

SOLEIL II: Towards a major Transformation of the Facility



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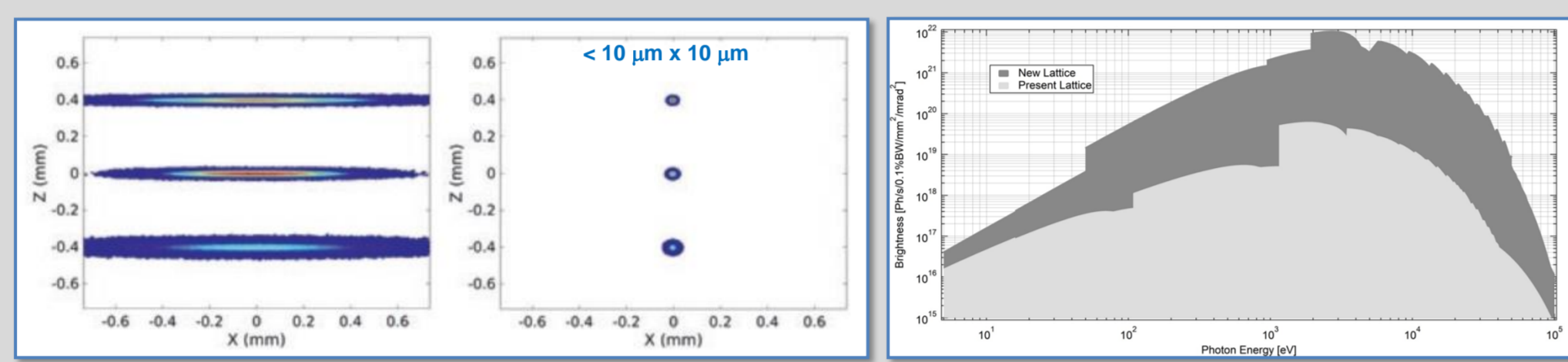
SOLEIL II project

Major Upgrade of the Accelerators and Beamlines addressing new scientific and societal challenges:



• Better performance for Accelerators and photon sources

Parameters	SOLEIL L	SOLEIL II
Energy (GeV)	2.75	2.75
Circumference (m)	354.10	353.97
Maximum beam current (mA)	500	500
Lattice type	DBA	7BA-4BA
Natural emittance (pm.rad)	3,900	83

