



**HFM**  
High Field Magnets

*HFM Annual Meeting*  
HFM master plan

G. Riddone on behalf of the  
HFM Programme Office



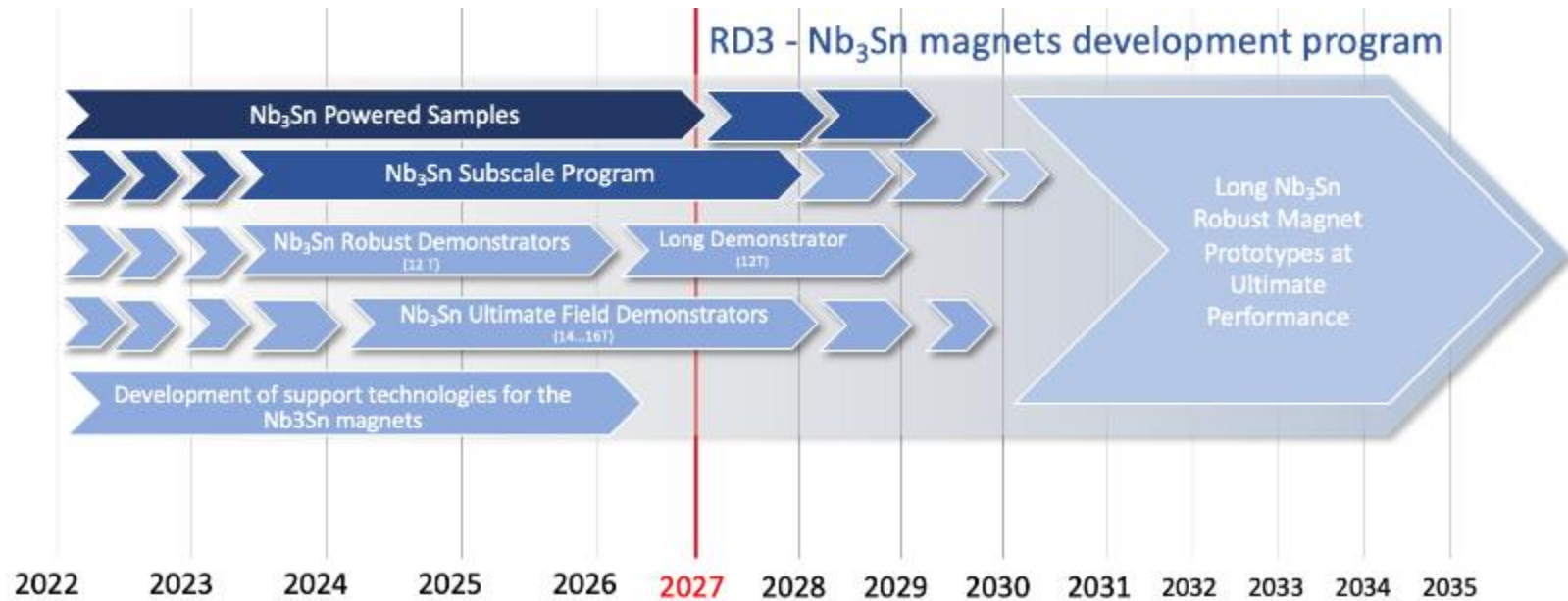
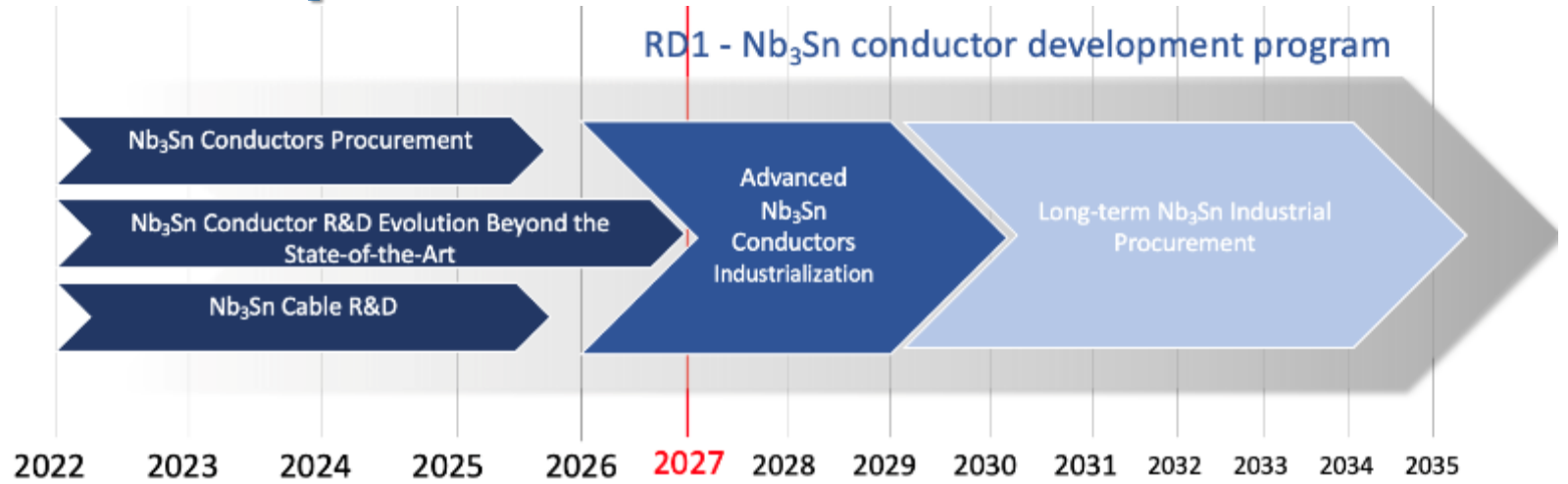
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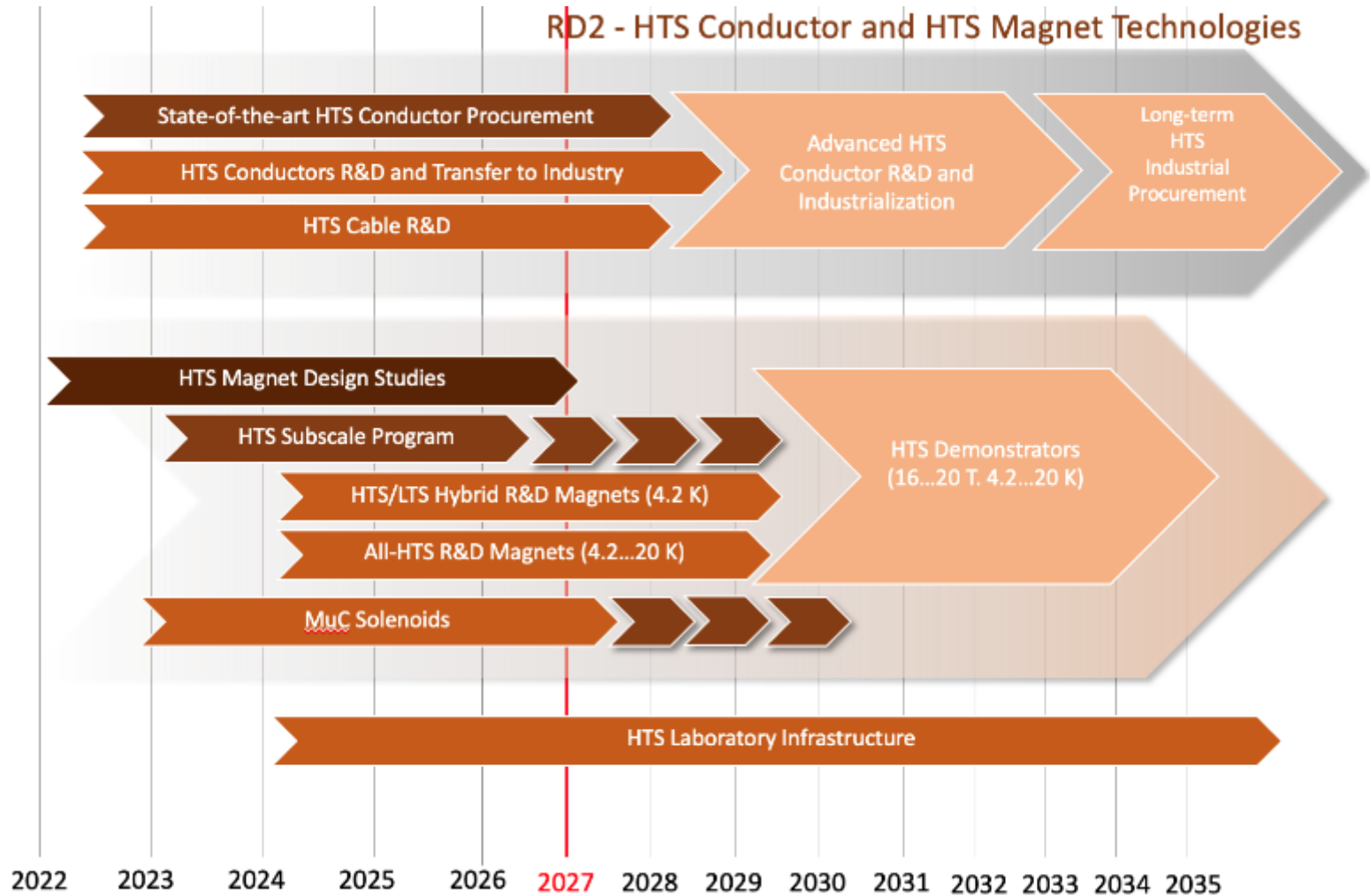


# HFM Roadmap

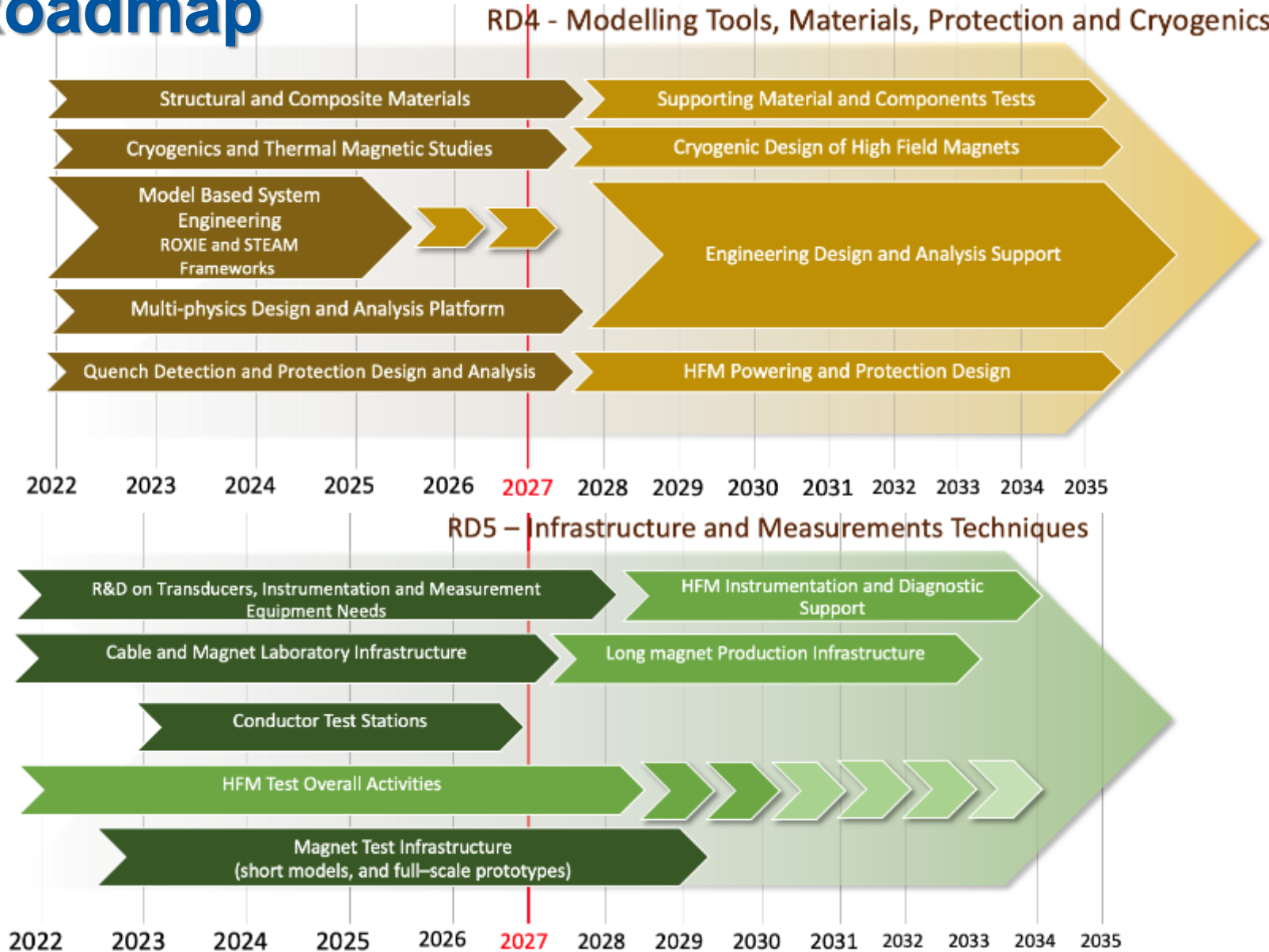
Program until 2035, focus until 2027



# HFM Roadmap



# HFM Roadmap



# Master plan



The master plan builds on the 6 RD, prepared with input from along with their respective WPs Leaders). The master plan is created using Microsoft Project with possibility to export to Excel.



