

# WP 11 - Controls and Safety

DOMINIK PERUŠKO



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101008548

# WP11 - Participants

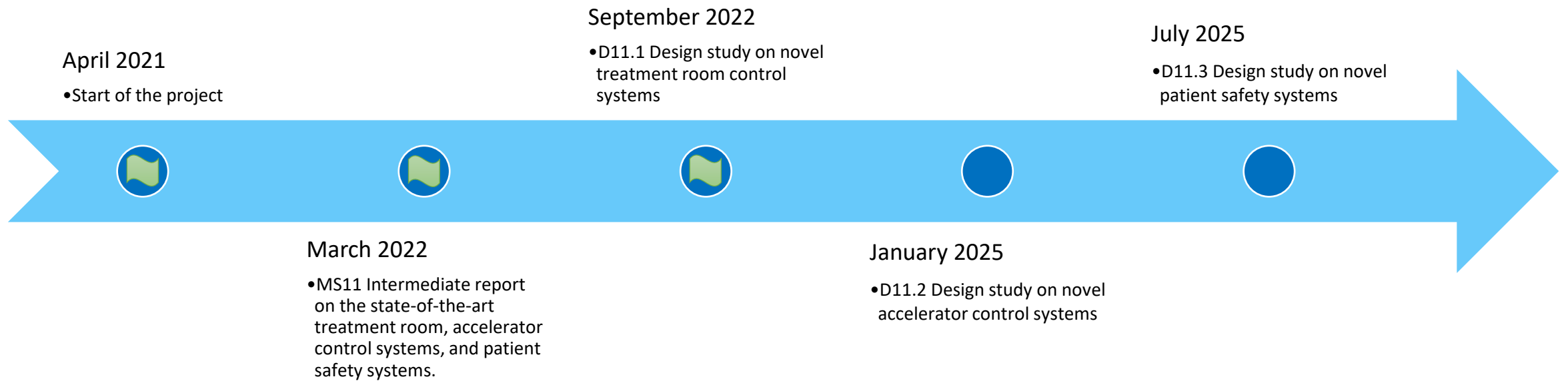
- Cosylab (CSL) – WP *Lead*
- MedAustron (MEDA)
- Inštitut Jožef Stefan (IJS)
  - South East European International Institute for Sustainable Technologies (SEEIIST)



# WP11 - Tasks

- Task 11.1: Technical Coordination (CSL)
- Task 11.2: Machine controls (CSL, MEDA, SEEIIST [IJS])
- Task 11.3: Treatment room controls (CSL, MEDA)
- Task 11.4: Patient safety systems (MEDA, CSL)

# WP11 - Roadmap

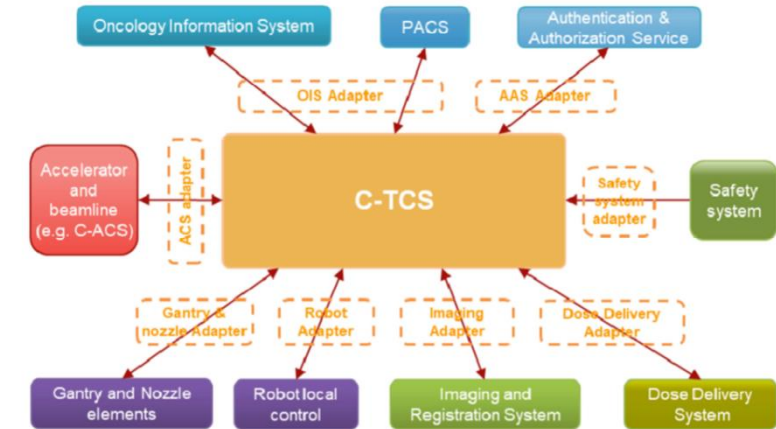


# WP11 - Work done, and in progress

- Delivered and accepted Milestone 11.1 report
- Delivered and accepted for D11.1
- Collaboration with impact and dissemination
  
- As planned, large gap between D11.1 (Sep 2022) and D11.2 (Jan 2025)
  - RP2 quiet period for WP11 – work will ramp up now in RP3
  - WP11 Leader: Mariano Cecowski → Dominik Peruško
  - Planning and drafting for D11.2 (ACS Study, M46 / Jan 2025) and D11.3 (Safety System Study, July M52)

# D11.1 (TCS Design Study) Overview

- Functional and non-functional requirements based on:
  - State-of-the-art systems such as MedAustron and experience by Cosylab
  - Requirements gathering workshops
    - Open to HITRIplus members
    - Go through clinical and non-clinical workflows, focusing on a single session
- Design solutions, addressing requirements:
  - Distributed systems favored over monolithic solutions, decoupling of components
  - Adaptability and flexibility (to support varying equipment/workflows between TRs/centers)
  - Technology stack



