MXCuBE at MAX IV

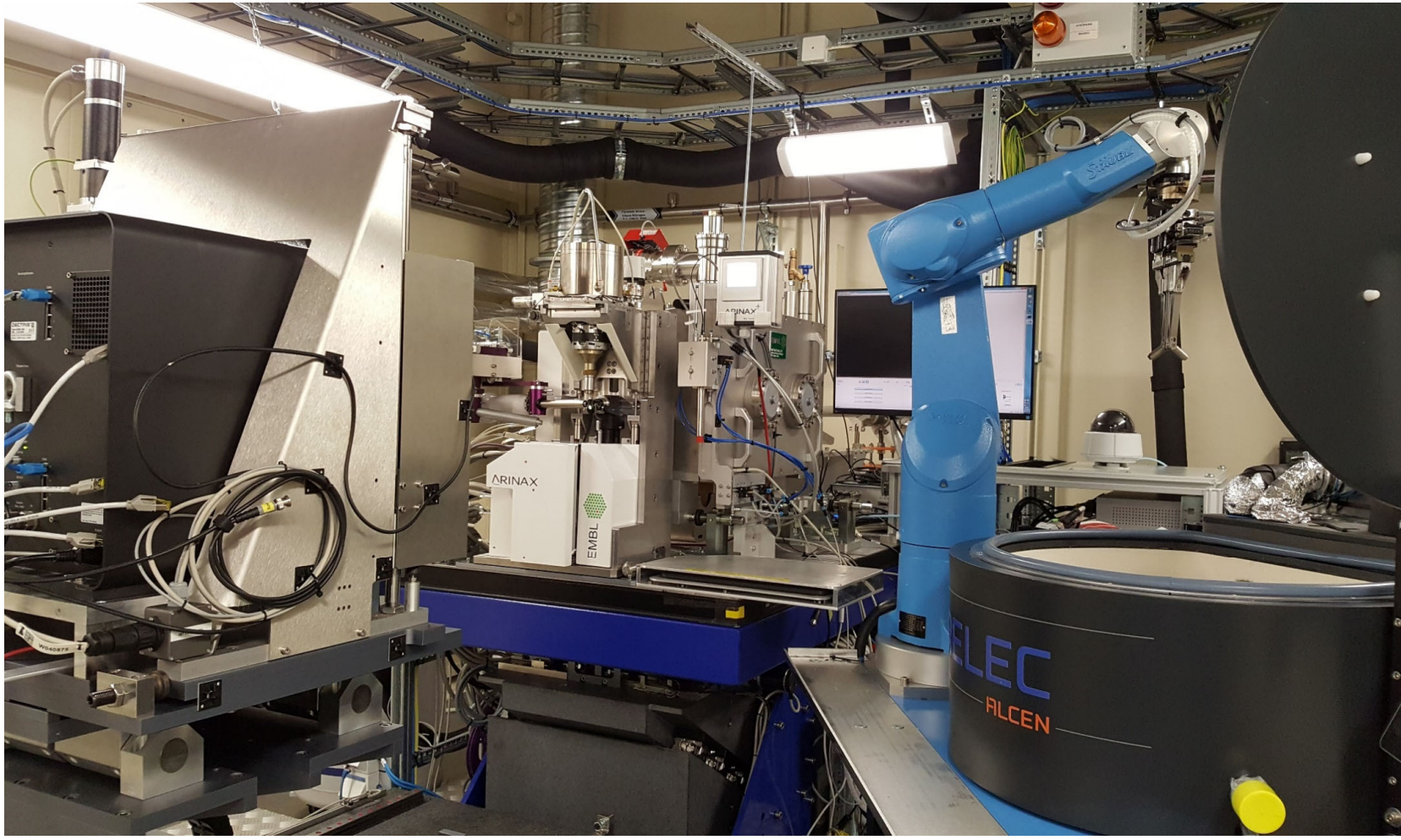
Jie Nan On behalf of MX-group at MAX IV

Oct 30, 2019

MX Beamlines at MAX IV

BioMAX

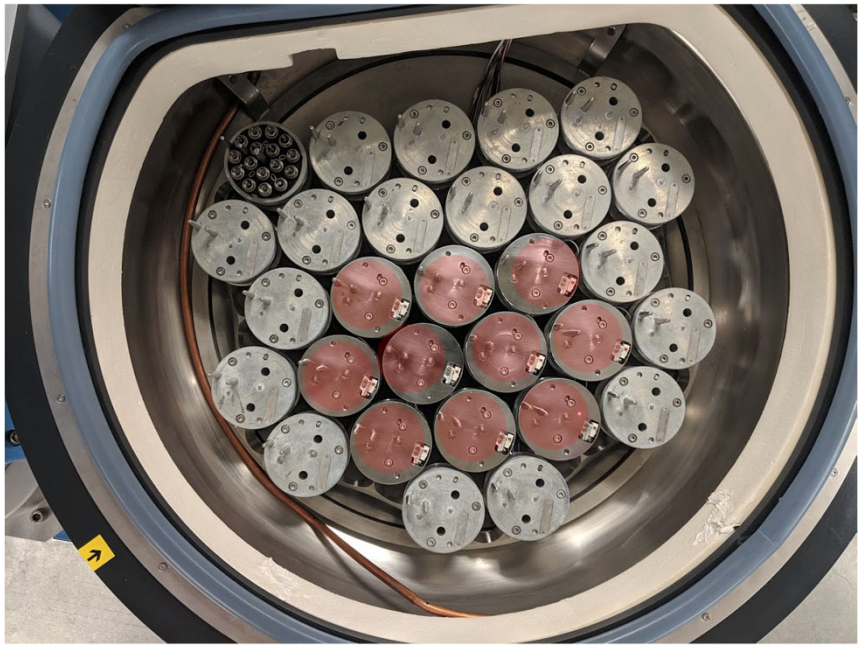
- In-vacuum undulator
- 5 – 25 keV
- 10^{13} ph/s @250mA
- BCU
- Cryojet5, HC-lab and REX
- Eiger16M
- ISARA sample changer
- MD3 Diffractometer
- Amptek fluorescence detector
- Roadrunner



MicroMAX

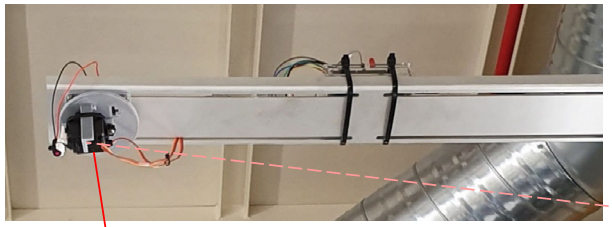
What's new - ISARA upgrade

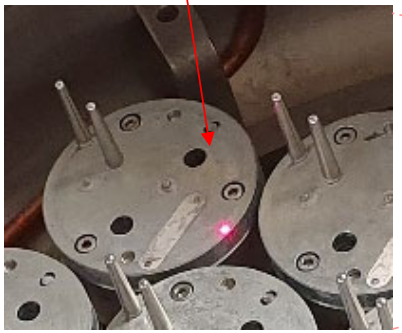
- Upgrade of 10 new Unipuck positions and implementation within ISARA/MXCuBE
- Spare gripper tool

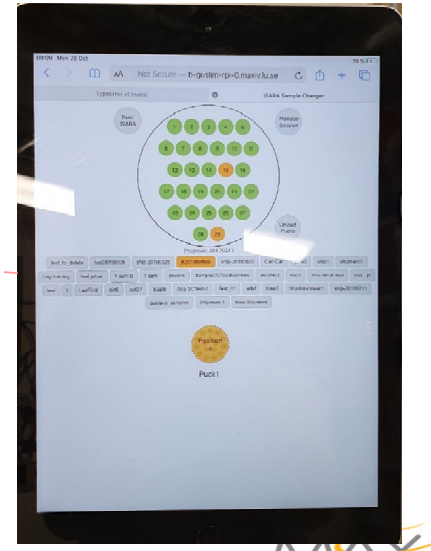


Uni-Puck support only, 29 positions = 464 samples

What's new - Puck loading app







Puck positions are automatically registered in ISPyB

What's new - MD3 upgrade

Problems

- Raster scan frequently failed due to "insufficient calculation time" error
- overhead > 1s for each turn
- *Raster, 50x50 cells, 2500 imgs, 10 ms per img*

  25 s collection + >50 s overhead

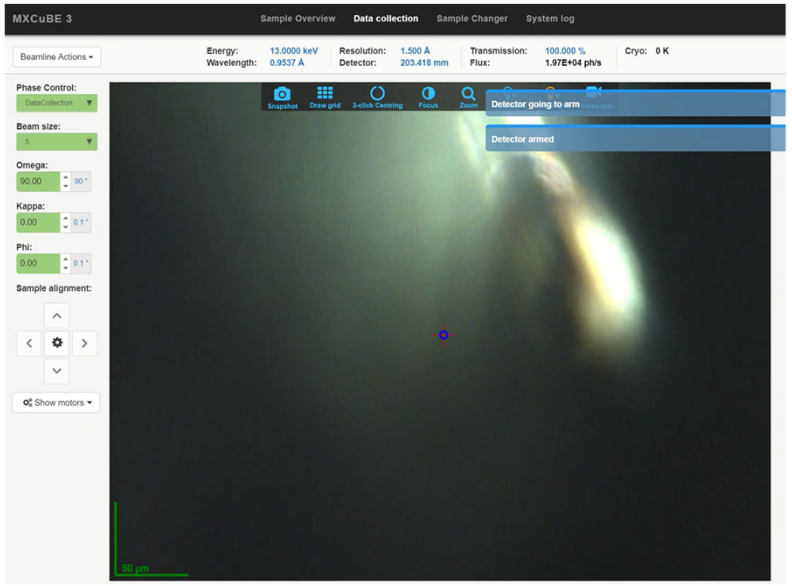
Achieved

- no failure of "insufficient calculation time"
- reduced overhead 0.33 s per turn
- *Raster, 50x50 cells, 2500 imgs, 10 ms per img*

  25 s collection + 17s overhead

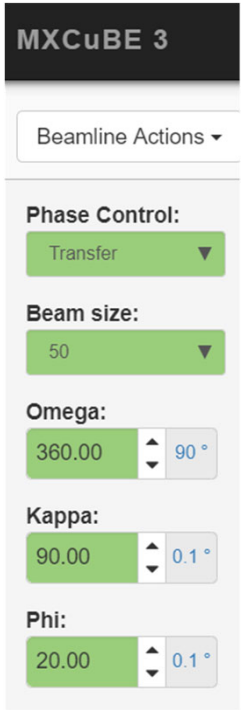
Upgrade

- Turbo PMAC → Power PMAC (including PMAC program)
- New Server, 4U RAID1 Core i7-6700
- MD3 software from v2.4 to v3



What's new – Minikappa upgrade

Minikappa upgraded, compatible with ISARA



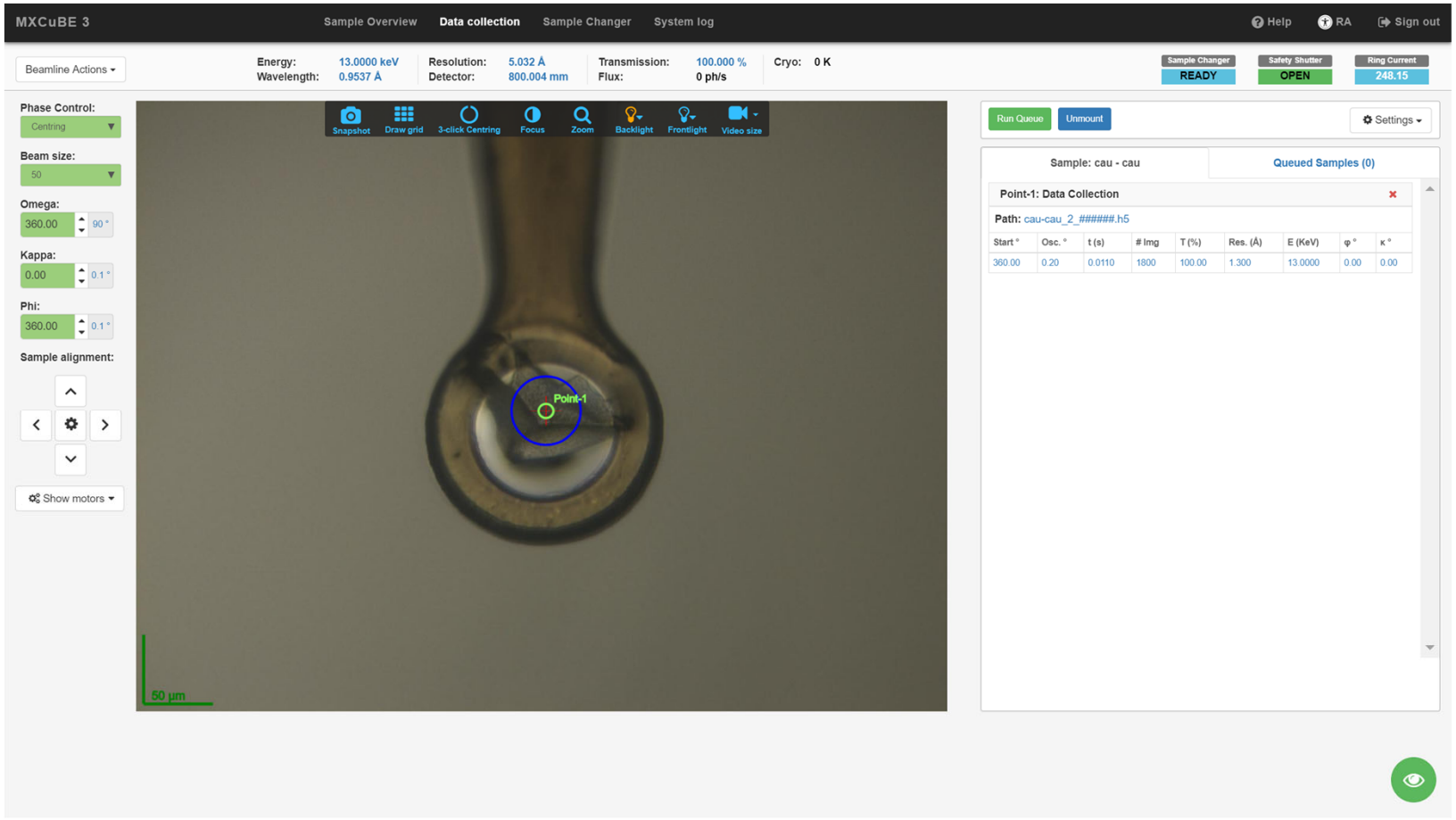
MXCuBE3 at BioMAX - 1

MXCuBE3 in production

- MXCuBE3, 3.0.1
- HardwareRepository, 2.2
- Same as spring

Deployed new features

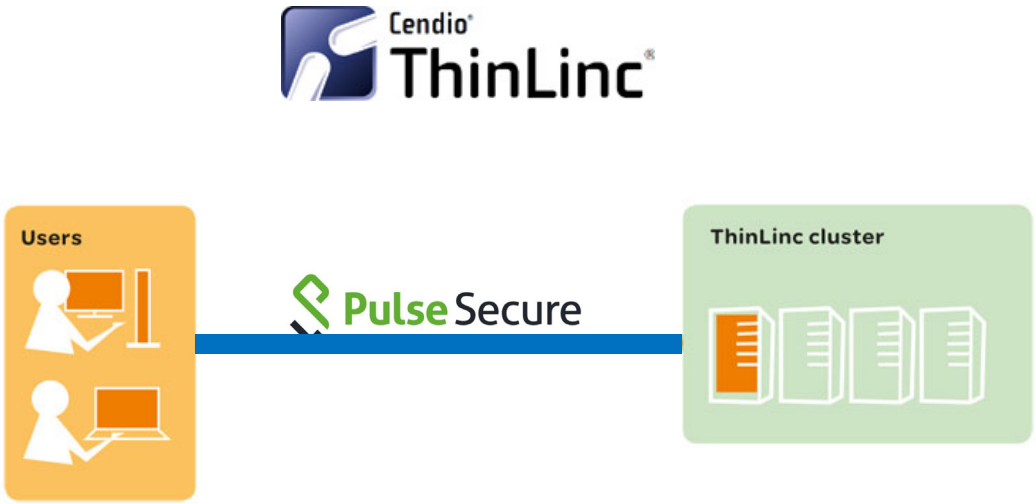
- Lucid3
- Flux calculation
- Characterization analysis
- Performance improvement
- Remote operation, control handling