The master plan provides a comprehensive view of each RD Line, outlining the Work Packages, as well as a **concise summary of the progress for each individual Work Package and for the overall programme.**



Every 6 months, the HFM Programme Office organizes a status report meetings with the WPs Leaders (CERN and collaborations) to update the master plan (percentage of completion for their WPs), highlighting the progress within the program.

Last update completed: 05.10.2023



The **Master Plan** includes details such as tasks, deliverables, project duration, start and end date, technical responsible, and the progress status of the associated Work Packages. The right side of the plan visualizes the overall timeline performance for each WP per RD Line.

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Duration	Start	Finish	Resource Names	% Complete	Status	2021		2022		2023		2024		2025		2026		2027		
									H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	
RD1	RD1	Nb3Sn Conductors	3125.71 d	Sun 02/02/20	Fri 31/12/27	C. Senatore, T. Boutboul	31%	Late															
	WP1.1	Nb3Sn conductors for high field magnets - CERN	2369.86 d	Sat 01/01/22	Fri 31/12/27	T. Boutboul	15%	Late															
	WP1.2	KE5074 BAF, Freiberg (Amend.1)	2764.57 d	Fri 01/01/21	Fri 31/12/27	S. Hopkins, A. Leineweber	100%	Complete															
RD2	WP1.3	KE4663 UNIGE (Amend.1)	1742.71 d	Sun 02/02/20	Sun 30/06/24	C. Senatore, T. Boutboul	20%	Late															
	RD2	HTS Conductors and HTS Magnet Technologies	3523.29 d	Sat 01/02/20	Sun 31/12/28	A. Kario, A. Ballarino	17%	Late															
	WP2.1	KE5283, KIT	1983.72 d	Wed 22/12/21	Wed 30/12/26	B. Holzapfel, C. Barth	12%	Late															
	WP2.2	HTS REBCO tapes, cables and associated technologies - CERN	2371.14 d	Sun 01/01/23	Sun 31/12/28	A. Ballarino	11%	Late															
	WP2.3	KE4612 UNIGE (Amend.1)	1843.43 d	Sat 01/02/20	Mon 30/09/24	C. Senatore, T. Boutboul	35%	Late															
	WP2.5	Demonstrator of the dielectric-insulated REBCO high field magnet coils - CERN	1579.86 d	Mon 01/01/24	Fri 31/12/27	A. Ballarino	10%	Future Task															
	WP2.6	HTS high field insert magnets and MuC solenoids - CERN	1744.71 d	Sun 01/01/23	Tue 01/06/27	L. Bottura	43%	Late															
	WP2.7	KE5276 Univeristy of Twente (Amend.1)	1028.71 d	Tue 23/11/21	Sun 30/06/24	A. Ballarino, A. Kario	55%	Late															
	WP2.9	Other Superconductors and low-field applications	1579.86 d	Mon 01/01/24	Fri 31/12/27	A. Ballarino	0%	Future Task															
	WP2.11	KE5647 CEA	787.43 d	Sat 01/04/23	Fri 28/03/25	A. Ballarino, T. Lecrevisse	4%	Late															
WP2.16	Laboratory Infrastructure	1579.86 d	Mon 01/01/24	Fri 31/12/27	A. Ballarino	0%	Future Task																
RD3	RD3	Nb3Sn Magnets	4312.14 d	Tue 02/01/18	Fri 01/12/28	F. Toral, D. Perini	29%	Late															
	WP3.1	Nb3Sn robust performance double aperture 12T cosθ dipole models - CERN	1613.71 d	Tue 01/03/22	Tue 31/03/26	D. Perini, L. Baudin	38%	Late															
	WP3.2	KE4102 INFN (Amend.1)	2865.57 d	Sat 01/09/18	Mon 01/12/25	S. Farinon, D. Perini	21%	Late															
	WP3.3	Nb3Sn robust performance 12T long dipole prototype - CERN	1746.43 d	Mon 01/07/24	Fri 01/12/28	A. Milanese	0%	Future Task															
	WP3.4	Development of support technologies for the Nb3Sn magnets	1877.71 d	Fri 01/04/22	Thu 31/12/26	D. Perini	16%	Late															
	WP3.5	Nb3Sn ultimate performance dipole models - CERN	2336.57 d	Sat 01/01/22	Tue 30/11/27	J. C. Perez	12%	Late															
	WP3.6	KE3782 CEA (Amend.1)	2961.43 d	Tue 02/01/18	Tue 01/07/25	E. Rochepault, J. C. Perez	82%	Late															
	WP3.7	KE3920 CIEMAT (Amend.1)	3618.14 d	Tue 02/01/18	Sun 28/02/27	F. Toral, J. C. Perez	13%	Late															
WP3.8	KE4808 PSI (Amend.2)	925.71 d	Thu 26/11/20	Fri 31/03/23	A. Milanese, B. Auchmann	100%	Complete																
WP3.12	KE5655 CEA	1943.86 d	Sat 01/04/23	Thu 02/03/28	E. Rochepault, J. C. Perez	3%	Late																
RD4	RD4	Modelling Tools, Materials Protection and Cryogenics	3127 d	Sat 01/02/20	Fri 31/12/27	S. Farinon, C. Garion	17%	Late															
	WP4.1	Common modelling and simulation tools for HFM magnets and conductors - CERN	1813.14 d	Fri 01/07/22	Sun 31/01/27	S. Russenschuck	0%	Late															
	WP4.2	Structural materials for HFM magnets - CERN	1184.43 d	Sun 01/01/23	Tue 30/12/25	C. Garion	9%	Late															
	WP4.3	Insulation materials for HFM magnet coils and conductors - CERN	2337.57 d	Sat 01/01/22	Wed 01/12/27	R. Piccin	14%	Late															
	WP4.4	KE4738 ETHZ	1644.29 d	Sat 01/02/20	Sat 30/03/24	T. Tervoort, R. Piccin	77%	Late															
	WP4.5	Quench detection, protection and diagnostic methods for Nb3Sn and HTS high-field	2501.57 d	Wed 01/09/21	Fri 31/12/27	M. Wozniak	12%	Late															
RD5	WP4.6	Cryogenic and thermal management studies for HFM magnets - CERN	2106.86 d	Thu 01/09/22	Fri 31/12/27	P. Borges de Sousa, R. van Weelderden	17%	Late															
	RD5	Infrastructures and Measurement Techniques	2141.71 d	Fri 01/07/22	Wed 01/12/27		5%	Late															
	WP5.1	Test infrastructure needs for the HFM R&D programme - CERN	2141.71 d	Fri 01/07/22	Wed 01/12/27	S. Russenschuck, F. J. Mangiarotti	5%	Late															
	WP5.2	Infrastructure needs for conductors - CERN	1976.14 d	Fri 30/09/22	Thu 30/09/27	T. Boutboul	6%	Late															
	WP5.3	Infrastructure needs for demonstrator and short magnet models - CERN	627.43 d	Thu 01/06/23	Tue 31/12/24	J. C. Perez	10%	Late															
	WP5.4	Infrastructure needs for the construction of full-scale prototypes - CERN	1352 d	Wed 01/03/23	Sat 01/08/26	A. Milanese	0%	Late															
RD6	WP5.5	Transducers, instrumentation and measurement equipment needs for the HFM R&D	1942.57 d	Sun 01/01/23	Wed 01/12/27	S. Russenschuck, L. Fiscarelli	5%	Late															
	RD6	Scientific and Societal Impact Forum	3588.86 d	Wed 01/12/21	Tue 31/12/30	E. Chesta, L. Kretzschmar	10%	Late															
WP6.1	Scientific and societal impact of the HFM R&D - CERN	3588.86 d	Wed 01/12/21	Tue 31/12/30	E. Chesta, L. Kretzschmar	10%	Late																





# Detailed planning

- Annex 1 show the **overview for each RD line** (1 to 6 with related WPs), namely:
  - plan 2021 to 2027
  - particular focus on 2023-2024
- The progress by **task/deliverables** with respect to the forecast (as defined in 2022) is also shown
  - Overall progress for the program (until 2027) ~ 21 %
- Next slides show **few typical cases**



# Overview of the RD Line 1 – WP1.1 T1 (CERN)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	2021 H1	2021 H2	2022 H1	2022 H2	2023 H1	2023 H2	2024 H1	2024 H2	2025 H1	2025 H2	2026 H1	2026 H2	2027 H1	2027 H2
RD1	RD1	Nb3Sn Conductors	Sun 02/02/20	Fri 31/12/27	C. Senatore, T. Boutboul	31%	Late	[Gantt chart bars for RD1]													
	WP1.1	Nb3Sn conductors for high field magnets - CERN	Sat 01/01/22	Fri 31/12/27	T. Boutboul	15%	Late	[Gantt chart bars for WP1.1]													
	WP1.1-T1	Wire procurement and industrialisation	Sat 01/01/22	Fri 31/12/27		15%	Late	[Gantt chart bars for WP1.1-T1]													
	WP1.1-T1-D1	Wire procurement and industrialisation	Thu 01/09/22	Wed 30/09/26		7%	Late	[Gantt chart bars for WP1.1-T1-D1]													
	WP1-T1-D1-M1	Invitation to tender: initial wire needs for WP2 and collaborations	Sat 01/04/23	Wed 31/01/24	T. Boutboul	20%	Late	[Gantt chart bars for WP1-T1-D1-M1]													
	WP1-T1-D1-M2	Acceptance testing of wire for WP2 short models and collaborations	Sun 01/09/24	Fri 28/02/25		0%	Future Task	[Gantt chart bars for WP1-T1-D1-M2]													
	WP1-T1-D1-M3	Specification of wire for 14+ T	Sun 01/01/23	Sun 30/06/24		15%	Late	[Gantt chart bars for WP1-T1-D1-M3]													
	WP1-T1-D1-M4	Invitation to tender: 12 T long models and 14+ T	Wed 01/11/23	Sun 01/09/24		0%	Future Task	[Gantt chart bars for WP1-T1-D1-M4]													
	WP1-T1-D1-M5	Acceptance testing of wire for 12 T long models	Sat 01/02/25	Wed 30/09/26		0%	Future Task	[Gantt chart bars for WP1-T1-D1-M5]													
	WP1-T1-D1-M6	Acceptance testing of wire for 14+ T	Thu 01/05/25	Thu 31/07/25		0%	Future Task	[Gantt chart bars for WP1-T1-D1-M6]													
	WP1-T1-D1-M7	Specification and procurement strategy for wire industrialisation	Thu 01/09/22	Sun 30/06/24		15%	Late	[Gantt chart bars for WP1-T1-D1-M7]													
	WP1-T1-D1-M8	Award of contracts for industrialisation and qualification of 2-4 suppliers	Mon 01/07/24	Sat 01/03/25		0%	Future Task	[Gantt chart bars for WP1-T1-D1-M8]													
	WP1-T1-D1-M9	Characterisation and analysis of industrialised wire	Mon 01/07/24	Wed 31/12/25		0%	Future Task	[Gantt chart bars for WP1-T1-D1-M9]													
	WP1.1-T1-D2	Critical current, magnetisation and stability characterisation	Tue 01/03/22	Thu 31/12/26		35%	Late	[Gantt chart bars for WP1.1-T1-D2]													
	WP1-T1-D2-M1	Self-field stability measurements of 91, 127 and 169 stack RRP wires and extracted	Tue 01/03/22	Sat 30/09/23		90%	Late	[Gantt chart bars for WP1-T1-D2-M1]													
	WP1-T1-D2-M2	Characterisation and analysis of distributed tin R&D wire	Sat 01/04/23	Fri 30/06/23		90%	Late	[Gantt chart bars for WP1-T1-D2-M2]													
	WP1-T1-D2-M3	Literature review of experimental and modelling data and methods for magnetot	Thu 01/09/22	Fri 30/06/23		20%	Late	[Gantt chart bars for WP1-T1-D2-M3]													
	WP1-T1-D2-M4	Experimental and computational analysis of magnetothermal stability as a functio	Thu 01/09/22	Thu 31/12/26		15%	Late	[Gantt chart bars for WP1-T1-D2-M4]													
	WP1.1-T1-D3	Microscopy, phase transformations and heat treatment optimisation	Sat 01/01/22	Fri 31/12/27		23%	Late	[Gantt chart bars for WP1.1-T1-D3]													
	WP1-T1-D3-M1	Development of software tools and machine learning for image analysis of Nb3Sn	Sat 01/01/22	Tue 31/12/24		40%	Late	[Gantt chart bars for WP1-T1-D3-M1]													
	WP1-T1-D3-M2	Quantitative geometrical analysis, microstructural and phase transformation studi	Sun 01/01/23	Fri 31/12/27		25%	On Schedule	[Gantt chart bars for WP1-T1-D3-M2]													
	WP1-T1-D3-M3	Modelling of diffusion, phase transformations and internal oxidation processes	Tue 01/08/23	Fri 31/12/27		10%	On Schedule	[Gantt chart bars for WP1-T1-D3-M3]													
	WP1.1-T1-D4	Mechanical, thermomechanical and electromechanical behaviour of wire	Wed 01/06/22	Fri 31/12/27		9%	Late	[Gantt chart bars for WP1.1-T1-D4]													
	WP1-T1-D4-M1	Standardisation and validation of experimental techniques for assessing cabling d	Sun 01/01/23	Sat 30/03/24		45%	Late	[Gantt chart bars for WP1-T1-D4-M1]													
	WP1-T1-D4-M3	Evaluation of suitability for cabling of industrialised wire	Sun 01/10/23	Sun 30/06/24		5%	Late	[Gantt chart bars for WP1-T1-D4-M3]													
	WP1-T1-D4-M4	Modelling of wire deformation behaviour; analysis of the influence of wire archite	Sun 01/01/23	Wed 31/12/25		10%	Late	[Gantt chart bars for WP1-T1-D4-M4]													
	WP1-T1-D4-M5	Development of sampleholder (e.g. Walters spring) for testing under axial strain	Sat 01/06/24	Tue 30/12/25		0%	Future Task	[Gantt chart bars for WP1-T1-D4-M5]													
	WP1-T1-D4-M6	Measurements of Ic vs. strain for procured and R&D wires	Tue 30/12/25	Thu 31/12/26		0%	Future Task	[Gantt chart bars for WP1-T1-D4-M6]													
	WP1-T1-D4-M7	Database and critical review of CERN and literature data concerning the response	Wed 01/06/22	Sun 30/06/24		5%	Late	[Gantt chart bars for WP1-T1-D4-M7]													
	WP1-T1-D4-M8	Microscopy and quantitative analysis of cracks and voids in strands after applicat	Sat 01/04/23	Fri 31/12/27		5%	Late	[Gantt chart bars for WP1-T1-D4-M8]													
	WP1.1-T1-D5	Technology development for high Ic wire	Sat 01/01/22	Tue 31/12/24		4%	Late	[Gantt chart bars for WP1.1-T1-D5]													
	WP1-T1-D5-M1	Analysis of internal oxidation wire samples from collaborations	Sat 01/01/22	Tue 31/12/24		10%	Late	[Gantt chart bars for WP1-T1-D5-M1]													
	WP1-T1-D5-M2	Review of evidence for Nb alloying and oxygen source effects on Ic; recommenda	Sun 01/01/23	Sun 30/06/24		0%	Late	[Gantt chart bars for WP1-T1-D5-M2]													
	WP1-T1-D5-M3	Literature review of strengthening and reinforcement methods, and estimation o	Wed 01/03/23	Sun 30/06/24		0%	Late	[Gantt chart bars for WP1-T1-D5-M3]													
	WP1-T1-D5-M4	Experimental study of wire coatings and model samples	Mon 01/01/24	Sun 30/06/24		0%	Future Task	[Gantt chart bars for WP1-T1-D5-M4]													
	WP1-T1-D5-M5	Modelling of the impact of high heat capacity additions on wire stability, magnet	Mon 01/01/24	Sun 30/06/24		0%	Future Task	[Gantt chart bars for WP1-T1-D5-M5]													
	WP1-T1-D5-M6	Decision on approach(es) for further study: wire manufacturer collaborations, wir	Sat 01/06/24	Sun 30/06/24		0%	Future Task	[Gantt chart bars for WP1-T1-D5-M6]													



