MS41-1-1 SOLEIL ongoing development using industrial robots for beamline automation
#MS41-1-1

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Abstract
SOLEIL [1] already provides a large variety of experimental techniques and sample environments to its user communities throughout its 29 beamlines. Looking towards the future, SOLEIL teams are currently working towards a technical proposal of an ambitious upgrade of SOLEIL [2], aiming at an improvement in brilliance, coherence and flux. The upgrade of the facility will be accompanied by the offer of new access mode to benefit efficiently from these new performances.
Following actual trends, the new sources will bring up a data deluge especially resulting from multi-technique, fast 2D detectors, and automatization improvement. To address these scientific challenges, a Data-driven approach has been adopted as strategy in technical and scientific fields. In this perspective, new automated processes are currently under development involving industrial robot [3] to improve samples throughput or to manipulate the detectors in multiple positions through large working spaces and complex end-stations. These new applications can benefit from robotization, in particular for diffraction techniques This automatization will integrate Artificial Intelligence (AI) algorithms to complete acquisition scanning technics allowing optimization of complex feedbacks and data processing.
Over the last decade, the beamlines such as PROXIMA1[4] and PROXIMA2[5] at SOLEIL, for macromolecular crystallography, have implemented industrial robots with their dedicated control system. Recently, a SOLEIL standard to integrate STAUBLI [6] robots into TANGO [7] control system has been built and is ready to be declined in the applications identified in the roadmap. A first system for picking and placing samples has been deployed in the powder instrument at CRISTAL [8] beamline. Currently under commissioning, another robot to automate the positioning of a detector was installed at the NANOSCOPIUM [9] beamline in order to add wide-angle nano-diffraction to its X-ray imaging modalities.

References
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