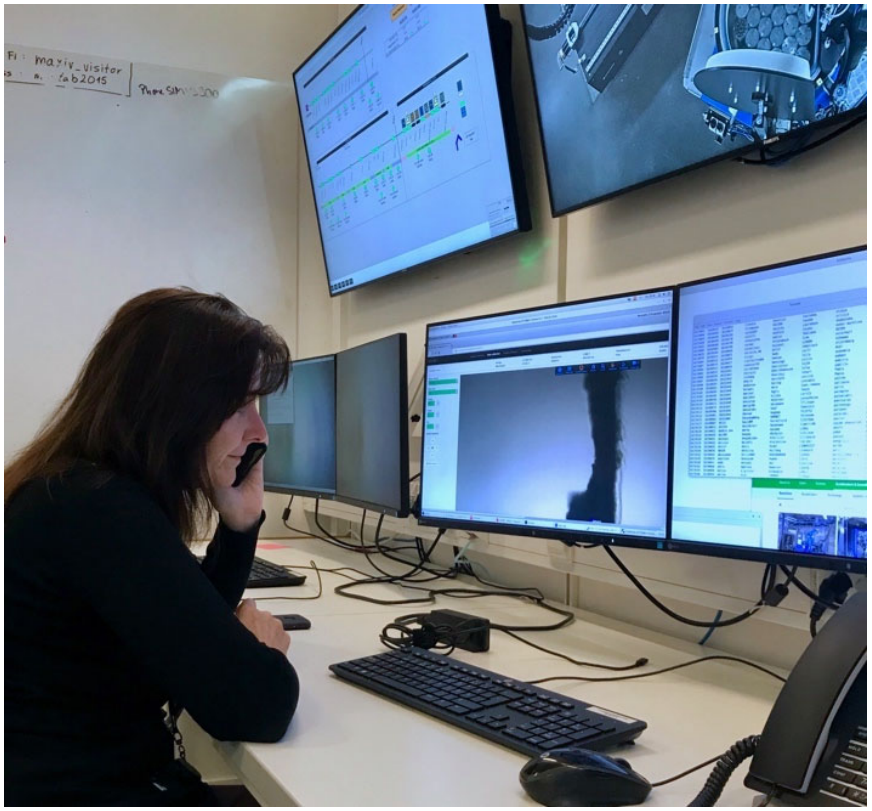


Remote operation

- Remote access for commissioning users, success with two proposal groups

- Users run MXCuBE3 on remote desktop via ThinLinc



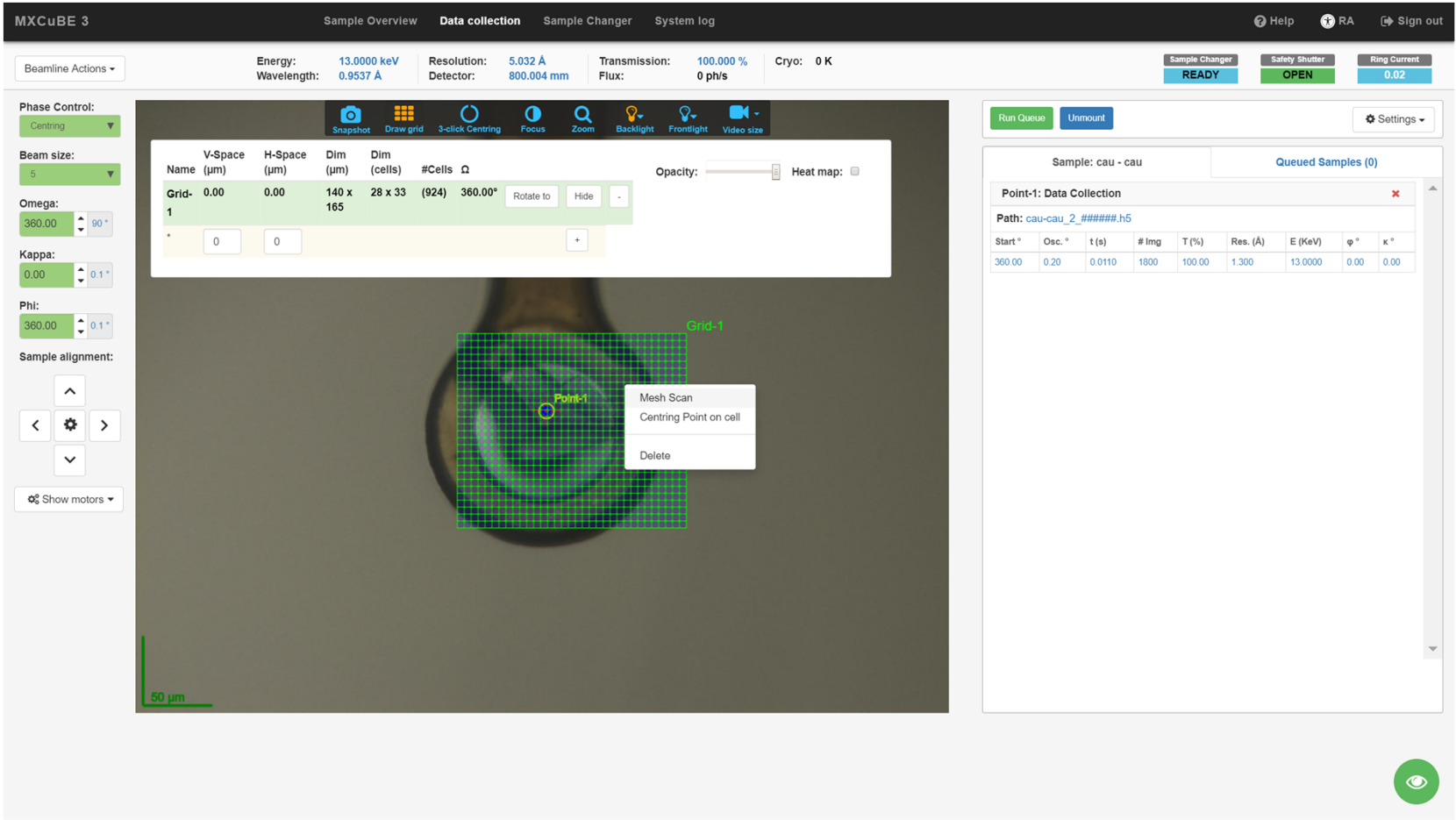


Ana Gonzalez is assisting remote users during data-collections

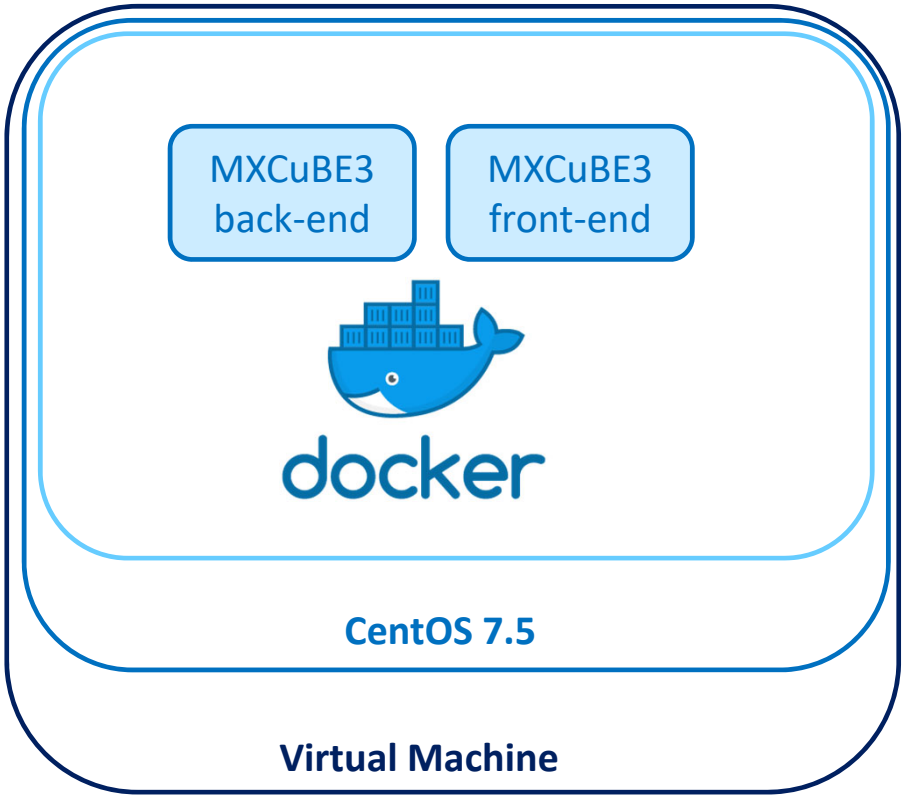
MXCuBE3 at BioMAX - 2

Ongoing

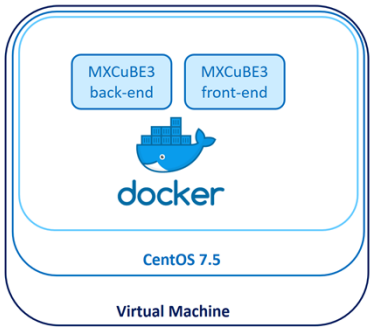
- Raster scan
- Multicast (tested)
- Beamline operation macros, i.e. Beam alignment
- Integration of Amptek to support for XRF, XANES



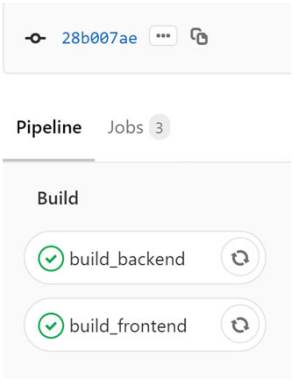
How we run MXCuBE3 Server?



How we update MXCuBE3 Server?