# Overview of the RD Line 3 – WP3.6 to 3.12 (CERN, CEA, CIEMAT, PSI)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	Timeline (2021-2027)											
								2021 H1	2021 H2	2022 H1	2022 H2	2023 H1	2023 H2	2024 H1	2024 H2	2025 H1	2025 H2	2026 H1	2026 H2
<b>WP3.6 KE3782 CEA (Amendm.1)</b>								<b>E. Rochepault, J. C. Perez</b>											
✓	CEA-RD-1.1	FRESCA2 second assembly	Tue 02/01/18	Thu 01/12/22	E. Rochepault, J. C. Perez	100%	Complete	[Progress bar]											
✓	CEA-RD-1.2	Third spare coil for FRESCA2	Tue 02/01/18	Thu 01/12/22		100%	Complete	[Progress bar]											
✓	CEA-RD-2.1	Adapted EuroCoil design to conductor for short dipole model magnet	Tue 02/01/18	Fri 02/12/22		100%	Complete	[Progress bar]											
✓	CEA-RD-5.1	Preliminary conceptual design report of the FCC-hh arc quadrupole magnet	Tue 02/01/18	Fri 02/12/22		100%	Complete	[Progress bar]											
✓	CEA-RD-5.2	Final conceptual design report of the FCC-hh arc quadrupole magnet	Tue 02/01/18	Fri 02/12/22		100%	Complete	[Progress bar]											
✓	CEA-RD-2.2a	11 T SMC-CEA coil	Wed 01/04/20	Sun 03/10/21		100%	Complete	[Progress bar]											
✓	CEA-RD-2.2b	R2D2 Engineering design report	Wed 01/04/20	Tue 30/01/24		80%	Late	[Progress bar]											
✓	CEA-RD-3.1a	Manufacturing of a R2D2 Cu coil	Sun 01/01/23	Sat 30/12/23		80%	Late	[Progress bar]											
✓	CEA-RD-3.1b	Support structure validation	Sun 01/10/23	Tue 30/01/24		0%	Late	[Progress bar]											
✓	CEA - RD-3.2	Manufacturing of two Nb3Sn R2D2 coils	Sun 01/10/23	Sun 30/06/24		0%	Late	[Progress bar]											
✓	CEA-RD-4.1	R2D2 magnet delivered to CERN	Sun 01/10/23	Tue 31/12/24		0%	Late	[Progress bar]											
✓	CEA-RD-4.2a	R2D2 magnet manufacturing folder	Sun 01/10/23	Sun 01/06/25		0%	Late	[Progress bar]											
✓	CEA-RD-4.2b	Cold powering test results analysis	Sat 30/09/23	Tue 01/07/25		0%	Late	[Progress bar]											
<b>WP3.7 KE3920 CIEMAT (Amend.1)</b>								<b>F. Toral, J.C. Perez</b>											
✓	UM-IO-1.1	Identification, refurbishment, and provision of building and service	Tue 02/01/18	Tue 30/01/24	F. Toral, J.C. Perez	82%	Late	[Progress bar]											
✓	UM-IO-1.2	Set-up and commissioning of the Magnet Laboratory	Tue 02/01/18	Sat 30/03/24		29%	Late	[Progress bar]											
✓	UM-IO-2.1	Production of tooling and structure for ERMIC and RMM magnets	Tue 02/01/18	Sun 30/06/24		0%	Late	[Progress bar]											
✓	UM-IO-2.2	Production of practice coils	Tue 02/01/18	Mon 30/12/24		10%	Late	[Progress bar]											
✓	UM-IO-3.1	High field magnet demonstrator: detailed design	Tue 02/01/18	Mon 30/12/24		5%	Late	[Progress bar]											
✓	UM-IO-3.2	High field magnet demonstrator: design and procurement of the tooling	Tue 02/01/18	Thu 30/10/25		0%	Late	[Progress bar]											
✓	UM-IO-3.3	High field magnet demonstrator: manufacturing of the coils	Tue 02/01/18	Tue 30/06/26		0%	Late	[Progress bar]											
✓	UM-IO-3.4	High field magnet demonstrator: magnet assembly and participation to cold tests	Tue 02/01/18	Sun 28/02/27		0%	Late	[Progress bar]											
<b>WP3.8 KE4808 PSI (Amend.2)</b>								<b>A. Milanese, B. Auchman</b>											
✓	CH2-PSI-1.1	Laboratory building	Thu 26/11/20	Tue 01/12/20	A. Milanese, B. Auchman	100%	Complete	[Progress bar]											
✓	CH2-PSI-1.2	Commissioning reports of laboratory equipment	Thu 26/11/20	Wed 01/06/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-1.3	Cryogen-free test station upgrade commissioning report	Thu 26/11/20	Wed 01/06/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-2.1	Sample test reports	Thu 26/11/20	Sat 31/12/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-3.1	Powered- subscale sample test reports	Thu 26/11/20	Sat 31/12/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-3.2	CD2 manufacturing and test report	Thu 26/11/20	Sat 31/12/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-3.3	HFM design concept	Thu 26/11/20	Sat 01/10/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-4.1	Non-insulated round coil manufacturing and test report	Thu 26/11/20	Sat 01/10/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-4.2	Non-insulated racetrack coil manufacturing and test report	Thu 26/11/20	Sat 01/10/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-4.3	Coil-stack manufacturing and test report	Thu 26/11/20	Fri 31/03/23		100%	Complete	[Progress bar]											
<b>WP3.12 KE5655 CEA</b>								<b>E. Rochepault, J. C. Perez</b>											
✓	D1	Non-powered samples	Sat 01/04/23	Thu 02/03/28	E. Rochepault, J. C. Perez	10%	Late	[Progress bar]											
✓	D2.2.1	Debonding test	Sat 01/04/23	Sat 02/03/24		33%	Late	[Progress bar]											
✓	D2.2.2	Sample holder design	Sat 01/04/23	Sat 01/06/24		3%	Late	[Progress bar]											
✓	D3.2	Manufacturing of SMC v2 – Coil	Sat 01/04/23	Wed 02/10/24		24%	Late	[Progress bar]											
✓	D4.2.1	Manufacturing of R2D2 v2 – Coils	Sat 01/04/23	Wed 01/01/25		15%	Late	[Progress bar]											
✓	D4.2.2	Assembly of R2D2 v2 – Magnet	Sat 01/04/23	Sun 02/03/25		0%	Late	[Progress bar]											
✓	D5.1.1	Assembly of a FD Magnet v1	Sat 01/04/23	Mon 01/09/25		0%	Late	[Progress bar]											
✓	D5.1.2	Assembly of FD v1 – Magnet	Sat 01/04/23	Mon 01/12/25		0%	Late	[Progress bar]											
✓	D5.1.3	Manufacturing of FD Coils v2	Sat 01/04/23	Fri 02/07/27		0%	Late	[Progress bar]											
✓	D5.1.4	Assembly of a FD Magnet v2	Sat 01/04/23	Wed 01/09/27		0%	Late	[Progress bar]											
✓	D5.2.1	F2D2 - Engineering Design report	Sat 01/04/23	Sat 01/08/26		0%	Late	[Progress bar]											
✓	D5.2.2	Manufacturing of F2D2 – Coils	Sat 01/04/23	Thu 01/10/26		0%	Late	[Progress bar]											
✓	D5.2.3	Assembly of a F2D2 – Magnet	Sat 01/04/23	Fri 01/01/27		0%	Late	[Progress bar]											
✓	D5.2.4	R2D2/FD/F2D2 - Manufacturing folder	Sat 01/04/23	Thu 02/03/28		0%	Late	[Progress bar]											

# Summary of main deliverables during 2023-2026 as an input to the next update of ESPP (LTS)

- **Development of new HFM grade  $\text{Nb}_3\text{Sn}$  conductor** with target  $J_c$  of 1500 A/mm<sup>2</sup> @ 16 T and enhanced mechanical properties
- **Demonstration of the maturity of  $\text{Nb}_3\text{Sn}$  technology for collider-scale production through 12 T robust dipole magnet design**, including industrial processes and cost reduction:
  - INFN – 12 T FalconD single aperture short dipole model
  - CERN – 12 T Robust twin aperture short dipole model (either collared coils or bladder and key)
- **Demonstrators of the  $\text{Nb}_3\text{Sn}$  potential above 14 T**
  - CEA – FD single aperture 14 T graded conductor block coil demonstrator (no aperture)
  - CERN – 14+T block coil demonstrator (targeting 16 T)
  - CIEMAT – 14+ T common coil demonstrator
  - PSI – 14+ T common coil demonstrator with coil stress management (targeting 16 T)



# Summary of main deliverables during 2023-2026 as an input to the next update of ESPP (HTS)

- Exploration and demonstration of **suitability of state-of-the-art HTS conductors** for building accelerator magnets
  - KIT – accelerator magnet grade REBCO prototype tapes with optimized magnetization and mechanical properties
  - CERN – development of practical HTS cables
  - CEA – development of MI racetrack coil demonstrator
  - PSI – development of dielectric-insulated soldered tape-stack racetrack demonstrator with stress management
  - CERN – development of dielectric-insulated racetrack coil demonstrator



# Summary of main deliverables during 2023-2026 (modelling, protection, cryo and infrastructure)

- Database structure for material data in **Roxie** and other simulation tools
- **Structural materials** for HFM magnets
  - Inventory of material with their properties and characterization of new materials
- **Insulation materials** for HFM magnet coils and conductors
  - Characterization and development of enhanced resins and enhanced cable dielectric insulation
- **Cryogenic and thermal management studies** for HFM magnets
  - Modelling of full cold mass designs' thermal performance
- Procurement and installation on **new critical current stations**
- Procurement and installation of a **new cabling machine**
- Infrastructure needs for the construction of full-scale prototypes
  - Reaction furnace
  - Vacuum pressure impregnation station
- Measuring system for the other RD lines



