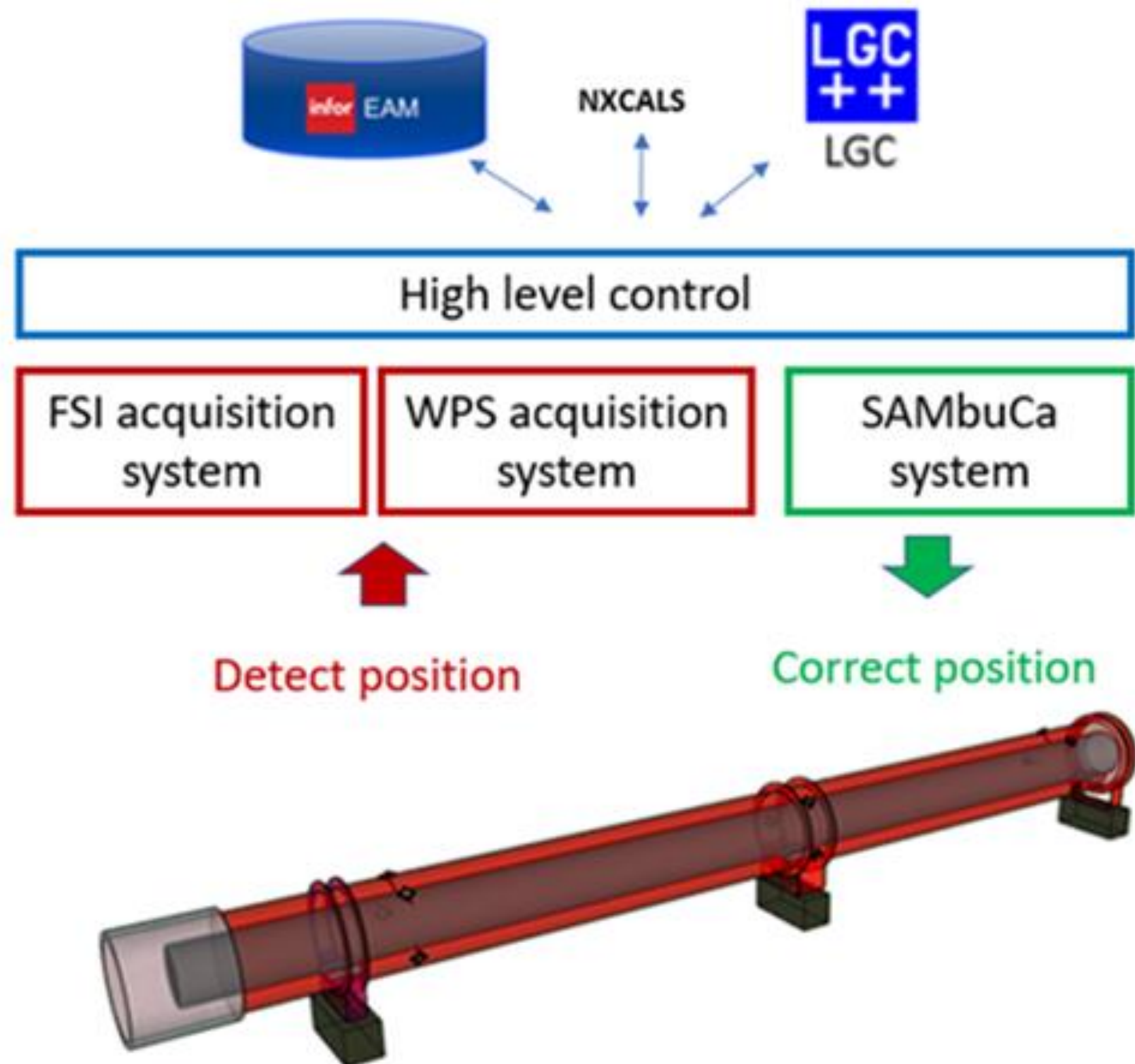


M. SOSIN, V. BARBARROUX, P. BIEDRAWA, J. CALMELS, M. DANDEKAR, J. FALCAO MACHADO, R. FERNANDEZ BAUTISTA, C. CALA FRANCO, A. HERTY, J. KAMPP, W. JASONEK, H. MAINAUD DURAND, M. NOIR, B. PUDLO, V. RUDE, P. SARVADE, CERN, Switzerland

Full Remote Alignment System (FRAS) to minimize radiation exposure to personnel



Full strategy put in place to qualify FRAS

- Development & preparation of FRAS:
 - Definition of responsibilities
 - Detailed definition of interfaces
 - Deliverables and milestones
 - Qualification of solutions on individual test setups
 - Cross-comparison between alignment solutions