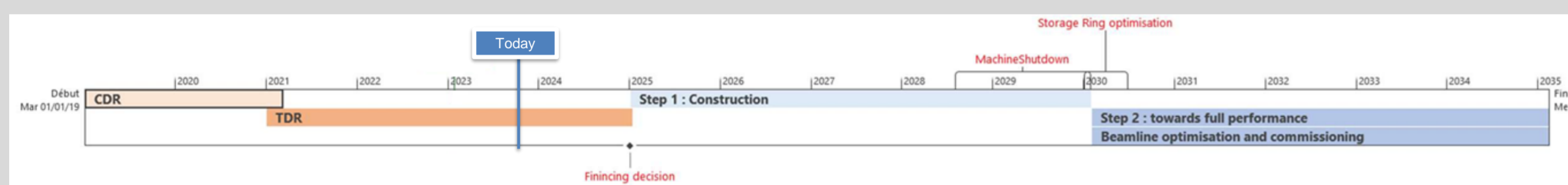


Parameters

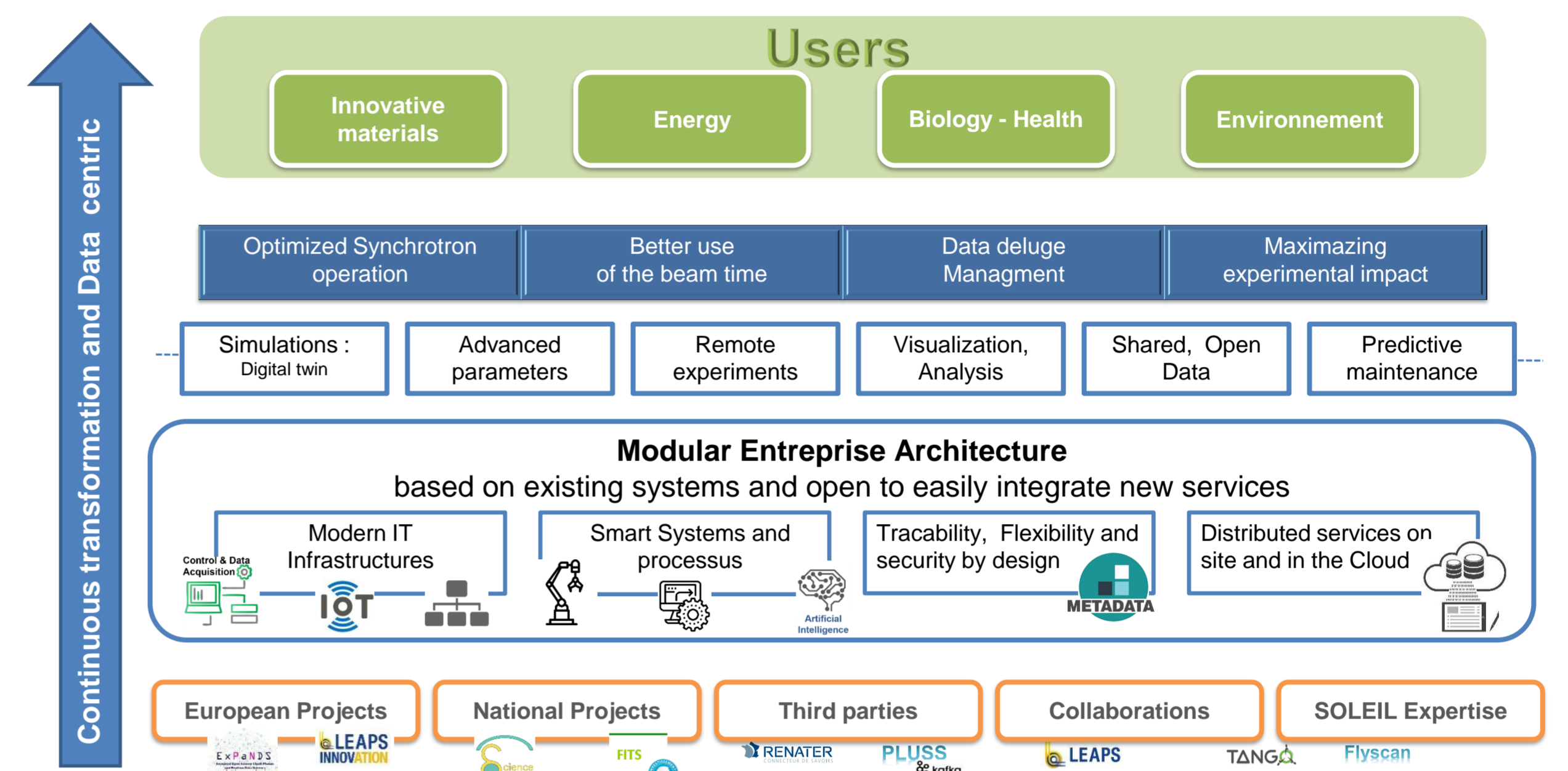
Beam sizes

Brilliance

• Schedule



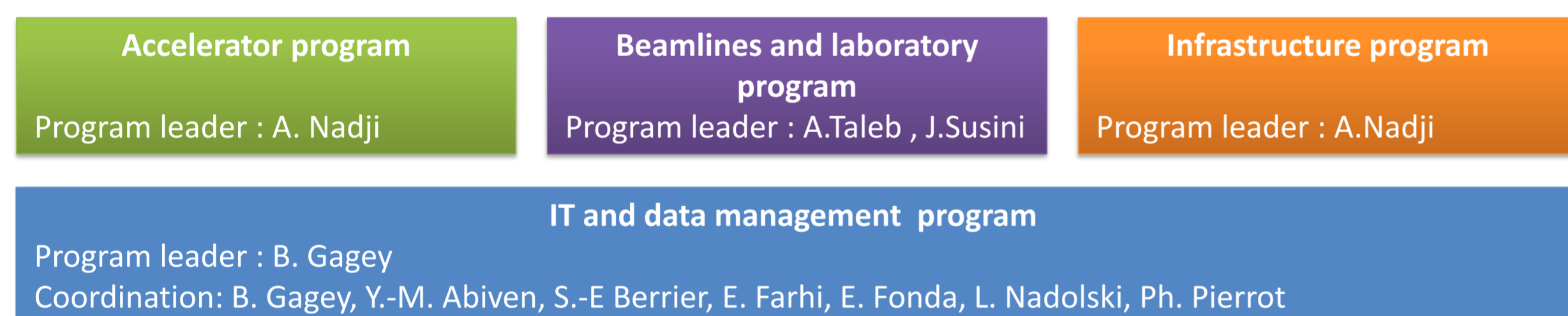
User and Data Centric Approach



Digital Transformation including:

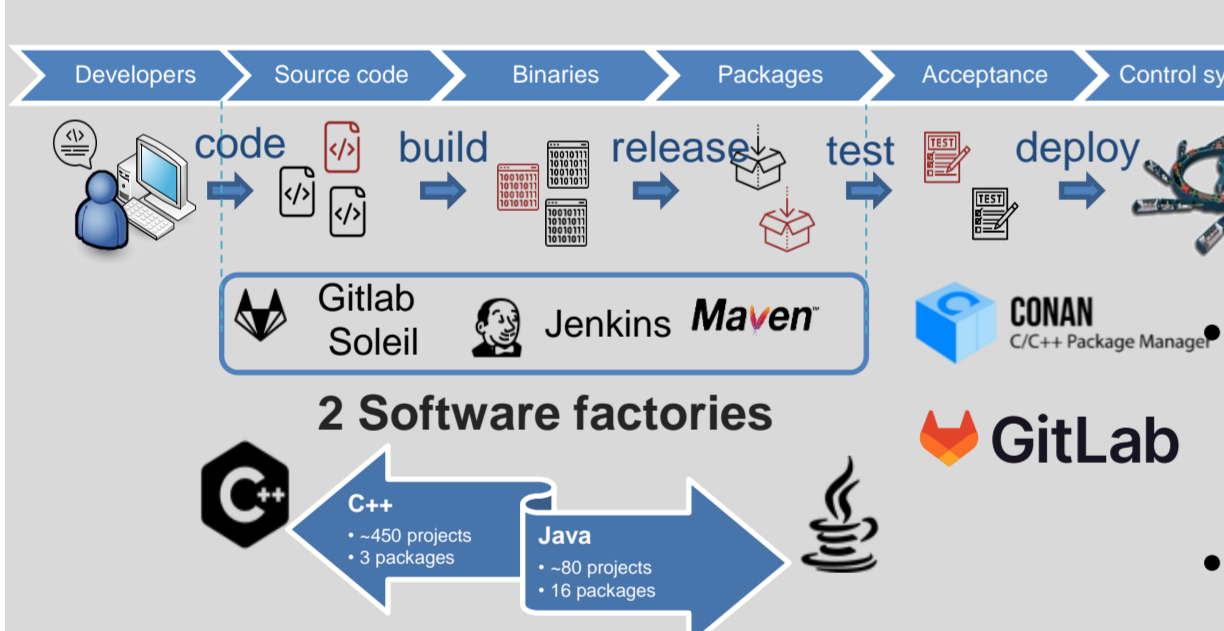
- Transversal enterprise architecture
- Integration of cloud solutions
- Improving on-premise and externally hosted HPC and data curation solutions
- Developing Artificial Intelligence for data processing, control and operational intelligence

IT and Data management program: Organization and Work in progress



- Transverse program of SOLEIL Upgrade to support Accelerators, infrastructure and Beamlines programs with close interactions.
- Transversal cross-disciplinary organization involving accelerators, scientific and computing teams.
- Program managed by a steering committee which reports to SOLEIL's Directors board.
- 6 work packages each one led by a duo. 32 sub-tasks addressed to improve Organization, Control Architecture, future Operation, Data Acquisition, User Experience, New Data processing including AI.

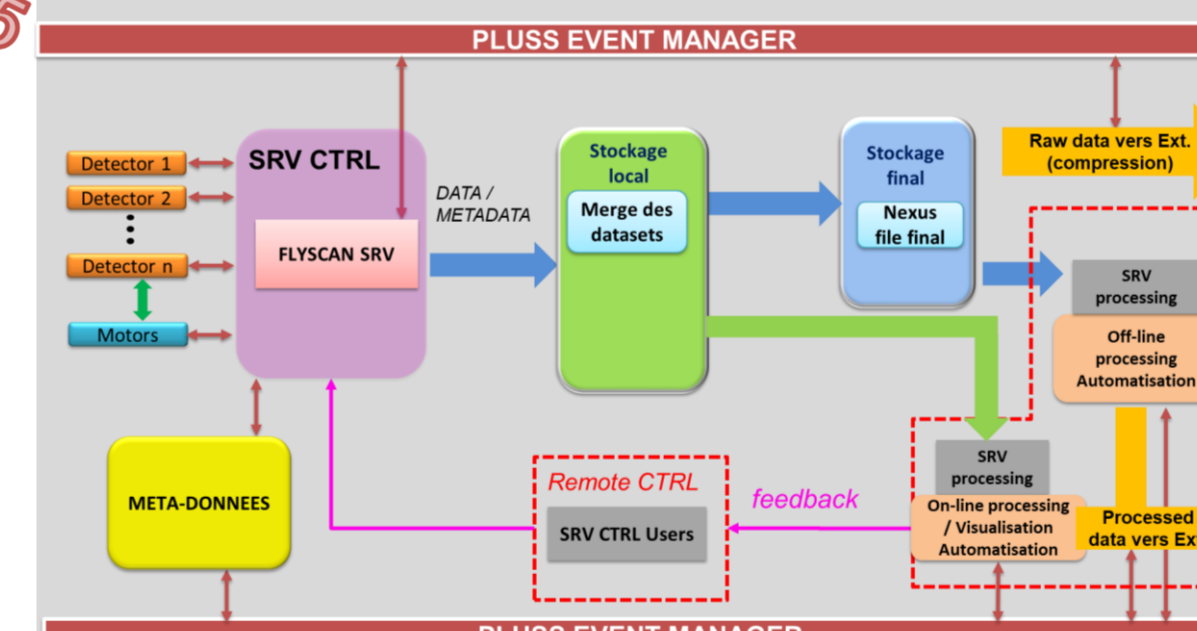
SPT1 – Organisational Tools and methods



- Methods and tools to establish common practices and efficient communication: Gitlab available for development. Staff training in progress, Software factory upgrade, JIRA and Confluence.
- Development of automated tools for continuous delivery, maintenance and failure recovering.
- Improving tools to manage Hardware and Software lifecycle, Baseline nomenclature, CMMS, PLM.

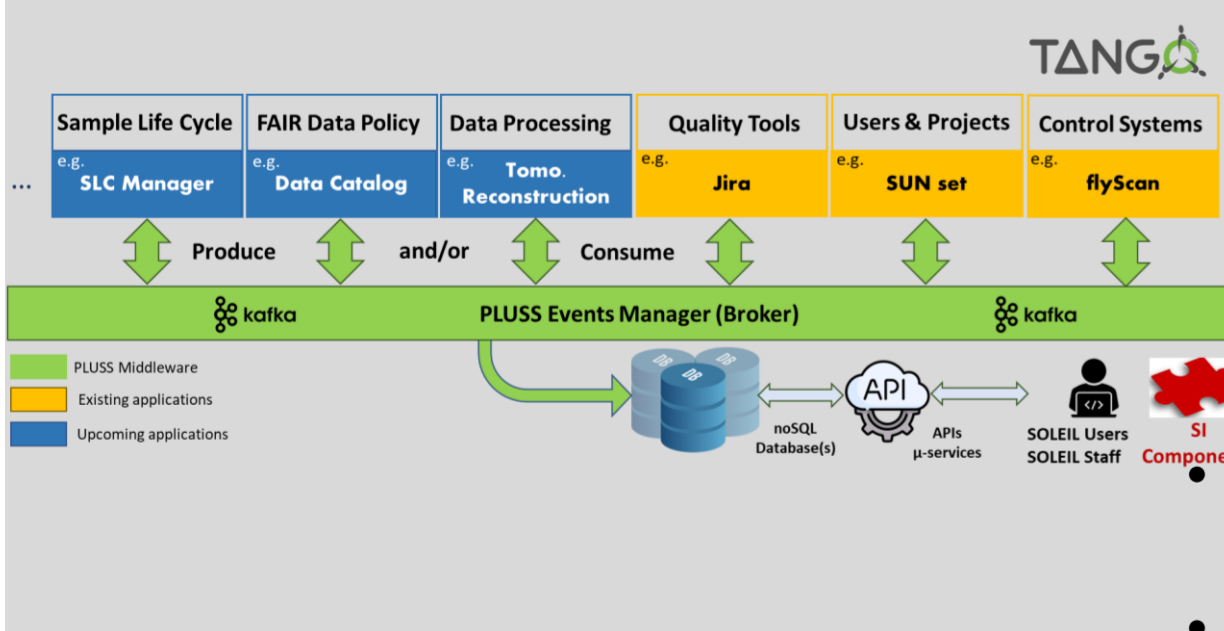
See POSTER THMBCMO15

SPT4 – Integrated Data acquisition architecture



- Data acquisition fully integrated with data processing in a microservice approach.
- Seamless access to data processing resources implementing VISA solution (PaNOSC & ExPaNDS European projects)
- Newly produced data managed on-premise while older data externally stored. Developed in the French FITS project.
- Integrated elogbook, ElabFTW or Scilog (PSI) under evaluation.

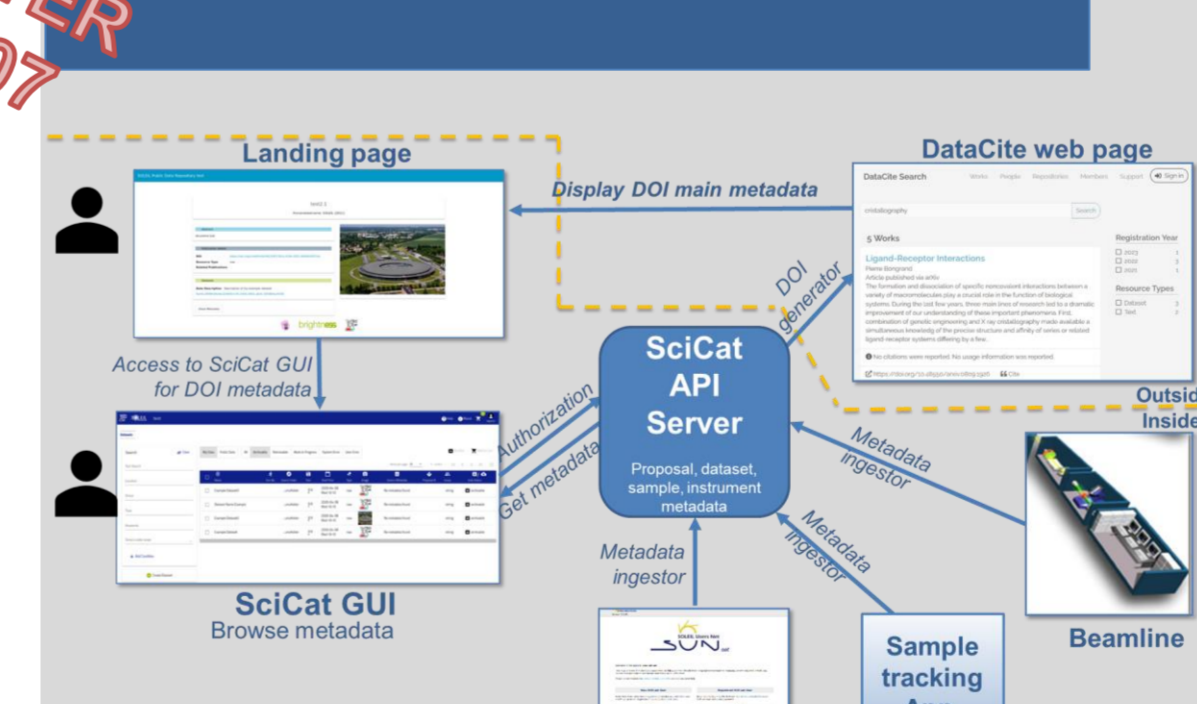
SPT2 – Infrastructure and architecture baseline