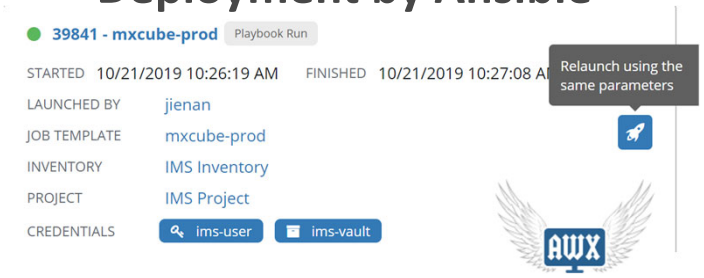


Build docker images



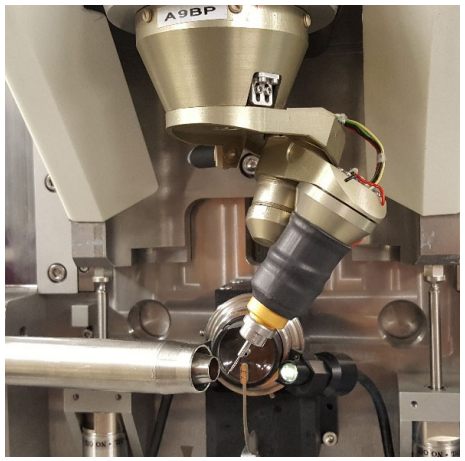
a few minutes

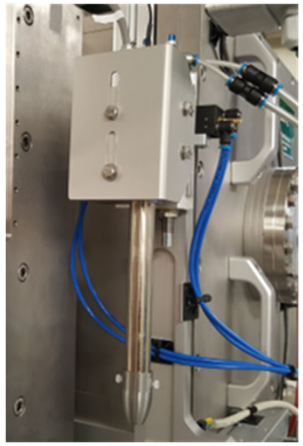
Deployment by Ansible

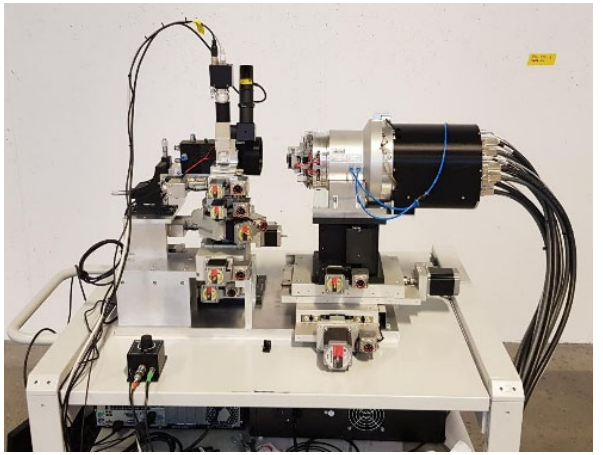


Ongoing and future work

- Upgrade MXCuBE3
- Raster scan
- MAD experiments
- Minikappa, visual or X-ray based re-orientation, strategy calculation
- Better support of SSX

