

# 2025-11-14 Operations Workshop Jork

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## Working group "automation"

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## Charge questions

### 1. Status

- Assess the current level of automation at machine, photon beamlines and experiments. Where is automation used routinely? Where is automation available but unused, or used only by specialists?
- Identify current labor-intensive procedures that could benefit from automation. Would the gain rather be in time or quality?
- Where are the barriers that currently limit the use of automation?

### 2. Suggestions for improvement

- List the top five areas where more automation would have the greatest positive impact on operations.
- List the top five measures that would lower current barriers to automation.

## Results

**PROCEDURES REQUIREMENTS**

- Write & review procedures (+ training)
- Advertise/clarity the benefits for the (tuning) experts

**RESOURCES**

- Allocate resources (people)
- Allocate beam time

**TRUST**

- Visualize & interact what's going on (during the automation)
- Better equipment & machine protection
- Automate bottom-up

**AUTOMATION**

- RESOURCE ALLOCATION, DELIVERY FOCUSED (WHEN IS TOOL AVAILABLE?)
  - ↳ REQUIRES PROCESS DEFINITION (e.g. BEAMTIME)
- BENCHMARKING TO ALLOW TRAINING
- LOGGING, EXTRACTION OF RELEVANT INFORMATION
- AUTOMATE ORBIT TUNING, PHASE SHIFTER SCANS, SETUP TASKS

**HIREX**

- FOCUS ON AUTOMATION → TO FIND THE BEAM DURING S
- SASE2 TO START WAVEFRONT SENSOR ON SAS2
- HIREX: TO PROTECT COTTHARD
- AUTOMATE FILTERS

**SASE CROSSTALK**

- AI TOOL FOR CORRELATIONS
- TO AVOID/IMPROVE MANUAL INTERVENTIONS
- COULD IMPROVE/AUTOMATE REPORTING
- FIXED PULSE NUMBERS TO REDUCE PARAMETER FLEXIBILITY

**Other notes and sticky notes:**

- Priorities** (orange bubble): Lack of Procedures, Complexity, Time for experts, Low-level automation, Risk of damage
- Resources** (orange bubble): software dev, PM
- Top areas where automation will have greatest impact on guide** (2a)
- Photon Beamline Alignment**
- Undulator trajectory alignment**
- Failure detection and prevention**
- Sample Alignment**
- Self-seeding & Attosecond Turn-cycler Setup**
- Machine Recovery (especially photon system)**
- Phase space Measurement (LPS)**
- Crosstalk identification**
- RF FSM**
- Taskomat**
- KARABU Scheduler**
- Mirror drift Feedback**
- Orbit tuning**
- Phase shifter Optimisation**
- K-mono setup**
- Phase space measurements**
- HIREX setup**
- Mirror adjustment tool**
- Other (lower impact) automation needs**



## Questions to automation presentation

- Resources: Automation will lead to more or less people  
(Sinn)
- Ownership: expert will not break the system because of their context knowledge and the expert will have to fix it  
(Sinn)
- Reproducibility is important for automation  
(Svitozar)
- Baseline Alignment Automation: there is an ongoing project by the instruments  
(Mannell)
- How far in time are we away to inject some procedure document into a large language model (LLM) to perform the task automatically  
(Sinn)
- Dilemma Discussion on:

