DRD8 Kick-off Meeting:
WP4 – Design & Qualification Tools

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Introduction

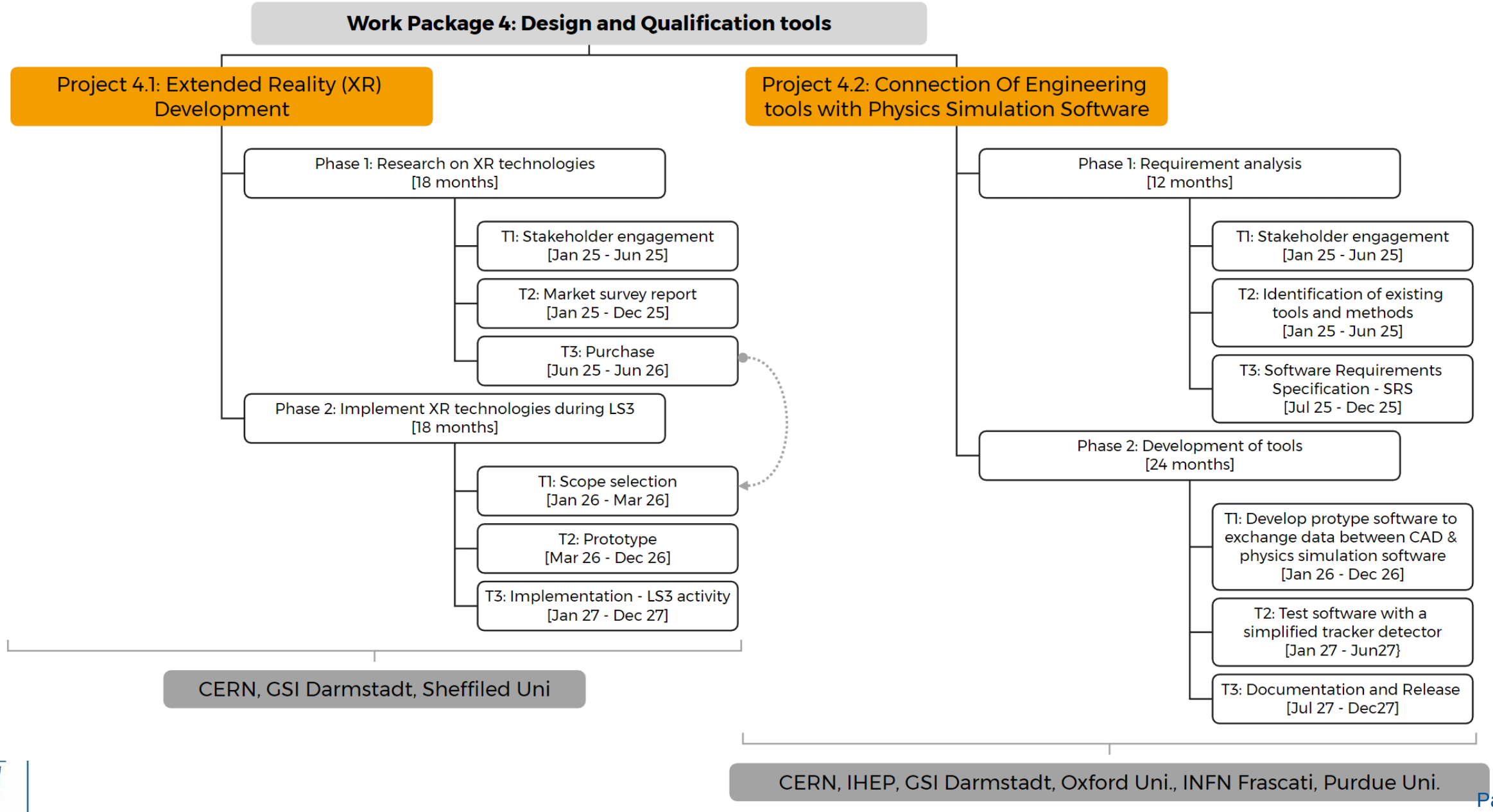
- WP4 aims to develop new tools and approaches to improve how we design and build detectors
- Enhance the entire design cycle for detectors, from the early conceptual phase to the final installation, maintenance and decommissioning
- Initial activities of DRD8-WP4 will focus on two projects for the next 3 years:
  1. **Extended Reality (XR) Development for Detector Design**
  2. **Connection of Engineering Design Tools with Physics Simulation Software**

DRD8-WP4 Projects

- **Project 4.1: Extended Reality Development Programme**
  - Objective: Investigate the adoption of Extended Reality (XR) technologies for the design, construction and interaction with detectors
  - Detector design, and particularly activities in experimental areas (e.g. installation, maintenance, decommissioning) could benefit greatly of Augmented Reality (AR), Virtual reality (VR) and Mixed Reality (MR) technologies (potential synergies with Project 1.2)

- **Project 4.2: Connection between Engineering & Physics Simulation Software**
  - Objective: Automatise data transfer between CAD design tools and physics simulation software (e.g. GEANT4, FLUKA)
  - Eliminating the need to introduce manually the detector geometry and material information in physics software will shorten the design times, minimise errors and allow for more realistic detector descriptions

DRD8-WP4 Projects



DRD8-WP4 Projects: Proposed Timeline

Project	Phase	Task	2025				2026				2027			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
4.1	1	T1: Stakeholder Engagement												
		T2: Market Survey												
		T3: Purchase												
	2	T1: Scope Selection												
		T2: Prototype												
		T3: Implementation												
4.2	1	T1: Stakeholder Engagement												
		T2: Identification existing Tools												
		T3: Software Requirement Specs												
	2	T1: Development Prototype Software												
		T2: Test with Simplified Detector												
		T3: Documentation & Release												

DRD8-WP4 Participants

- Comparatively short list of participating institutes in WP4; person power must be secured for both projects
- Relatively modest funding will be needed (dedicated primarily to the acquisition of XR systems)

Project	Institute	Effort [FTE/year]	
		Available	Required
Project 4.1	CERN	0.2	1.5
	GSI Darmstadt	0.1	0.1
	Sheffield	0.1	0.1
Project 4.2	CERN	0.2	1.0
	IHEP	0.1	1.0
	GSI Darmstadt	0.1	0.2
	Oxford	0.5	0.5
	INFN Frascati	0.1	0.1
	Purdue	0.5	2.0

Please, contact us if you are interested in collaborating in any of the WP4 projects!!!

Initial Plans for Organisation

- Regular meetings
  - General DRD8-WP4 meetings (~monthly) to monitor progress/coordinate effort (target for first one in February)
  - Project specific meetings (~bi-weekly) to drive technical activities

- Early objectives:
  - Review previous/ongoing activities relevant for WP4 at participating institutes
  - Identify key people to drive the technical progress for Projects 4.1 and 4.2
  - Engage new participants

- In parallel, in the next months the conveners will hold discussions with relevant parties in the wider HEP community (e.g. TC of experimental facilities, Simulation teams)
  - Refine objectives and define specifications
  - Investigate synergies and find potentially untapped resources

DRD8-WP4 Basic Infrastructure

- DRD8-WP4 Website to help participating institutes storing and accessing all relevant project information: https://drd8-wp4.web.cern.ch/
- DRD8-WP4 Indico Area: https://indico.cern.ch/category/19436/
- DRD8-WP4 Mailing List: drd8-wg4@cern.ch
- For any questions, please contact us!
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Questions?