# Conclusions

- The master plan is now available, and it can be found in EDMS: [2962558](#) (if issue on accessing the EDMS document, please contact the HFM Programme office)
  - main focus on 2021-2027
- The master plan details the tasks and deliverables per WP, and allows for tracking the progress (update each 6 months) for each individual Work Package and for the overall programme.
- It also allows to identify synergy across the RD lines
- Cost and schedule review will be organised next year
- *Feedback is welcome*



Thanks for your attention





# ANNEX 1



# Overview of the RD Line 1 – WP1.1 T1 (CERN)

Wc Pat	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	% Comj	Status	2023				2024			
					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
RD1	RD1	<b>Nb3Sn Conductors</b>	31%	Late								
	WP1.1	<b>Nb3Sn conductors for high field magnets - CERN</b>	15%	Late								
	WP1.1-T1	<b>Wire procurement and industrialisation</b>	15%	Late								
	WP1.1-T1-D1	<b>Wire procurement and industrialisation</b>	7%	Late								
	WP1-T1-D1-M1	Invitation to tender: initial wire needs for WP2 and collaborations	20%	Late	T. Boutboul							
	WP1-T1-D1-M2	Acceptance testing of wire for WP2 short models and collaborations	0%	Future Task								
	WP1-T1-D1-M3	Specification of wire for 14+ T	15%	Late								
	WP1-T1-D1-M4	Invitation to tender: 12 T long models and 14+ T	0%	Future Task								
	WP1-T1-D1-M5	Acceptance testing of wire for 12 T long models	0%	Future Task								
	WP1-T1-D1-M6	Acceptance testing of wire for 14+ T	0%	Future Task								
	WP1-T1-D1-M7	Specification and procurement strategy for wire industrialisation	15%	Late								
	WP1-T1-D1-M8	Award of contracts for industrialisation and qualification of 2-4 suppliers	0%	Future Task								
	WP1-T1-D1-M9	Characterisation and analysis of industrialised wire	0%	Future Task								
	WP1.1-T1-D2	<b>Critical current, magnetisation and stability characterisation</b>	35%	Late								
	WP1-T1-D2-M1	Self-field stability measurements of 91, 127 and 169 stack RRP wires and	90%	Late								
	WP1-T1-D2-M2	Characterisation and analysis of distributed tin R&D wire	90%	Late								
	WP1-T1-D2-M3	Literature review of experimental and modelling data and methods for	20%	Late								
	WP1-T1-D2-M4	Experimental and computational analysis of magnetothermal stability a	15%	Late								
	WP1.1-T1-D3	<b>Microscopy, phase transformations and heat treatment optimisation</b>	23%	Late								
	WP1-T1-D3-M1	Development of software tools and machine learning for image analysis	40%	Late								
	WP1-T1-D3-M2	Quantitative geometrical analysis, microstructural and phase transform	25%	On Schedule								
	WP1-T1-D3-M3	Modelling of diffusion, phase transformations and internal oxidation p	10%	On Schedule								
	WP1.1-T1-D4	<b>Mechanical, thermomechanical and electromechanical behaviour of wi</b>	9%	Late								
	WP1-T1-D4-M1	Standardisation and validation of experimental techniques for assessin	45%	Late								
	WP1-T1-D4-M3	Evaluation of suitability for cabling of industrialised wire	5%	Late								
	WP1-T1-D4-M4	Modelling of wire deformation behaviour; analysis of the influence of	10%	Late								
	WP1-T1-D4-M5	Development of sampleholder (e.g. Walters spring) for testing under a	0%	Future Task								
	WP1-T1-D4-M6	Measurements of I <sub>c</sub> vs. strain for procured and R&D wires	0%	Future Task								
	WP1-T1-D4-M7	Database and critical review of CERN and literature data concerning the	5%	Late								
	WP1-T1-D4-M8	Microscopy and quantitative analysis of cracks and voids in strands afte	5%	Late								
	WP1.1-T1-D5	<b>Technology development for high J<sub>c</sub> wire</b>	4%	Late								
	WP1-T1-D5-M1	Analysis of internal oxidation wire samples from collaborations	10%	Late								
	WP1-T1-D5-M2	Review of evidence for Nb alloying and oxygen source effects on J <sub>c</sub> ; rec	0%	Late								
	WP1-T1-D5-M3	Literature review of strengthening and reinforcement methods, and es	0%	Late								
	WP1-T1-D5-M4	Experimental study of wire coatings and model samples	0%	Future Task								
	WP1-T1-D5-M5	Modelling of the impact of high heat capacity additions on wire stabilit	0%	Future Task								
	WP1-T1-D5-M6	Decision on approach(es) for further study: wire manufacturer collabor	0%	Future Task								



# Overview of the RD Line 1 – WP1.1 T1 (CERN)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	2021 H1	2021 H2	2022 H1	2022 H2	2023 H1	2023 H2	2024 H1	2024 H2	2025 H1	2025 H2	2026 H1	2026 H2	2027 H1	2027 H2
RD1	RD1	Nb3Sn Conductors	Sun 02/02/20	Fri 31/12/27	C. Senatore, T. Boutboul	31%	Late														
	WP1.1	Nb3Sn conductors for high field magnets - CERN	Sat 01/01/22	Fri 31/12/27	T. Boutboul	15%	Late														
	WP1.1-T1	Wire procurement and industrialisation	Sat 01/01/22	Fri 31/12/27		15%	Late														
	WP1.1-T1-D1	Wire procurement and industrialisation	Thu 01/09/22	Wed 30/09/26		7%	Late														
	WP1-T1-D1-M1	Invitation to tender: initial wire needs for WP2 and collaborations	Sat 01/04/23	Wed 31/01/24	T. Boutboul	20%	Late														
	WP1-T1-D1-M2	Acceptance testing of wire for WP2 short models and collaborations	Sun 01/09/24	Fri 28/02/25		0%	Future Task														
	WP1-T1-D1-M3	Specification of wire for 14+ T	Sun 01/01/23	Sun 30/06/24		15%	Late														
	WP1-T1-D1-M4	Invitation to tender: 12 T long models and 14+ T	Wed 01/11/23	Sun 01/09/24		0%	Future Task														
	WP1-T1-D1-M5	Acceptance testing of wire for 12 T long models	Sat 01/02/25	Wed 30/09/26		0%	Future Task														
	WP1-T1-D1-M6	Acceptance testing of wire for 14+ T	Thu 01/05/25	Thu 31/07/25		0%	Future Task														
	WP1-T1-D1-M7	Specification and procurement strategy for wire industrialisation	Thu 01/09/22	Sun 30/06/24		15%	Late														
	WP1-T1-D1-M8	Award of contracts for industrialisation and qualification of 2-4 suppliers	Mon 01/07/24	Sat 01/03/25		0%	Future Task														
	WP1-T1-D1-M9	Characterisation and analysis of industrialised wire	Mon 01/07/24	Wed 31/12/25		0%	Future Task														
	WP1.1-T1-D2	Critical current, magnetisation and stability characterisation	Tue 01/03/22	Thu 31/12/26		35%	Late														
	WP1-T1-D2-M1	Self-field stability measurements of 91, 127 and 169 stack RRP wires and extracted	Tue 01/03/22	Sat 30/09/23		90%	Late														
	WP1-T1-D2-M2	Characterisation and analysis of distributed tin R&D wire	Sat 01/04/23	Fri 30/06/23		90%	Late														
	WP1-T1-D2-M3	Literature review of experimental and modelling data and methods for magnetot	Thu 01/09/22	Fri 30/06/23		20%	Late														
	WP1-T1-D2-M4	Experimental and computational analysis of magnetothermal stability as a functio	Thu 01/09/22	Thu 31/12/26		15%	Late														
	WP1.1-T1-D3	Microscopy, phase transformations and heat treatment optimisation	Sat 01/01/22	Fri 31/12/27		23%	Late														
	WP1-T1-D3-M1	Development of software tools and machine learning for image analysis of Nb3Sn	Sat 01/01/22	Tue 31/12/24		40%	Late														
	WP1-T1-D3-M2	Quantitative geometrical analysis, microstructural and phase transformation studi	Sun 01/01/23	Fri 31/12/27		25%	On Schedule														
	WP1-T1-D3-M3	Modelling of diffusion, phase transformations and internal oxidation processes	Tue 01/08/23	Fri 31/12/27		10%	On Schedule														
	WP1.1-T1-D4	Mechanical, thermomechanical and electromechanical behaviour of wire	Wed 01/06/22	Fri 31/12/27		9%	Late														
	WP1-T1-D4-M1	Standardisation and validation of experimental techniques for assessing cabling d	Sun 01/01/23	Sat 30/03/24		45%	Late														
	WP1-T1-D4-M3	Evaluation of suitability for cabling of industrialised wire	Sun 01/10/23	Sun 30/06/24		5%	Late														
	WP1-T1-D4-M4	Modelling of wire deformation behaviour; analysis of the influence of wire archite	Sun 01/01/23	Wed 31/12/25		10%	Late														
	WP1-T1-D4-M5	Development of sampleholder (e.g. Walters spring) for testing under axial strain	Sat 01/06/24	Tue 30/12/25		0%	Future Task														
	WP1-T1-D4-M6	Measurements of Ic vs. strain for procured and R&D wires	Tue 30/12/25	Thu 31/12/26		0%	Future Task														
	WP1-T1-D4-M7	Database and critical review of CERN and literature data concerning the response	Wed 01/06/22	Sun 30/06/24		5%	Late														
	WP1-T1-D4-M8	Microscopy and quantitative analysis of cracks and voids in strands after applicat	Sat 01/04/23	Fri 31/12/27		5%	Late														
	WP1.1-T1-D5	Technology development for high Jc wire	Sat 01/01/22	Tue 31/12/24		4%	Late														
	WP1-T1-D5-M1	Analysis of internal oxidation wire samples from collaborations	Sat 01/01/22	Tue 31/12/24		10%	Late														
	WP1-T1-D5-M2	Review of evidence for Nb alloying and oxygen source effects on Jc; recommenda	Sun 01/01/23	Sun 30/06/24		0%	Late														
	WP1-T1-D5-M3	Literature review of strengthening and reinforcement methods, and estimation o	Wed 01/03/23	Sun 30/06/24		0%	Late														
	WP1-T1-D5-M4	Experimental study of wire coatings and model samples	Mon 01/01/24	Sun 30/06/24		0%	Future Task														
	WP1-T1-D5-M5	Modelling of the impact of high heat capacity additions on wire stability, magnet	Mon 01/01/24	Sun 30/06/24		0%	Future Task														
	WP1-T1-D5-M6	Decision on approach(es) for further study: wire manufacturer collaborations, wir	Sat 01/06/24	Sun 30/06/24		0%	Future Task														



# Overview of the RD Line 1 – WP1.1-T2 to 1.3 (CERN, Freiberg, UNIGE)

Wc Pat	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	% Comj	Status	2023				2024			
					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	▲ WP1.1-T2	<b>Nb3Sn Cable Development, Production and Characterisation</b>	14%	Late								
	▲ WP1.1-T2-D1	<b>Cable design, trials and qualification</b>	37%	Late								
✓	WP1-T2-D1-M1	Cabling trials (~20 m per wire) of R&D internal tin wires	100%	Complete								
✓	WP1-T2-D1-M2	Cabling trials of industrialised wire	0%	Future Task								
✓	WP1-T2-D1-M3	Cabling trials for INFN FalconD	100%	Complete								
✓	WP1-T2-D1-M4	Cabling trials for CEA R2D2	100%	Complete								
✓	WP1-T2-D1-M5	Cable development for 14+ T	0%	Future Task								
✓	WP1-T2-D1-M6	Consolidation of on-line imaging and image analysis systems for cable	10%	Late								
✓	WP1-T2-D1-M7	Cabling trials with new cabling machine and >40 strand layouts	0%	Future Task								
	▲ WP1.1-T2-D2	<b>Cable production for magnets</b>	4%	Late								
✓	WP1-T2-D2-M1	INFN FalconD	0%	Late								
✓	WP1-T2-D2-M2	CEA R2D2	25%	Late								
✓	WP1-T2-D2-M3	Technology Development Programme	10%	Late								
✓	WP1-T2-D2-M4	12 T short models	0%	Future Task								
✓	WP1-T2-D2-M5	12 T long model	0%	Future Task								
✓	WP1-T2-D2-M6	14+ T models	0%	Late								
	▲ WP1.1-T2-D3	<b>Mechanical, thermomechanical and electromechanical behaviour</b>	4%	Late								
✓	WP1-T2-D3-M1	Microscopy and quantitative analysis of cracks in RRP 108/127 cables aft	20%	Late								
✓	WP1-T2-D3-M2	Database and critical review of CERN and literature data concerning the	5%	Late								
✓	WP1-T2-D3-M3	FRESCA/FRESCA 2 characterisation of cables as a function of transverse	0%	Future Task								
✓	WP1-T2-D3-M4	Microscopy and quantitative analysis of cracks and voids in cables and s	5%	Late								
✓	WP1-T2-D3-M5	Analysis of dependence of the mechanical stability of cables on cabling	0%	Future Task								
✓	WP1-T2-D3-M6	Thermomechanical analysis of cables	0%	Future Task								
✓	▲ WP1.2	<b>KE5074 BAF, Freiberg (Amend.1)</b>	100%	Complete								
✓	BAF-2-1.1	Alloy selection and experiment design for quaternary Cu-Nb-Sn system	100%	Complete	S. Hopkins							
✓	BAF-2-1.2	Effect of Ta on phase formation and microstructures in the Cu-Nb-Sn sy	100%	Complete								
✓	BAF-2-1.3	Effect of Hf/Zr on phase formation and microstructures in the Cu-Nb-Sn	100%	Complete								
✓	BAF-2-1.4	Thermodynamic model of quaternary Cu-Nb-Sn alloys	100%	Complete								
✓	BAF-2-1.5	Effect of Ta on phase formation and microstructures in the Cu-Nb-Sn-Hf	100%	Complete								
✓	BAF-2-2.1	Alloy selection and experiment design for oxygen additions	100%	Complete								
✓	BAF-2-2.2	Analysis of O transport from different O source configurations	100%	Complete								
✓	BAF-2-2.3	Effect of O on phase formation and microstructures in the Cu-Nb-Sn-Hf	100%	Complete								
✓	BAF-2-2.4	Effect of ~4 at% Ta on the Cu-Nb-Sn-(Hf/Zr) system with O additions	100%	Complete								
✓	BAF-2-3.1	Phase formation and microstructure analysis of reference wire sample	100%	Complete								
✓	BAF-2-3.2	Phase formation and microstructure analysis of Hf/Zr-alloyed and inter	100%	Complete								
✓	BAF-2-3.3	Model system studies for wire compositions and heat treatments	100%	Complete								
✓	BAF-2-3.4	Recommendations for design, composition and heat treatment optimis	100%	Complete								
✓	▲ WP1.3	<b>KE4663 UNIGE (Amend.1)</b>	20%	Late								
✓	UNIGE-AW-1.1	Supply of experimental wires with a reduced number of filaments	100%	Complete								
✓	UNIGE-AW-1.2	Report on the screening tests and initial optimization on experimental	100%	Complete								
✓	UNIGE-AW-2.1	Report on proposed billet design, processing route and subcontractors,	100%	Complete								
✓	UNIGE-AW-2.2	Supply of prototype wires from the first production (without oxygen sc	0%	Late								
✓	UNIGE-AW-2.3	Report on results obtained on the first production of prototype wires	0%	Late								
✓	UNIGE-AW-3.1	Report on the designs and results obtained for the first batch of improv	0%	Late								
✓	UNIGE-AW-3.2	Supply of improved prototype wires	0%	Late								
✓	UNIGE-AW-3.3	Report on the designs and results obtained for the second batch of imp	0%	Late								
✓	UNIGE-AW-4.1	Report on superconducting and electromechanical characterization of p	0%	Late								
✓	UNIGE-AW-4.2	Report on the final evaluation of the results with recommendations for	0%	Late								



# Overview of the RD Line 1 – WP1.1-T2 to 1.3 (CERN, Freiberg, UNIGE)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	2021		2022		2023		2024		2025		2026		2027	
								H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2		
	WP1.1-T2	Nb3Sn Cable Development, Production and Characterisation	Sat 01/01/22	Fri 31/12/27		14%	Late														
	WP1.1-T2-D1	Cable design, trials and qualification	Sat 01/01/22	Thu 31/12/26		37%	Late														
✓	WP1-T2-D1-M1	Cabling trials (~20 m per wire) of R&D internal tin wires	Sat 01/01/22	Mon 31/07/23		100%	Complete														
☒	WP1-T2-D1-M2	Cabling trials of industrialised wire	Mon 01/01/24	Wed 31/12/25		0%	Future Task														
✓	WP1-T2-D1-M3	Cabling trials for INFN FalconD	Sat 01/01/22	Fri 30/06/23		100%	Complete														
✓	WP1-T2-D1-M4	Cabling trials for CEA R2D2	Sat 01/01/22	Fri 30/06/23		100%	Complete														
☒	WP1-T2-D1-M5	Cable development for 14+ T	Fri 01/12/23	Wed 31/12/25		0%	Future Task														
☒	WP1-T2-D1-M6	Consolidation of on-line imaging and image analysis systems for cable geometry	Thu 01/06/23	Wed 30/12/26		10%	Late														
☒	WP1-T2-D1-M7	Cabling trials with new cabling machine and >40 strand layouts	Thu 01/01/26	Thu 31/12/26		0%	Future Task														
	WP1.1-T2-D2	Cable production for magnets	Sat 01/01/22	Fri 31/12/27		4%	Late														
☒	WP1-T2-D2-M1	INFN FalconD	Sat 01/04/23	Sat 30/09/23		0%	Late														
☒	WP1-T2-D2-M2	CEA R2D2	Sat 01/04/23	Sat 30/09/23		25%	Late														
☒	WP1-T2-D2-M3	Technology Development Programme	Tue 01/03/22	Wed 30/04/25		10%	Late														
☒	WP1-T2-D2-M4	12 T short models	Fri 01/03/24	Sat 30/11/24		0%	Future Task														
☒	WP1-T2-D2-M5	12 T long model	Thu 01/01/26	Fri 31/12/27		0%	Future Task														
☒	WP1-T2-D2-M6	14+ T models	Sat 01/01/22	Wed 30/04/25		0%	Late														
	WP1.1-T2-D3	Mechanical, thermomechanical and electromechanical behaviour	Tue 01/03/22	Fri 31/12/27		4%	Late														
☒	WP1-T2-D3-M1	Microscopy and quantitative analysis of cracks in RRP 108/127 cables after application	Tue 01/03/22	Tue 31/12/24		20%	Late														
☒	WP1-T2-D3-M2	Database and critical review of CERN and literature data concerning the response	Wed 01/06/22	Sun 30/06/24		5%	Late														
☒	WP1-T2-D3-M3	FRESCA/FRESCA 2 characterisation of cables as a function of transverse stress	Mon 01/01/24	Fri 31/12/27		0%	Future Task														
☒	WP1-T2-D3-M4	Microscopy and quantitative analysis of cracks and voids in cables and strands after	Sat 01/04/23	Fri 31/12/27		5%	Late														
☒	WP1-T2-D3-M5	Analysis of dependence of the mechanical stability of cables on cabling and winding	Mon 01/01/24	Mon 31/05/27		0%	Future Task														
☒	WP1-T2-D3-M6	Thermomechanical analysis of cables	Mon 01/07/24	Fri 31/12/27		0%	Future Task														
✓	WP1.2	KE5074 BAF, Freiberg (Amend.1)	Fri 01/01/21	Fri 31/12/27	S. Hopkins, A. Leinweb	100%	Complete														
✓	BAF-2-1.1	Alloy selection and experiment design for quaternary Cu-Nb-Sn systems	Tue 01/03/22	Sun 31/12/23	S. Hopkins	100%	Complete														
✓	BAF-2-1.2	Effect of Ta on phase formation and microstructures in the Cu-Nb-Sn system	Wed 01/06/22	Sun 31/12/23		100%	Complete														
✓	BAF-2-1.3	Effect of Hf/Zr on phase formation and microstructures in the Cu-Nb-Sn system	Mon 01/01/24	Fri 31/12/27		100%	Complete														
✓	BAF-2-1.4	Thermodynamic model of quaternary Cu-Nb-Sn alloys	Sat 01/04/23	Fri 31/12/27		100%	Complete														
✓	BAF-2-1.5	Effect of Ta on phase formation and microstructures in the Cu-Nb-Sn-Hf/Zr system	Sun 01/01/23	Mon 31/05/27		100%	Complete														
✓	BAF-2-2.1	Alloy selection and experiment design for oxygen additions	Sat 01/07/23	Fri 31/12/27		100%	Complete														
✓	BAF-2-2.2	Analysis of O transport from different O source configurations	Fri 01/01/21	Fri 01/10/21		100%	Complete														
✓	BAF-2-2.3	Effect of O on phase formation and microstructures in the Cu-Nb-Sn-(Hf/Zr) system	Fri 01/01/21	Sun 01/01/23		100%	Complete														
✓	BAF-2-2.4	Effect of ~4 at% Ta on the Cu-Nb-Sn-(Hf/Zr) system with O additions	Fri 01/01/21	Wed 01/03/23		100%	Complete														
✓	BAF-2-3.1	Phase formation and microstructure analysis of reference wire samples	Fri 01/01/21	Wed 01/03/23		100%	Complete														
✓	BAF-2-3.2	Phase formation and microstructure analysis of Hf/Zr-alloyed and internal oxidized	Fri 01/01/21	Wed 01/03/23		100%	Complete														
✓	BAF-2-3.3	Model system studies for wire compositions and heat treatments	Fri 01/01/21	Wed 01/03/23		100%	Complete														
✓	BAF-2-3.4	Recommendations for design, composition and heat treatment optimisation, and	Fri 01/01/21	Wed 01/03/23		100%	Complete														
✓	WP1.3	KE4663 UNIGE (Amend.1)	Sun 02/06/20	Sun 30/06/24	C. Senatore, T. Boutboul	20%	Late														
✓	UNIGE-AW-1.1	Supply of experimental wires with a reduced number of filaments	Sun 02/02/20	Fri 01/10/21	C. Senatore, T. Boutboul	100%	Complete														
✓	UNIGE-AW-1.2	Report on the screening tests and initial optimization on experimental wires with	Sun 02/02/20	Sat 01/10/22		100%	Complete														
✓	UNIGE-AW-2.1	Report on proposed billet design, processing route and subcontractors, and result	Sun 02/02/20	Sat 31/12/22		100%	Complete														
☒	UNIGE-AW-2.2	Supply of prototype wires from the first production (without oxygen source)	Sun 02/02/20	Tue 28/11/23		0%	Late														
☒	UNIGE-AW-2.3	Report on results obtained on the first production of prototype wires	Sun 02/02/20	Thu 30/11/23		0%	Late														
☒	UNIGE-AW-3.1	Report on the designs and results obtained for the first batch of improved prototy	Sun 02/02/20	Sat 30/03/24		0%	Late														
☒	UNIGE-AW-3.2	Supply of improved prototype wires	Sun 02/02/20	Fri 29/03/24		0%	Late														
☒	UNIGE-AW-3.3	Report on the designs and results obtained for the second batch of improved prot	Sun 02/02/20	Wed 29/05/24		0%	Late														
☒	UNIGE-AW-4.1	Report on superconducting and electromechanical characterization of prototype v	Sun 02/02/20	Thu 30/05/24		0%	Late														
☒	UNIGE-AW-4.2	Report on the final evaluation of the results with recommendations for industrial	Sun 02/02/20	Sun 30/06/24		0%	Late														



# Overview of the RD Line 2 – WP2.1 to 2.2

## CERN, KIT)

Wc Par	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	% Comj	Status	2023				2024					
					Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
RD2	RD2	<b>HTS Conductors and HTS Magnet Technologies</b>	<b>17%</b>	<b>Late</b>										
	WP2.1	<b>KES283, KIT</b>	<b>12%</b>	<b>Late</b>										
✓	D1.1	Executive report on technical clarifications and negotiations for the pre	100%	Complete										
✓	D1.2	Report on preparatory work for the installation of the machines and too	100%	Complete										
✓	D1.3	Report on installation of PLD equipment as main component of the HTS	100%	Complete										
✓	D1.4	Report on installation of side equipment for complete CC fabrication	100%	Complete										
✓	D1.5	Report on commissioning of PLD machines as main part of the HTS-CC La	100%	Complete										
✓	D1.6	Report on commissioning of machines required for full CC architecture s	100%	Complete										
📄	D2.1	Report and samples ( $d > 1\mu\text{m}$ ) from qualification with $J_c > 1\text{MA}/\text{cm}^2 @ 77\text{K}$ ,	0%	Late										
📄	D2.2	Report and samples from qualification of complete HTS-CC architecture	0%	Late										
📄	D2.3	Report and samples from demonstration of first 3 full HTS-CC baseline o	0%	Late										
📄	D3.1	Report and samples from process stability demonstration samples ( $s(\text{IC}$	0%	Late										
📄	D3.2	Report and samples ( $d > 1\mu\text{m}$ ) from long length qualification ( $> 50\text{m}$ ) with	0%	Late										
📄	D4.1	Report and samples from qualification of complete long length HTS-CC a	0%	Late										
📄	D4.2	Report and samples from process stability demonstration samples ( $s(\text{IC}$	0%	Late										
📄	D4.3	Report and samples from qualification of complete HTS-CC architecture	0%	Late										
📄	D5.1	Report and samples from process stability demonstration samples ( $s(\text{IC}$	0%	Late										
📄	D5.2	Report and samples from qualification of complete HTS-CC architecture	0%	Late										
	WP2.2	<b>HTS REBCO tapes, cables and associated technologies - CERN</b>	<b>11%</b>	<b>Late</b>										
	WP2.2-T1	<b>Procurement REBCO conductor</b>	<b>11%</b>	<b>Late</b>										
📄	WP2.2-T1-D1	IT Specification document	10%	Late										
📄	WP2.2-T1-D2	REBCO Tape procurement - Phase 1 HFM FCC	10%	On Schedule										
📄	WP2.2-T1-D3	REBCO Tape procurement - Phase 2 HFM FCC	12%	Future Task										
📄	WP2.2-T1-D4	REBCO Tape procurement - Solenoids	5%	Late										
	WP2.2-T2	<b>Characterization</b>	<b>8%</b>	<b>Late</b>										
📄	WP2.2-T2-D1	QC Definition and implementation, including reproducibility and scaling	15%	Late										
📄	WP2.2-T2-D2	Continuous Critical Current Measurement set-up (liquid nitrogen, 65 K -	15%	On Schedule										
📄	WP2.2-T2-D3	Test station for higher temperatures (20 K- 50 K, 1 T to 2 T): procurement	10%	Future Task										
📄	WP2.2-T2-D4	Inserts for split coils (10 T) and solenoid (20 T)	15%	Future Task										
📄	WP2.2-T2-D5	Liquid nitrogen test station for coils	5%	Future Task										
📄	WP2.2-T2-D6	Qualification of splices, cables and coils: inserts for measurements at 77	20%	Late										
📄	WP2.2-T2-D7	Measurement of REBCO in external high field laboratories	5%	On Schedule										
	WP2.2-T3	<b>Development of REBCO cables</b>	<b>7%</b>	<b>Future Task</b>										
📄	WP2.2-T3-D1	Cable concepts and cabling equipment (R&D)	10%	Future Task										
📄	WP2.2-T3-D2	Electrical insulation and impregnation techniques	10%	Future Task										
📄	WP2.2-T3-D3	Coating technologies	5%	Future Task										
📄	WP2.2-T3-D4	Winding tests and winding/cabling equipment (long units)	0%	Future Task										
	WP2.2-T4	<b>Development of small prototype coils</b>	<b>13%</b>	<b>Late</b>										
	WP2.2-T4-D1	HTS prototype Solenoids. Concepts, modelling, assembly, test	20%	On Schedule										
	WP2.2-T4-D2	Measurement of REBCO solenoids in external high field laboratories	20%	On Schedule										
	WP2.2-T4-D3	HTS Racetrack model coils. Concepts, modelling, assembly, test	10%	Late										
	WP2.2-T4-D4	Hybrid model coils. Concepts, modelling, assembly, test	10%	Late										
	WP2.2-T4-D5	Nb3Sn Outserts for racetracks	5%	Late										