FRAS qualification on 1 single component [2023-2024]

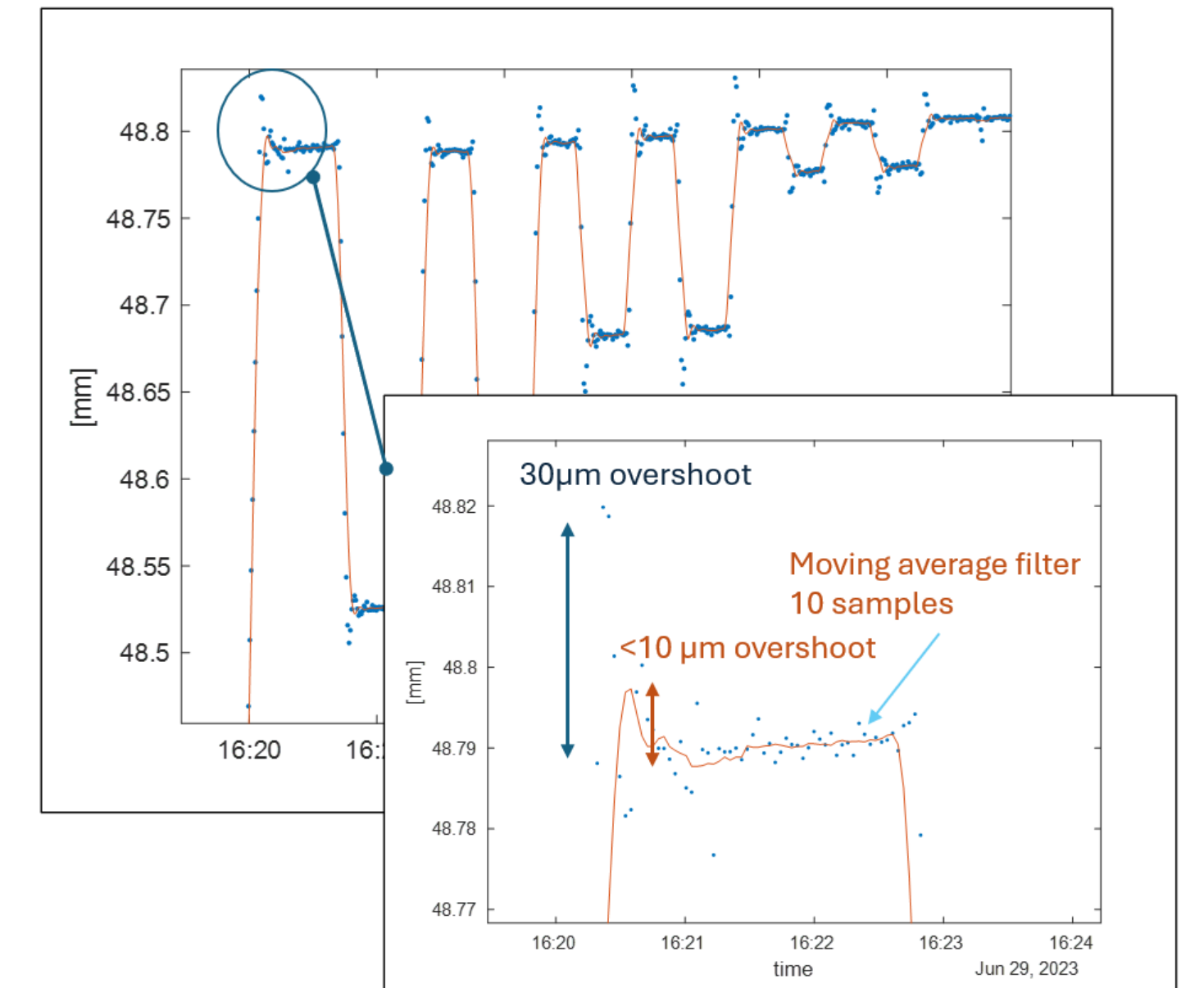
FRAS qualification on IT String Test[2024-2025]

Installation, commissioning and operation in the LHC [2027+]

76 components 344 motors 1150 sensors

Lessons learned:

- Validation of FRAS sub-components integration, installation procedures and networks routing
- System commissioning and rehearsal platform for control system upgrades
- FSI-based dynamic response tests.



FRAS qualification on 1 single component

Least squares real-time adjustment software tests

