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SLS 2.0 beamline upgrade experience: navigating modernization, legacy, and commissioning constraints

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After successfully reaching the key milestones of the SLS 2.0 machine upgrade, focus and prioritization have shifted to the beamline upgrades. These have been structured into three distinct phases. In the “pre-dark time” Phase 0, core technical solutions and controls hardware portfolio were validated on selected beamlines. We are currently finalizing the upgrades for Phase 1 beamlines, while preparations for Phase 2 —scheduled for 2026 —are gradually ramping up. In this contribution, we first reflect on the Phase 1 commissioning deliverables and assess how far we could implement the originally proposed control system upgrade strategy, particularly regarding hardware modernization and the coexistence with legacy components. Second, we analyze the impact of resource and time constraints on our commissioning activities. Delays in the prerequisite steps for control system commissioning (device list provision, schematic design, hardware assembly, testing, installation and cabling) largely due to limited capacity in infrastructure groups, ultimately resulted in a significantly compressed commissioning window during a critical project phase. We discuss adopted mitigation strategies - including pre-commissioning using test systems, solution standardization efforts, task prioritization driven by the minimum viable product (MVP) delivery, and strong cross-team coordination activities. These insights offer practical lessons for managing the coming SLS 2.0 Phase 2 beamline upgrades.

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Author: CELCER, Tine (Paul Scherrer Institute)

Presenter: CELCER, Tine (Paul Scherrer Institute)

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