# Overview of the RD Line 2 – WP2.1 to 2.2 (CERN, KIT)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	2021 H1	2021 H2	2022 H1	2022 H2	2023 H1	2023 H2	2024 H1	2024 H2	2025 H1	2025 H2	2026 H1	2026 H2	2027 H1	2027 H2
RD2	RD2	HTS Conductors and HTS Magnet Technologies	Sat 01/02/20	Sun 31/12/28	A. Kario, A. Ballarino	17%	Late														
	WP2.1	KE5283, KIT	Wed 22/12/21	Wed 30/12/26	B. Holzapfel, C. Barth	12%	Late														
	D1.1	Executive report on technical clarifications and negotiations for the preparation of	Thu 23/12/21	Sat 22/01/22	B. Holzapfel, C. Barth	100%	Complete														
	D1.2	Report on preparatory work for the installation of the machines and tooling studies	Thu 23/12/21	Thu 01/09/22		100%	Complete														
	D1.3	Report on installation of PLD equipment as main component of the HTS-CC Lab	Thu 23/12/21	Thu 01/09/22		100%	Complete														
	D1.4	Report on installation of side equipment for complete CC fabrication	Thu 23/12/21	Thu 01/12/22		100%	Complete														
	D1.5	Report on commissioning of PLD machines as main part of the HTS-CC Lab and on	Wed 22/12/21	Fri 30/12/22		100%	Complete														
	D1.6	Report on commissioning of machines required for full CC architecture synthesis	Wed 22/12/21	Fri 30/12/22		100%	Complete														
	D2.1	Report and samples (d>1µm) from qualification with Jc>1MA/cm2@77K, sf and Jc	Wed 25/05/22	Thu 30/11/23		0%	Late														
	D2.2	Report and samples from qualification of complete HTS-CC architecture with target	Sat 23/04/22	Tue 30/01/24		0%	Late														
	D2.3	Report and samples from demonstration of first 3 full HTS-CC baseline operation	Sat 22/01/22	Tue 30/01/24		0%	Late														
	D3.1	Report and samples from process stability demonstration samples (s(IC) < 10% @	Wed 22/12/21	Sun 30/06/24		0%	Late														
	D3.2	Report and samples (d>1µm) from long length qualification (>50m) with Jc>1MA/cm	Wed 22/12/21	Mon 30/12/24		0%	Late														
	D4.1	Report and samples from qualification of complete long length HTS-CC architecture	Thu 23/12/21	Wed 30/04/25		0%	Late														
	D4.2	Report and samples from process stability demonstration samples (s(IC) < 10% @	Thu 23/12/21	Sat 30/08/25		0%	Late														
	D4.3	Report and samples from qualification of complete HTS-CC architecture with target	Thu 23/12/21	Tue 30/12/25		0%	Late														
	D5.1	Report and samples from process stability demonstration samples (s(IC) < 10% @	Wed 22/12/21	Tue 30/06/26		0%	Late														
	D5.2	Report and samples from qualification of complete HTS-CC architecture with full	Thu 23/12/21	Wed 30/12/26		0%	Late														
	WP2.2	HTS REBCO tapes, cables and associated technologies - CERN	Sun 01/01/23	Sun 31/12/28	A. Ballarino	11%	Late														
	WP2.2-T1	Procurement REBCO conductor	Sun 01/01/23	Sun 31/12/28		18%	Late														
	WP2.2-T1-D1	IT Specification document	Sun 01/01/23	Tue 30/09/25	A. Ballarino	50%	On Schedule														
	WP2.2-T1-D2	REBCO Tape procurement - Phase 1 HFM FCC	Sat 30/09/23	Wed 31/12/25		10%	On Schedule														
	WP2.2-T1-D3	REBCO Tape procurement - Phase 2 HFM FCC	Mon 30/06/25	Sun 31/12/28		0%	Future Task														
	WP2.2-T1-D4	REBCO Tape procurement - Solenoids	Sat 30/09/23	Sun 31/12/23		0%	Late														
	WP2.2-T2	Characterization	Thu 01/06/23	Sun 31/12/28		6%	Late														
	WP2.2-T2-D1	QC Definition and implementation, including reproducibility and scaling of perfor	Thu 01/06/23	Sun 31/12/23		10%	Late														
	WP2.2-T2-D2	Continuous Critical Current Measurement set-up (liquid nitrogen, 65 K - 77 K): pro	Sun 01/10/23	Tue 31/12/24		5%	Late														
	WP2.2-T2-D3	Test station for higher temperatures (20 K- 50 K, 1 T to 2 T): procurement, design a	Wed 01/01/25	Thu 31/12/26		10%	Future Task														
	WP2.2-T2-D4	Inserts for split coils (10 T) and solenoid (20 T)	Thu 01/01/26	Thu 01/01/26		15%	Future Task														
	WP2.2-T2-D5	Liquid nitrogen test station for coils	Mon 01/01/24	Wed 31/12/25		5%	Future Task														
	WP2.2-T2-D6	Qualification of splices, cables and coils: inserts for measurements at 77 K and 4.2	Sun 01/10/23	Sun 31/12/23		20%	Late														
	WP2.2-T2-D7	Measurement of REBCO in external high field laboratories	Sun 01/10/23	Sun 31/12/28		5%	On Schedule														
	WP2.2-T3	Development of REBCO cables	Mon 01/01/24	Sun 31/12/28		7%	Future Task														
	WP2.2-T3-D1	Cable concepts and cabling equipment (R&D)	Mon 01/01/24	Thu 31/12/26		10%	Future Task														
	WP2.2-T3-D2	Electrical insulation and impregnation techniques	Mon 01/01/24	Sun 31/12/28		10%	Future Task														
	WP2.2-T3-D3	Coating technologies	Mon 01/01/24	Sun 31/12/28		5%	Future Task														
	WP2.2-T3-D4	Winding tests and winding/cabling equipment (long units)	Tue 01/10/24	Wed 31/12/25		0%	Future Task														
	WP2.2-T4	Development of small prototype coils	Sun 01/01/23	Sun 31/12/28		13%	Late														
	WP2.2-T4-D1	HTS prototype Solenoids. Concepts, modelling, assembly, test	Sun 01/01/23	Sun 31/12/28		20%	On Schedule														
	WP2.2-T4-D2	Measurement of REBCO solenoids in external high field laboratories	Sun 01/01/23	Sun 31/12/28		20%	On Schedule														
	WP2.2-T4-D3	HTS Racetrack model coils. Concepts, modelling, assembly, test	Sun 01/01/23	Sun 31/12/28		10%	Late														
	WP2.2-T4-D4	Hybrid model coils. Concepts, modelling, assembly, test	Sun 01/01/23	Sun 31/12/28		10%	Late														
	WP2.2-T4-D5	Nb3Sn Outserts for racetracks	Sun 01/01/23	Sun 31/12/28		5%	Late														



# Overview of the RD Line 2 – WP2.3 to 2.16 (CERN, UNIGE, U-TWENTE, CEA)

Wc Pat	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	% Com	Status	2023				2024					
					Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	WP2.3	KE4612 UNIGE (Amend.1)	35%	Late	[Gantt bar]									
	CH2-UNG-1.1	Documented multi-physical characterization of Nb3Sn wires	100%	Complete	[Gantt bar]									
		Acceptance of the 1st activity report	100%	Complete	[Gantt bar]									
		Acceptance of the 2nd activity report	100%	Complete	[Gantt bar]									
		Acceptance of the 3rd activity report	100%	Complete	[Gantt bar]									
	CH2-UNG-2.1	Documented multi-physical characterization of REBCO coated conductor	0%	Late	[Gantt bar]									
		Acceptance of the 4th activity report	0%	Late	[Gantt bar]									
		Acceptance of the 5th activity report	0%	Late	[Gantt bar]									
		Acceptance of the final report	0%	Late	[Gantt bar]									
	WP2.5	Demonstrator of the dielectric-insulated REBCO high field magnet coils	10%	Future Task	[Gantt bar]									
	WP2.5-T1	Magnet demonstrator(s)	10%	Future Task	[Gantt bar]									
	WP2.5-T1-D1	High field demonstrator(s): Common Coil Design. Concepts, modelling, i	10%	Future Task	[Gantt bar]									
	WP2.5-T1-D2	High field demonstrator(s): Solenoids. Concepts, modelling, design, ma	10%	Future Task	[Gantt bar]									
	WP2.6	HTS high field insert magnets and MuC solenoids - CERN	43%	Late	[Gantt bar]									
	WP2.6-T1	UHF HTS solenoids study - general work	17%	Late	[Gantt bar]									
	WP2.6-T1.1	Review and define conductor requirements for UHF compact solenoids	80%	Late	[Gantt bar]									
	WP2.6-T1.2	Review and define performance specifications for UHF solenoids	75%	Late	[Gantt bar]									
		Define reference geometries and estimate material needs for technolo	100%	Complete	[Gantt bar]									
	WP2.6-T1.3	Review material options for HF and UHF HTS solenoids (REBCO, Bi-2212,	0%	Late	[Gantt bar]									
	WP2.6-T1.4	Cost and power estimate	0%	Late	[Gantt bar]									
	WP2.6-T2	UHF conductor procurement and characterization	71%	Late	[Gantt bar]									
	WP2.6-T2-D1	Short samples for initial screening	100%	Complete	[Gantt bar]									
	WP2.6-T2-D2	Procurement of 9+3 km 4 mm tape for UHF solenoids R&D - phase I	25%	Late	[Gantt bar]									
	WP2.6-T2-D3	Procurement of 15 km 4 mm tape for UHF solenoids R&D - phase II	0%	Future Task	[Gantt bar]									
	WP2.6-T3	UHF solenoids conceptual study and performance validation	50%	Late	[Gantt bar]									
	WP2.6-T3-D1	CERN - engineering design of UHF final cooling solenoid	50%	Late	[Gantt bar]									
	WP2.7	KE5276 Univeristy of Twente (Amend.1)	55%	Late	[Gantt bar]									
	D1.1	Two HTS cables samples: intermedate report	100%	Complete	[Gantt bar]									
	D1.2	Two HTS cables samples: final report 1.2	0%	Late	[Gantt bar]									
	D2	Roebel cable bonding test rig: final report 2	100%	Complete	[Gantt bar]									
	D3	ReBCO pancake coil test: final report 3	100%	Complete	[Gantt bar]									
	WP2.9	Other Superconductors and low-field applications	0%	Future Task	[Gantt bar]									
	WP2.9-T1-D1	Other superconductors and low-field applications	0%	Future Task	[Gantt bar]									
	WP2.9-T1-D2	Other superconductors and low-field applications	0%	Future Task	[Gantt bar]									
	WP2.11	KE5647 CEA	4%	Late	[Gantt bar]									
	D1.1	Parametrical study on racetrack coil report	60%	Late	[Gantt bar]									
	D1.2	Parametrical study on double racetrack coil report	0%	Late	[Gantt bar]									
	D2	Mock-up Conceptual design	0%	Late	[Gantt bar]									
	D3	Mock-up engineering design report	0%	Late	[Gantt bar]									
	D4	Mock-up sent to CERN	0%	Late	[Gantt bar]									
	D5	Mock-up fabrication and test report	0%	Late	[Gantt bar]									
	WP2.16	Laboratory Infrastructure	0%	Future Task	[Gantt bar]									
	WP2.16-T1-D1	Upgrade of HTS laboratory	0%	Future Task	[Gantt bar]									