- Platform for Urbanization at Synchrotron SOLEIL
 - Scalable, reliable and event-driven data bus (Kafka broker) deployed at facility scale,
 - a features-rich API manager of data retrieval through microservices (WSO2 API manager)
- Building homogeneous Identity Access Management (IAM)
- Service-oriented approach to operate and use the control systems.

See POSTER THDP007

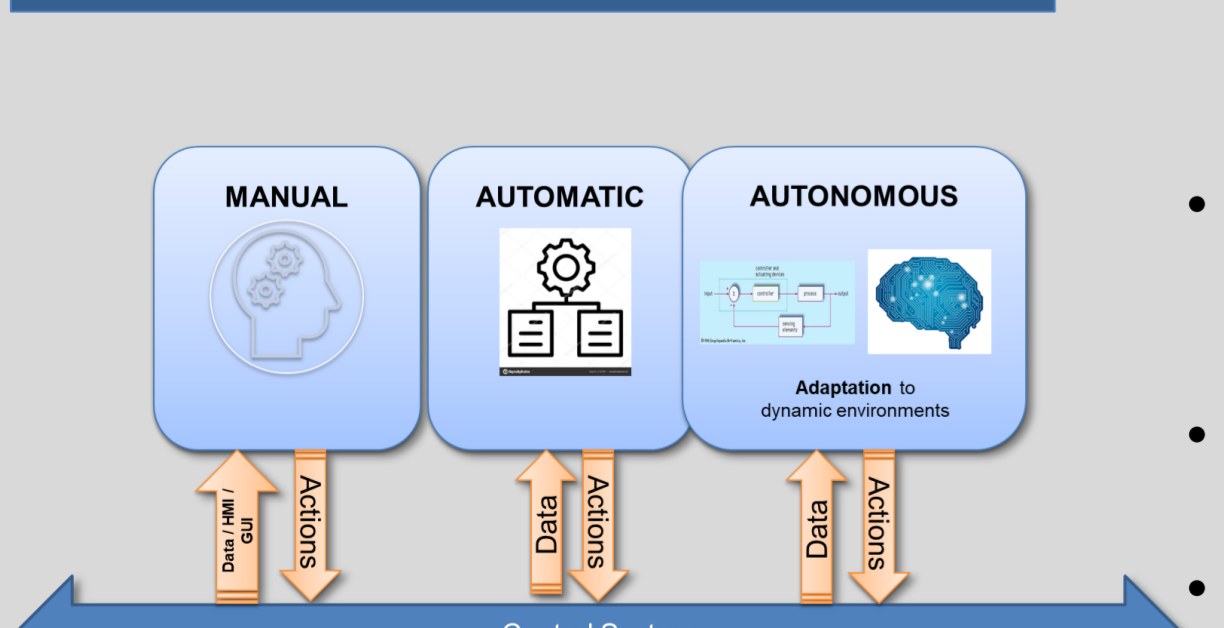
SPT5 – User experience



- Optimised user office tools
- Realtime Experiment follow-up
- Sample tracking application under development
- Support to promote Open Science, specially including the installation of SciCat data catalog at SOLEIL.
- Improving tools for managing proposals of industrial exp.