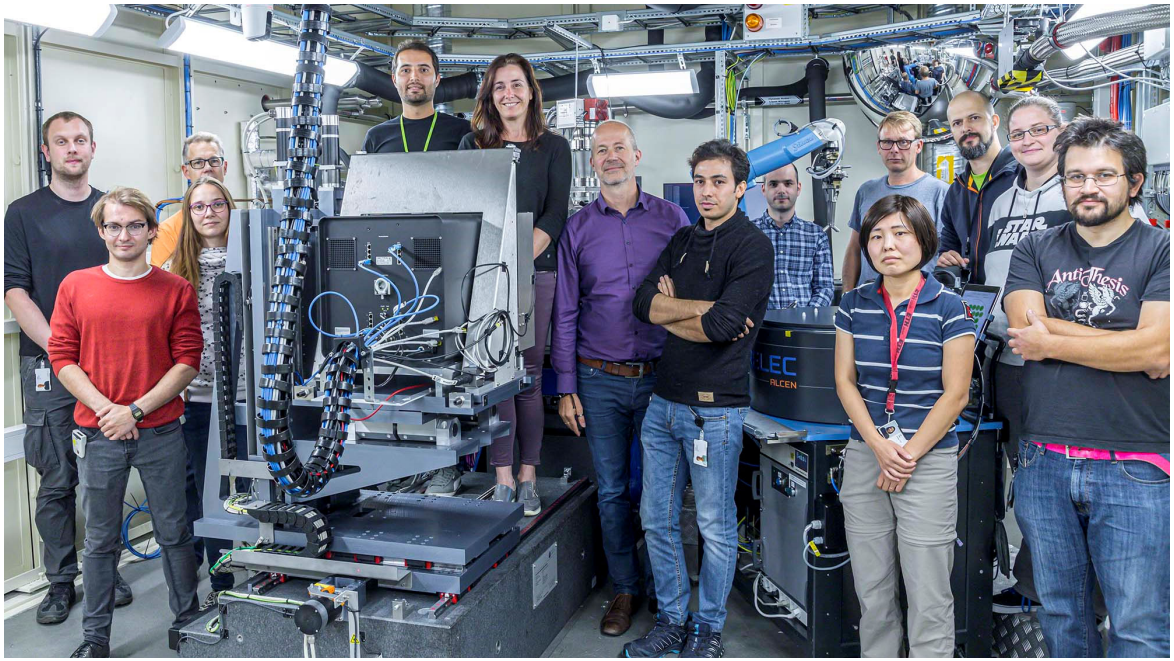






Acknowledgement

The MX group



From left to right:

- Oskar Aurelius
- Vladimir Talibov
- Laila Benz
- Thomas Ursby
- Gustavo Lima
- Ana Gonzalez
- Uwe Mueller
- Vahid Haghighat
- Mikel Eguiraun (KITS)
- Jie Nan
- Johan Unge
- Mirko Milas
- Monika Bjelcic
- Elmir Jagudin

- All BioMAX users
- Many others from MAX IV and MXCuBE/ISPyB collaboration