# Overview of the RD Line 2 – WP2.3 to 2.16 (CERN, UNIGE, U-TWENTE, CEA)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	2021		2022		2023		2024		2025		2026		2027				
								H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2					
WP2.3	WP2.3	KE4612 UNIGE (Amend.1)	Sat 01/02/20	Mon 30/09/24	C. Sentore, T. Boutboul	35%	Late																	
	CH2-UNG-1.1	Documented multi-physical characterization of Nb3Sn wires	Sat 01/02/20	Tue 30/05/23		100%	Complete																	
		Acceptance of the 1st activity report	Sat 01/02/20	Sat 01/05/21	C. Sentore, Th. Boutboul	100%	Complete																	
		Acceptance of the 2nd activity report	Sat 01/02/20	Fri 01/04/22		100%	Complete																	
	CH2-UNG-2.1	Acceptance of the 3rd activity report	Sat 01/02/20	Tue 30/05/23		100%	Complete																	
		Documented multi-physical characterization of REBCO coated conductors	Sat 01/02/20	Mon 30/09/24		0%	Late																	
		Acceptance of the 4th activity report	Sat 01/02/20	Thu 30/11/23		0%	Late																	
		Acceptance of the 5th activity report	Sat 01/02/20	Sat 30/03/24		0%	Late																	
	WP2.5	WP2.5	Demonstrator of the dielectric-insulated REBCO high field magnet coils - CERN	Mon 01/01/24	Fri 31/12/27	A. Ballarino	10%	Future Task																
		WP2.5-T1	Magnet demonstrator(s)	Mon 01/01/24	Fri 31/12/27		10%	Future Task																
High field demonstrator(s): Common Coil Design. Concepts, modelling, design, m.			Mon 01/01/24	Fri 31/12/27		10%	Future Task																	
WP2.5-T1-D2		High field demonstrator(s): Solenoids. Concepts, modelling, design, manufactur	Mon 01/01/24	Fri 31/12/27		10%	Future Task																	
		HTS high field insert magnets and MuC solenoids - CERN	Sun 01/01/23	Tue 01/06/27	L. Bottura	43%	Late																	
WP2.6		WP2.6-T1	UHF HTS solenoids study - general work	Sun 01/01/23	Tue 01/06/27		17%	Late																
		WP2.6-T1.1	Review and define conductor requirements for UHF compact solenoids	Sun 01/01/23	Tue 30/05/23		80%	Late																
			Review and define performance specifications for UHF solenoids	Sun 01/01/23	Sat 30/09/23		75%	Late																
		WP2.6-T1.3	Define reference geometries and estimate material needs for technology R&D	Sun 01/01/23	Sun 30/04/23		100%	Complete																
			Review material options for HF and UHF HTS solenoids (REBCO, Bi-2212, Bi-2223, II	Sun 01/01/23	Sat 30/03/24		0%	Late																
	WP2.6-T1.4	Cost and power estimate	Sun 01/01/23	Tue 01/06/27		0%	Late																	
		UHF conductor procurement and characterization	Sun 01/01/23	Sat 01/05/27		71%	Late																	
	WP2.6-T2-D1	Short samples for initial screening	Sun 01/01/23	Sat 01/05/27		100%	Complete																	
		Procurement of 9+3 km 4 mm tape for UHF solenoids R&D - phase I	Mon 01/05/23	Sun 30/06/24		25%	Late																	
	WP2.6-T2-D3	Procurement of 15 km 4 mm tape for UHF solenoids R&D - phase II	Mon 01/07/24	Mon 30/06/25		0%	Future Task																	
UHF solenoids conceptual study and performance validation		Sun 01/01/23	Sun 31/12/23		50%	Late																		
WP2.7	WP2.7	KE5276 University of Twente (Amend.1)	Tue 23/11/21	Sun 30/06/24	A. Ballarino, A. Kario	55%	Late																	
	D1.1	Two HTS cables samples: intermediate report	Tue 23/11/21	Fri 30/06/23	A. Ballarino, A. Kario	100%	Complete																	
		Two HTS cables samples: final report 1.2	Tue 23/11/21	Sun 30/06/24		0%	Late																	
	D2	Roebel cable bonding test rig: final report 2	Tue 23/11/21	Mon 30/05/22		100%	Complete																	
		REBCO pancake coil test: final report 3	Tue 23/11/21	Fri 30/12/22		100%	Complete																	
	WP2.9	Other Superconductors and low-field applications	Mon 01/01/24	Fri 31/12/27	A. Ballarino	0%	Future Task																	
		Other superconductors and low-field applications	Mon 01/01/24	Fri 31/12/27		0%	Future Task																	
		Other superconductors and low-field applications	Mon 01/01/24	Fri 31/12/27		0%	Future Task																	
	WP2.11	WP2.11	KE5647 CEA	Sat 01/04/23	Fri 28/03/25	A. Ballarino, T. Lecrevisse	4%	Late																
		D1.1	Parametrical study on racetrack coil report	Sat 01/04/23	Mon 30/10/23	A. Ballarino, T. Lecrevisse	60%	Late																
Parametrical study on double racetrack coil report			Sat 01/04/23	Tue 30/01/24		0%	Late																	
D2		Mock-up Conceptual design	Sat 01/04/23	Sun 31/03/24		0%	Late																	
		Mock-up engineering design report	Sat 01/04/23	Mon 30/09/24		0%	Late																	
D4		Mock-up sent to CERN	Sat 01/04/23	Wed 26/02/25		0%	Late																	
WP2.16	WP2.16	Laboratory Infrastructure	Mon 01/01/24	Fri 31/12/27	A. Ballarino	0%	Future Task																	
	WP2.16-T1-D1	Upgrade of HTS laboratory	Mon 01/01/24	Fri 31/12/27		0%	Future Task																	



# Overview of the RD Line 3 – WP3.1 to 3.5 (CERN)

Wc Par	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	% Comj	Status	2023				2024			
					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
<b>RD3</b>	<b>RD3</b>	<b>Nb3Sn Magnets</b>	<b>29%</b>	<b>Late</b>								
	<b>WP3.1</b>	<b>Nb3Sn robust performance double aperture 12T cosθ dipole models - C</b>	<b>38%</b>	<b>Late</b>								
	WP3.1-T0-D0	Functional specifications	100%	Complete								
	WP3.1-T1-D1	Coil design (cosθ configuration)	80%	On Schedule								
	WP3.1-T1-D2	Thermo-mechanical design short model, collared coils option	80%	Late								
	WP3.1-T1-D3	Mirror structure to test single coils or single aperture	50%	On Schedule								
	WP3.1-T1-D4	Short instrumented mock up, Coll. Coils option (based on existing 11 T coils)	50%	Late								
	WP3.1-T1-D5	Short instrumented mock up, B&K option (based on existing 11 T coils)	40%	Late								
	WP3.1-T1-D6	Winding - reaction - impregnation - assembly tools	20%	Late								
	WP3.1-T1-D7	Winding of test coils	10%	Late								
	WP3.1-T1-D8	Winding of coils	0%	Future Task								
	WP3.1-T1-D9	Procurement of components for short model - including controls	0%	Late								
	WP3.1-T1-D10	Assembly of short model (Collared coils) - including tools	0%	Future Task								
	<b>WP3.2</b>	<b>KE4102 INFN (Amend.1)</b>	<b>21%</b>	<b>Late</b>								
	D1.1	Technical desing report	100%	Complete								
	D1.2	Final desing review	0%	Late								
	D1.3	Confirmation of the schedule	100%	Complete								
	D1.4	Heat treatment and vacuum pressure impregnation tool ready	60%	Late								
	D1.5	Approval of manufacturing drawings of cold mass components (CERN, INFN)	20%	Late								
	D2.1	Magnet assembly Production Readiness Review	0%	Late								
	D2.2	Acceptance of the 3 magnet poles (one spare)	0%	Late								
	D2.3	Magnet assembled keys installed	0%	Late								
	D2.4	Magnet acceptance CERN, INFN	0%	Late								
	D2.5	Final report	0%	Late								
	<b>WP3.3</b>	<b>Nb3Sn robust performance 12T long dipole prototype - CERN</b>	<b>0%</b>	<b>Future Task</b>								
	<b>WP3.3-T1</b>	<b>Tooling and first 15 m long Nb3Sn coils</b>	<b>0%</b>	<b>Future Task</b>								
	WP3.3-T1-D1	Design of coils (including drawings)	0%	Future Task								
	WP3.3-T1-D2	Design of coil contact toolings (including drawings)	0%	Future Task								
	WP3.3-T1-D3a	Procurement of components for coils (2xCu, 4xNb3Sn) and coil contact	0%	Future Task								
	WP3.3-T1-D3b	Procurement of components for coils (4xNb3Sn)	0%	Future Task								
	WP3.3-T1-D4	Manufacture of first set (2xCu, 4xNb3Sn) of coils	0%	Future Task								
	WP3.3-T1-D5	Manufacture of second set (4x Nb3Sn) of coils	0%	Future Task								
	<b>WP3.3-T2</b>	<b>Test cryo-assembly for 15 m long Nb3Sn coils, including mirror configur</b>	<b>0%</b>	<b>Future Task</b>								
	WP3.3-T2-D1	Design of test cryo-assembly (including drawings)	0%	Future Task								
	WP3.3-T2-D2	Procurement of components for test cryo-assembly (including toolings)	0%	Future Task								
	WP3.3-T2-D3	Commissioning of mirror type cryo-assembly	0%	Future Task								
	<b>WP3.4</b>	<b>Development of support technologies for the Nb3Sn magnets</b>	<b>16%</b>	<b>Late</b>								
	WP3.4-T1-D1	Mechanical properties of Nb3Sn coils	20%	Late								
	WP3.4-T1-D2	Nb3Sn damages in case of overpressure: experiment and modeling	20%	Late								
	WP3.4-T1-D3	Coil - coil electrical connections - splices	30%	Late								
	WP3.4-T1-D4	Coil fabrication tools	10%	Late								
	WP3.4-T1-D5	Nb3Sn outserts for HTS	0%	Future Task								
	<b>WP3.5</b>	<b>Nb3Sn ultimate performance dipole models - CERN</b>	<b>12%</b>	<b>Late</b>								
	WP3.5-T0	Understand SMC behaviour and fix problems	20%	Late								
	WP3.5-T1	SMC program - old proposal - wire 11 T	50%	Late								
	WP3.5-T2	SMC program - new proposal - wire 0.85	5%	Late								
	WP3.5-T3	RMM1b powering tests	60%	Late								
	WP3.5-T4	RMM2a magnet construction	0%	Late								
	WP3.5-T5	Flared end coil fabrication (cable with 40 strands)	0%	Late								
	WP3.5-T6	Test structure for coils (mirror)	0%	Late								
	WP3.5-T7	Flared end coil fabrication (optimized cable)	0%	Future Task								
	WP3.5-T8	Design studies	20%	Late								
	WP3.5-T9	Mock up - straight part with available cable	0%	Late								
	WP3.5-T10	Construction of single aperture - optimized cable	0%	Future Task								
	WP3.5-T11	Costruction of a double aperture - optimized cable	0%	Future Task								