See POSTER THDP007

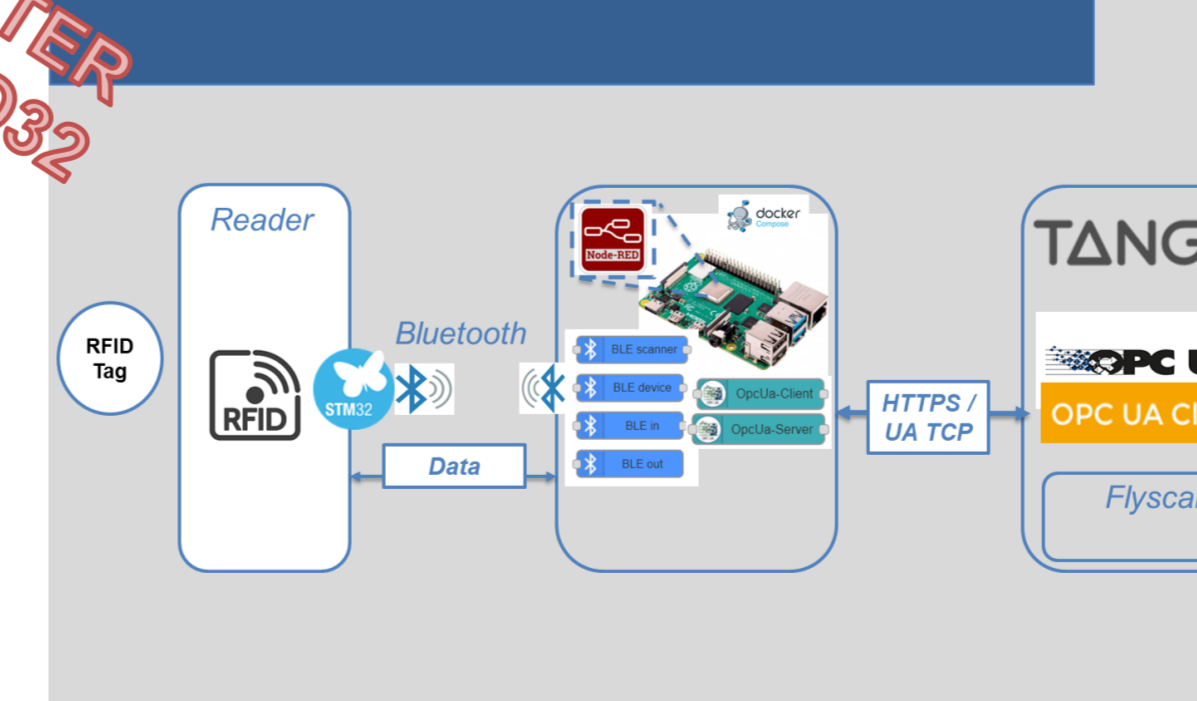
SPT3 – Enhanced architecture for future Operation



- More automatized processes such as beam and sample alignment and dynamic trajectory adaptation integrating Robotic and Vision.
- Enhanced database usage for archiving and configuration management systems
- New HMI, python or web based.
- Thanks to the 2020 lockdown period, improvement of the remote access

See POSTER THMBCMO32

SPT6 – Advanced Data processing



- Investigating AI technics: Setting an AI working group
- Investigating Big Data technics and IoT approach to improve operation
- Investigating algorithms or tools to develop operational intelligence. Use cases for instrumentation, log analysis etc. Work in progress to implement Elasticsearch
- Improving the experimental data processing for beamlines and accelerators

STATUS: IT and data management program

- Work in progress of SOLEIL II's detailed technical studies, progressively launching development projects
- Results of a first brainstorming during Conceptual Design Report work including User community <https://www.synchrotron-soleil.fr/en/news/conceptual-design-report-soleil-upgrade>
- Challenging organization to address TDR and SOLEIL daily operation.

• Open for new collaborations.

• Join us for this challenging project !

See Job offers : <https://www.synchrotron-soleil.fr/en/job-offers>

