

# Stable Operation of MAX IV



P. Sjöblom, S. Padmanabhan, M. Klingberg, V. Hardion, V. Martos, A. Freitas, A. Milan-Otero, P. Bell, D. Erb, A. Amjad, A. Nardella, H. Petri, J. Rosenqvist, D. Spruce



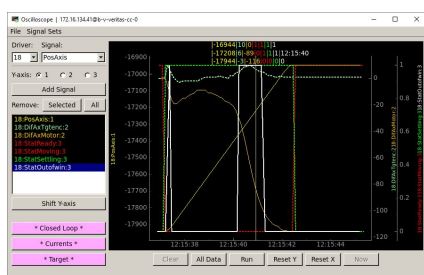
Snapshot of MAX IV machine status window showing 11 open shutters while the 1.5 GeV and 3 GeV rings operate in top up mode at 250 mA.

**MAX IV Laboratory**, inaugurated in June 2016, has for the last 8 months accepted synchrotron users on three beamlines, NanoMAX, BioMAX and Hippie, while pushing forward with bringing more beamlines into commissioning and into a state where they can accept users. The last call was addressed for 10 beamlines. MAX IV has now reached a point when 11 beamlines simultaneously have shutters open and thus receive light during stable operation. With 16 beamlines funded, the number of beamlines taking light simultaneously will grow over the coming years.

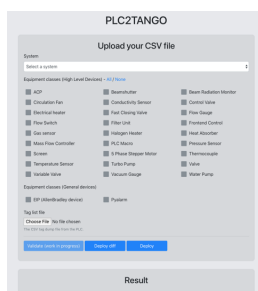
The availability and reliability at MAX IV are constantly monitored and available through web interface. For 2019, up to mid September, the up time and meantime between failure has been 98%, 61 h for 1.5 GeV ring, 98%, 43 h for 3.0 GeV ring, and 98%, 42 h for the short pulse facility.



**Elogy** supports rich text editing and attachments. Each logbook can be configured with a template and custom attributes to increase productivity and facilitate information sharing.



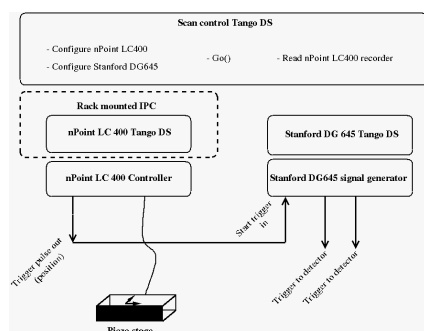
**IcePAP Oscilloscope** increase the tuning capabilities of the IcePAP motion system. It can easily be reconfigured to show relevant information for e.g. position closed loop configuration or trouble shooting.



**PLC2Tango** is a new web application used to decrease the lead time of PLC configuration in the control system. Species, Flexpes and the new beamlines have been deployed with the new tool. The PLC group also produces more complete and stable configurations due to the validation feature. It brings autonomy, a faster feedback loop since the control group does not need to be involved anymore.

	2019	2020	2021	2022	2023
<b>Workpackage 1: Data Management of Experiments</b>					
• Improved beam time proposal, sample and scheduling management					
• Metadata view, browser, select, transfer management for users and staff					
<b>Workpackage 2: Experimental Data and Metadata</b>					
• Automatic metadata recording making characterization					
• Integration of next generation of fast detectors					
<b>Workpackage 3: Data Evaluation</b>					
• Data visualization tools					
• Collaborative data analysis environments in the cloud					
• Data compression to reduce eventual storage costs					
<b>Workpackage 4: Data Storage</b>					
• Increased offline storage with many year data retention					
• Increased local offline data analysis resources					

**DataStaMP** project is divided in four key workpackages; Data Management of Experiments, Experimental Data and Metadata, Data Evaluation and Data Storage. The overall mission is to improve the value of the data generated at the facility in terms of the benefit to research, in the spirit of the European Open Science Cloud and the FAIR data principles. The DataStaMP project is funded by Knut and Alice Wallenbergs foundation.



**Nanomax flyscanning motion and trigger scheme** allows time-based triggers to be sent to Dectris Pilatus, Quantum Detectors Merlin, and Xspress3 detectors in synchronisation with the measurement of the sample position when scanned linearly in one direction. During 2019 the system has been redeveloped, with an nPoint piezo stage capable of supporting a heavier sample environment.

## MAX IV Laboratory

MAX IV Laboratory has operated successfully for more than 30 years and is currently operating the new MAX IV synchrotron facility in Lund. Fully developed it will receive more than 2 000 scientists annually, from Sweden and the rest of the world. They will do research in areas such as materials science, structural biology, chemistry, geology,

physics and nanotechnology. MAX IV is the largest and most ambitious Swedish investment in national research infrastructure. It is the brightest source of x-rays worldwide, inaugurated June 2016. MAX IV Laboratory is hosted by Lund University.