431	Labview/Profinet-Schnittstelle	Task	Normal	New	Harald Kleines	Harald Kleines	26 Jan 2022 15:30		Methan Moderator
4430	SPS-Software	Task	Normal	New	Frank Suxdorf	Harald Kleines	26 Jan 2022 15:31		Methan Moderator
4429	Verkabelung	Task	Normal	New	Michael Heinzler	Harald Kleines	26 Jan 2022 15:32		Methan Moderator
4428	Bau des Schaltschranks	Task	Normal	New	Michael Heinzler	Harald Kleines	26 Jan 2022 15:33		Methan Moderator
4427	Verkabelung	Task	Normal	New	Michael Heinzler	Harald Kleines	26 Jan 2022 15:19		LH2-Moderator
4426	Bau des Schaltschranks	Task	Normal	New	Michael Heinzler	Harald Kleines	26 Jan 2022 15:18		LH2-Moderator
4425	Erstellung Schaltplan	Task	Normal	New	Michael Glum	Harald Kleines	26 Jan 2022 15:35		Methan Moderator
4424	Erstellung Schaltplan	Task	Normal	New	Michael Glum	Harald Kleines	26 Jan 2022 15:15		LH2-Moderator

From Instrument control to facility control?