# Action plan for the WP11 (final two deliverables)

- Focused workshops with members from WPs with impact on ACS and Safety Systems:
  - WP7 (Advanced accelerator and gantry design) – improving injection, synchrotron and beamline/gantry performance with technical features of the control system.
  - WP9 (Advanced beam delivery) – upright patient positioning and arc therapy (synchronization of accelerator/beam-delivery with rotating gantry/patient support).
  - WP10 (Multiple energy extraction) – control system features, needed for multiple energy extraction (real-time data processing and control, reaction times, control system architectural approaches).
- Scheduling workshops in the next months (until end of September)
- **Call to Action:** if you see your work impacting ACS and Safety System, let me know to include you!

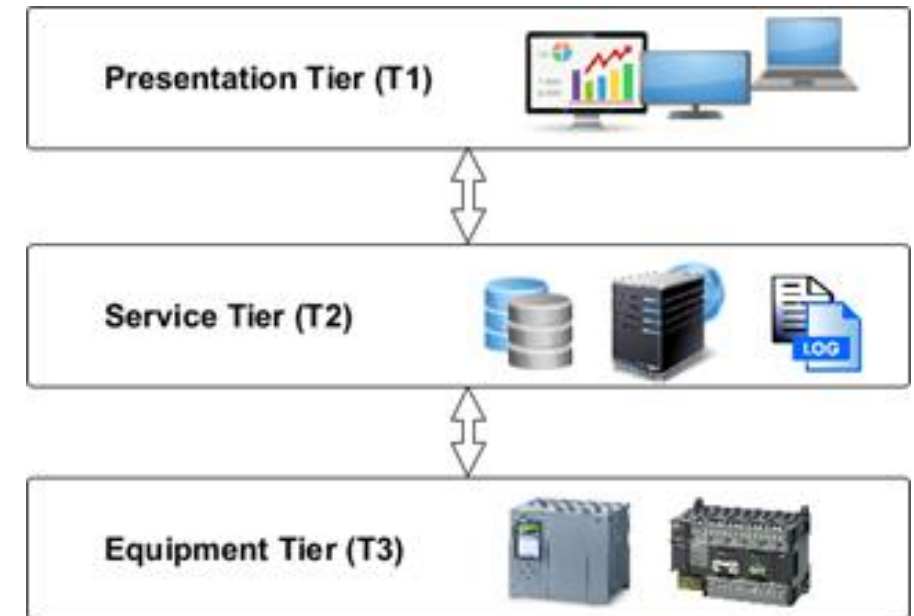
# Action plan for the WP11 (final two deliverables)

- Other inputs
  - Milestone 11.1 - Intermediate report on the state-of-the-art treatment room, accelerator control systems and patient safety systems
  - Best practices from WP members (CSL, MEDA, IJS)
    - Include inputs from IBA SA on best practices and state-of-the-art
  - HITRIplus seminars and workshops (as source of requirements)



# WP11 – Focus for Design study on novel ACS

- Modular front-end controllers:
  - Spatial distribution (synchrotron, beamline, gantry) & central control
  - Various functional, interface and timing characteristics of controlled devices
  - Upgrade with new functionality (long system lifetime)
- Core services:
  - Interface with Treatment Control System, abstraction and automatization of ACS operation
  - Logging
  - Alarming
  - Archiving
  - Configuration Mgmt.
  - Save & Restore, Commissioning Tools (automatization)
- Presentation (UI) layer:
  - Multiple user types (operators, service engineers, beam physicists)
  - Easy estimation of overall device state & Access to low-level data (GUI, logs)
  - Access from hand-held devices



# WP11 – Focus for Design study on novel ACS

- Synchronization: timing system (ns level control)
  - Front-end hardware to support implementation of a TS
- On-line calculations on front-end controllers (performance)
- Data transfer and storage performance
- Operation modes (treatment, service, machine/clinical QA)
- Long-term operation:
  - Availability of hardware
  - Long-term support
  - Modular HW Interfaces, standardized HW/SW interfaces and standardized HW platforms
- Safety, Reliability and Up-time
  - Availability of data for analysis and predictive maintenance
- Cost-effectiveness: re-use of already developed SW and HW
- Certification as part of a medical device

The Design Study will propose the design approaches, architecture and technology stack that will address all of the mentioned issues.

# THANK YOU

dominik.perusko@cosylab.com

---

