

WP 11

JRA5 - Controls and Safety

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WP 11

WP Number: WP11

WP Title: JRA5 - Controls and Safety

Lead beneficiary: Cosylab d.d.

Person months: 29.00

Start month: 1

End month: 48

OBJECTIVE

The goal of this WP is to analyse and determine the best solutions for an upgrade of current and future facilities in terms of performance and cost. Using experience from past research results in previous projects, as well as clinical users' experience, future trends and market needs, a novel design for the control software and safety systems will be elaborated. Existing state-of-the-art solutions for machine and treatment room controls and patient safety systems will be used as baseline on top of which novel solutions will be proposed – unique solutions which will facilitate both research and clinical users at the same time.

WP 11 - PARTNERS

- Cosylab, Control system laboratory, d.d., Slovenia – WP coordinator



- EBG MedAustron GmbH, Austria



- J. Stefan Institute, Slovenia



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Wp 11 - TASKS

Task 11.1: Technical Coordination (Cosylab)

Task 11.2: Machine controls (Cosylab, MedAustron, IJS)

Task 11.3: Treatment room controls (Cosylab, MedAustron)

Task 11.4: Patient safety systems (MedAustron, Cosylab)

Task 11.1: Technical Coordination

This Task concerns the coordination between different tasks and the incorporation of inputs from other WPs as well as transfer of WP-results (Cosylab). This Task will also provide input in an industry workshop to make sure the design directions defined in the tasks can be well integrated in the EU industry in terms of design and manufacturability at affordable cost.

Task 11.2: Machine controls

Concepts and solutions will be studied to ensure fast commissioning and machine QA, ease of use by non-clinical personnel, high reliability of the accelerator and lowering of the total operational costs (Cosylab). This will be achieved by concentrating on the design of a “future proof” control system architecture, which will facilitate both clinical and research requirements (MedAustron, IJS). Specifically, Cosylab will leverage upon the best concepts from the state-of-the-art solutions used in other facilities (both research and clinics). This task will result in a set of system engineering requirements and a multi-tier control system architecture.

Collaborating partners: Cosylab, MedAustron, SEEIIST [IJS]

Result: deliverable D11.1: Design study on novel accelerator control systems

Task 11.3: Treatment room controls

This Task will propose solutions to increase patient safety, increase treatment quality (adaptive treatment workflow), lower the total treatment time, and ensure easy operation by clinical personnel (Cosylab). This task will first study all possible treatment room control systems in existence today (and in the near future). Then it will propose a treatment control system which will make it easy to integrate all those together and be used ergonomically by the radio-therapy technicians (MedAustron, Cosylab). Making the system simpler, medically safe and easier to integrate will lower the cost of the treatment room software by an estimated 30% and improve treatment availability by as much as 20%. This task will result in system engineering requirements and a treatment control system architecture and design. The results will not only benefit future facilities, but all collaborators of HITRIplus project who are treating patients (CNAO, MedAustron, UKHD/HIT, etc.).

Collaborating partners: Cosylab, MedAustron

Result: deliverable D11.2: Design study on novel treatment room control systems

Task 11.4: Patient safety systems

Task will propose comprehensive system engineering requirements as well as design and architecture for safety systems relevant for safety as required by European regulations, in particular related to patient safety (MedAustron). The aim is: (1) to match the performance of such systems to the performance of the accelerator design; (2) a sustainable architecture with respect to expected technical and medical development over the lifetime of a heavy ion beam therapy system; (3) low complexity; (4) low effort for maintenance and operation; (5) low investment costs. Applicable international standards will be considered, e.g.: IEC 60601-1; IEC 60601-2-64; IEC 60601-1-2; IEC 60601-1-6; IEC 60601-1-8; IEC 62304; IEC 82304; IEC 62366-1; IEC 61217. The work is based on MedAustron's and Cosylab's experience in design and clinical operation of such systems. Experience of other partners within the HITRIplus community will be included. The results of this task are relevant for WP7, WP10, WP11 and are also directly relevant to all other HITRIplus partners who are treating patients like CNAO; MedAustron and UKHD/HIT.

Collaborating partners: MedAustron, Cosylab

Result: deliverable D11.3: Design study on novel patient safety systems

WP 11 - DELIVERABLES

Task 11.1: Technical
Coordination (Cosylab)

Task 11.2: Machine controls
(Cosylab, MedAustron, IJS)

Task 11.3: Treatment room
controls (Cosylab, MedAustron)

Task 11.4: Patient safety systems
(MedAustron, Cosylab)

- D11.1: Design study on novel accelerator control systems

- D11.2: Design study on novel treatment room control systems

- D11.3: Design study on novel patient safety systems

WP 11 - DELIVERABLES

Deliverable Number	Deliverable Title	Due Date (in months)	Description
D11.2	Design study on novel treatment room control systems	18	Design novel treatment control system, which will increase patient safety, increase treatment quality, lower the total treatment time, and ensure easy operation and smooth clinical workflows.
D11.1	Design study on novel accelerator control systems	46	Design novel accelerator control system with standard multi-tier control system architecture, based on flexible and maintainable off the shelf platform(s).
D11.3	Design study on novel patient safety systems	46	Design novel patient safety system, which will especially focus on: matching performance of the patient safety system; developing a sustainable; low complexity; low effort for maintenance and operation low investment costs.

WP 11 - MILESTONE

Milestone number	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS11	Intermediate report on the state-of-the-art treatment room, accelerator control systems, and patient safety systems.	Cosylab	12	The milestone M11.1 will be reached when the intermediate report on the state-of-the-art treatment room, accelerator control systems, and patient safety systems will be prepared. Within this report, the analysis of the technologies and solutions will be prepared.

WP11 effort by partners

Partner number and short name	WP11 effort
6 - COSYLAB	23.00 MM
10 - MEDA	4.00 MM
13 - SEEIIST (IJS)	2.00 MM
	Total: 29.0 MM

Thank you!