# Overview of the RD Line 3 – WP3.1 to 3.5 (CERN)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	2021		2022		2023		2024		2025		2026		2027	
								H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2		
RD3	RD3	<b>Nb3Sn Magnets</b>	<b>Tue 02/01/18</b>	<b>Fri 01/12/28</b>	<b>F. Toral, D. Perini</b>	<b>29%</b>	<b>Late</b>														
	WP3.1	<b>Nb3Sn robust performance double aperture 12T cosθ dipole models - CERN</b>	<b>Tue 01/03/22</b>	<b>Tue 31/03/26</b>	<b>D. Perini, L. Baudin</b>	<b>38%</b>	<b>Late</b>														
		WP3.1-T0-D0	Functional specifications	Sat 30/07/22	Sat 31/12/22	L. Baudin	100%	Complete													
		WP3.1-T1-D1	Coil design (cosθ configuration)	Tue 01/03/22	Sun 31/03/24		80%	On Schedule													
		WP3.1-T1-D2	Thermo-mechanical design short model, collared coils option	Mon 01/08/22	Sat 30/09/23		80%	Late													
		WP3.1-T1-D3	Mirror structure to test single coils or single aperture	Sun 01/01/23	Fri 31/10/25		50%	On Schedule													
		WP3.1-T1-D4	Short instrumented mock up, Coll. Coils option (based on existing 11 T coils)	Sun 01/01/23	Sat 30/09/23		50%	Late													
		WP3.1-T1-D5	Short instrumented mock up, B&K option (based on existing 11 T coils)	Wed 01/03/23	Sun 31/12/23		40%	Late													
		WP3.1-T1-D6	Winding - reaction - impregnation - assembly tools	Sun 01/01/23	Mon 30/06/25		20%	Late													
		WP3.1-T1-D7	Winding of test coils	Mon 01/08/22	Fri 31/05/24		10%	Late													
		WP3.1-T1-D8	Winding of coils	Sat 01/06/24	Tue 31/12/24		0%	Future Task													
		WP3.1-T1-D9	Procurement of components for short model - including controls	Sun 01/10/23	Tue 31/12/24		0%	Late													
		WP3.1-T1-D10	Assembly of short model (Collared coils) - including tools	Wed 01/01/25	Tue 31/03/26		0%	Future Task													
	WP3.2	<b>KE4102 INFN (Amend.1)</b>	<b>Sat 01/09/18</b>	<b>Mon 01/12/25</b>	<b>S. Farinon, D. Perini</b>	<b>21%</b>	<b>Late</b>														
		D1.1	Technical desing report	Sat 01/09/18	Fri 01/10/21	S. Farinon, D. Perini	100%	Complete													
		D1.2	Final desing review	Sat 01/09/18	Fri 01/11/24		0%	Late													
		D1.3	Confirmation of the schedule	Sat 01/09/18	Thu 01/06/23		100%	Complete													
		D1.4	Heat treatment and vacuum pressure impregnation tool ready	Sat 01/09/18	Mon 01/04/24		60%	Late													
		D1.5	Approval of manufacturing drawings of cold mass components (CERN, INFN, Indus	Sat 01/09/18	Sun 01/12/24		20%	Late													
		D2.1	Magnet assembly Production Readiness Review	Sat 01/09/18	Sun 01/12/24		0%	Late													
		D2.2	Acceptance of the 3 magnet poles (one spare)	Sat 01/09/18	Sat 01/02/25		0%	Late													
		D2.3	Magnet assembled keys installed	Sat 01/09/18	Thu 01/05/25		0%	Late													
		D2.4	Magnet acceptance CERN, INFN	Sat 01/09/18	Sun 01/06/25		0%	Late													
		D2.5	Final report	Sat 01/09/18	Mon 01/12/25		0%	Late													
	WP3.3	<b>Nb3Sn robust performance 12T long dipole prototype - CERN</b>	<b>Mon 01/07/24</b>	<b>Fri 01/12/28</b>	<b>A. Milanese</b>	<b>0%</b>	<b>Future Task</b>														
		WP3.3-T1	<b>Tooling and first 15 m long Nb3Sn coils</b>	<b>Mon 01/07/24</b>	<b>Fri 01/12/28</b>		<b>0%</b>	<b>Future Task</b>													
		WP3.3-T1-D1	Design of coils (including drawings)	Mon 01/07/24	Tue 01/10/24	A. Milanese	0%	Future Task													
		WP3.3-T1-D2	Design of coil contact toolings (including drawings)	Sun 01/09/24	Tue 01/04/25		0%	Future Task													
		WP3.3-T1-D3a	Procurement of components for coils (2xCu, 4xNb3Sn) and coil contact toolings (1	Fri 01/11/24	Mon 01/03/27		0%	Future Task													
		WP3.3-T1-D3b	Procurement of components for coils (4xNb3Sn)	Fri 01/11/24	Tue 30/03/27		0%	Future Task													
		WP3.3-T1-D4	Manufacture of first set (2xCu, 4xNb3Sn) of coils	Tue 01/09/26	Wed 01/12/27		0%	Future Task													
		WP3.3-T1-D5	Manufacture of second set (4x Nb3Sn) of coils	Sat 01/01/28	Fri 01/12/28		0%	Future Task													
		WP3.3-T2	<b>Test cryo-assembly for 15 m long Nb3Sn coils, including mirror configuration</b>	<b>Sun 01/09/24</b>	<b>Sat 01/07/28</b>		<b>0%</b>	<b>Future Task</b>													
		WP3.3-T2-D1	Design of test cryo-assembly (including drawings)	Sun 01/09/24	Fri 01/08/25		0%	Future Task													
		WP3.3-T2-D2	Procurement of components for test cryo-assembly (including toolings)	Tue 01/04/25	Sat 01/05/27		0%	Future Task													
		WP3.3-T2-D3	Commissioning of mirror type cryo-assembly	Wed 01/09/27	Sat 01/07/28		0%	Future Task													
	WP3.4	<b>Development of support technologies for the Nb3Sn magnets</b>	<b>Fri 01/04/22</b>	<b>Thu 31/12/26</b>	<b>D. Perini</b>	<b>16%</b>	<b>Late</b>														
		WP3.4-T1-D1	Mechanical properties of Nb3Sn coils	Fri 01/04/22	Wed 31/12/25	D. Perini	20%	Late													
		WP3.4-T1-D2	Nb3Sn damages in case of overpressure: experiment and modeling	Thu 01/09/22	Tue 31/12/24		20%	Late													
		WP3.4-T1-D3	Coil - coil electrical connections - splices	Sun 01/01/23	Tue 30/04/24		30%	Late													
		WP3.4-T1-D4	Coil fabrication tools	Sat 01/10/22	Sat 31/08/24		10%	Late													
		WP3.4-T1-D5	Nb3Sn outserts for HTS	Thu 01/05/25	Thu 31/12/26		0%	Future Task													
	WP3.5	<b>Nb3Sn ultimate performance dipole models - CERN</b>	<b>Sat 01/01/22</b>	<b>Tue 30/11/27</b>	<b>J. C. Perez</b>	<b>12%</b>	<b>Late</b>														
		WP3.5-T0	Understand SMC behaviour and fix problems	Tue 15/03/22	Sat 31/12/22	J. C. Perez	20%	Late													
		WP3.5-T1	SMC program - old proposal - wire 11 T	Sat 01/01/22	Sun 31/12/23		50%	Late													
		WP3.5-T2	SMC program - new proposal - wire 0.85	Tue 01/08/23	Sun 30/08/26		5%	Late													
		WP3.5-T3	RMM1b powering tests	Wed 01/06/22	Wed 31/01/24		60%	Late													
		WP3.5-T4	RMM2a magnet construction	Mon 01/05/23	Sun 30/06/24		0%	Late													
		WP3.5-T5	Flared end coil fabrication (cable with 40 strands)	Fri 01/09/23	Mon 31/03/25		0%	Late													
		WP3.5-T6	Test structure for coils (mirror)	Sun 01/01/23	Wed 30/04/25		0%	Late													
		WP3.5-T7	Flared end coil fabrication (optimized cable)	Sun 01/06/25	Thu 31/12/26		0%	Future Task													
		WP3.5-T8	Design studies	Sun 01/01/23	Wed 31/07/24		20%	Late													
		WP3.5-T9	Mock up - straight part with available cable	Fri 01/09/23	Mon 31/03/25		0%	Late													
		WP3.5-T10	Construction of single aperture - optimized cable	Sun 01/06/25	Wed 31/03/27		0%	Future Task													
		WP3.5-T11	Costruction of a double aperture - optimized cable	Thu 01/01/26	Tue 30/11/27		0%	Future Task													



# Overview of the RD Line 3 – WP3.6 to 3.12 (CERN, CEA, CIEMAT, PSI)

Wc Pat	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	% Comj	Status	2023				2024				
					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	
<b>WP3.6 KE3782 CEA (Amendm.1)</b>					82%	<b>Late</b>							
✓	CEA-RD-1.1	FRESCA2 second assembly	100%	Complete	Rochevault, J. C. Perez								
✓	CEA-RD-1.2	Third spare coil for FRESCA2	100%	Complete									
✓	CEA-RD-2.1	Adapted EuroCirCol design to conductor for short dipole model magnet	100%	Complete									
✓	CEA-RD-5.1	Preliminary conceptual design report of the FCC-hh arc quadrupole magnet	100%	Complete									
✓	CEA-RD-5.2	Final conceptual design report of the FCC-hh arc quadrupole magnet	100%	Complete									
✓	CEA-RD-2.2a	11 T SMC-CEA coil	100%	Complete									
📄	CEA-RD-2.2b	R2D2 Engineering design report	80%	Late									
📄	CEA-RD-3.1a	Manufacturing of a R2D2 Cu coil	80%	Late									
📄	CEA-RD-3.1b	Support structure validation	0%	Late									
	CEA - RD-3.2	Manufacturing of two Nb3Sn R2D2 coils	0%	Late									
	CEA-RD-4.1	R2D2 magnet delivered to CERN	0%	Late									
	CEA-RD-4.2a	R2D2 magnet manufacturing folder	0%	Late									
📄	CEA-RD-4.2b	Cold powering test results analysis	0%	Late									
<b>WP3.7 KE3920 CIEMAT (Amend.1)</b>					13%	<b>Late</b>							
📄	UM-IO-1.1	Identification, refurbishment, and provision of building and service	82%	Late	F. Toral, J.C. Perez								
📄	UM-IO-1.2	Set-up and commissioning of the Magnet Laboratory	29%	Late									
📄	UM-IO-2.1	Production of tooling and structure for ERMIC and RMM magnets	0%	Late									
📄	UM-IO-2.2	Production of practice coils	10%	Late									
📄	UM-IO-3.1	High field magnet demonstrator: detailed design	5%	Late									
📄	UM-IO-3.2	High field magnet demonstrator: design and procurement of the tooling	0%	Late									
📄	UM-IO-3.3	High field magnet demonstrator: manufacturing of the coils	0%	Late									
📄	UM-IO-3.4	High field magnet demonstrator: magnet assembly and participation to	0%	Late									
<b>WP3.8 KE4808 PSI (Amend.2)</b>					100%	<b>Complete</b>							
✓	CH2-PSI-1.1	Laboratory building	100%	Complete									
✓	CH2-PSI-1.2	Commissioning reports of laboratory equipment	100%	Complete									
✓	CH2-PSI-1.3	Cryogen-free test station upgrade commissioning report	100%	Complete									
✓	CH2-PSI-2.1	Sample test reports	100%	Complete									
✓	CH2-PSI-3.1	Powered- subscale sample test reports	100%	Complete									
✓	CH2-PSI-3.2	CD2 manufacturing and test report	100%	Complete									
✓	CH2-PSI-3.3	HFM design concept	100%	Complete									
✓	CH2-PSI-4.1	Non-insulated round coil manufacturing and test report	100%	Complete									
✓	CH2-PSI-4.2	Non-insulated racetrack coil manufacturing and test report	100%	Complete									
✓	CH2-PSI-4.3	Coil-stack manufacturing and test report	100%	Complete									
<b>WP3.12 KE5655 CEA</b>					3%	<b>Late</b>							
📄	D1	Non-powered samples	10%	Late									
📄	D2.2.1	Debonding test	33%	Late									
📄	D2.2.2	Sample holder design	3%	Late									
📄	D3.2	Manufacturing of SMC v2 – Coil	24%	Late									
📄	D4.2.1	Manufacturing of R2D2 v2 – Coils	15%	Late									
📄	D4.2.2	Assembly of R2D2 v2 – Magnet	0%	Late									
📄	D5.1.1	Assembly of a FD Magnet v1	0%	Late									
📄	D5.1.2	Assembly of FD v1 – Magnet	0%	Late									
📄	D5.1.3	Manufacturing of FD Coils v2	0%	Late									
📄	D5.1.4	Assembly of a FD Magnet v2	0%	Late									
📄	D5.2.1	F2D2 - Engineering Design report	0%	Late									
📄	D5.2.2	Manufacturing of F2D2 – Coils	0%	Late									
📄	D5.2.3	Assembly of a F2D2 – Magnet	0%	Late									
📄	D5.2.4	R2D2/FD/F2D2 - Manufacturing folder	0%	Late									

# Overview of the RD Line 3 – WP3.6 to 3.12 (CERN, CEA, CIEMAT, PSI)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	Timeline (2021-2027)											
								2021 H1	2021 H2	2022 H1	2022 H2	2023 H1	2023 H2	2024 H1	2024 H2	2025 H1	2025 H2	2026 H1	2026 H2
<b>WP3.6 KE3782 CEA (Amendm.1)</b>								<b>E. Rochepault, J. C. Perez</b>											
✓	CEA-RD-1.1	FRESCA2 second assembly	Tue 02/01/18	Thu 01/12/22	E. Rochepault, J. C. Perez	100%	Complete	[Progress bar]											
✓	CEA-RD-1.2	Third spare coil for FRESCA2	Tue 02/01/18	Thu 01/12/22		100%	Complete	[Progress bar]											
✓	CEA-RD-2.1	Adapted EuroCoil design to conductor for short dipole model magnet	Tue 02/01/18	Fri 02/12/22		100%	Complete	[Progress bar]											
✓	CEA-RD-5.1	Preliminary conceptual design report of the FCC-hh arc quadrupole magnet	Tue 02/01/18	Fri 02/12/22		100%	Complete	[Progress bar]											
✓	CEA-RD-5.2	Final conceptual design report of the FCC-hh arc quadrupole magnet	Tue 02/01/18	Fri 02/12/22		100%	Complete	[Progress bar]											
✓	CEA-RD-2.2a	11 T SMC-CEA coil	Wed 01/04/20	Sun 03/10/21		100%	Complete	[Progress bar]											
✓	CEA-RD-2.2b	R2D2 Engineering design report	Wed 01/04/20	Tue 30/01/24		80%	Late	[Progress bar]											
✓	CEA-RD-3.1a	Manufacturing of a R2D2 Cu coil	Sun 01/01/23	Sat 30/12/23		80%	Late	[Progress bar]											
✓	CEA-RD-3.1b	Support structure validation	Sun 01/10/23	Tue 30/01/24		0%	Late	[Progress bar]											
✓	CEA - RD-3.2	Manufacturing of two Nb3Sn R2D2 coils	Sun 01/10/23	Sun 30/06/24		0%	Late	[Progress bar]											
✓	CEA-RD-4.1	R2D2 magnet delivered to CERN	Sun 01/10/23	Tue 31/12/24		0%	Late	[Progress bar]											
✓	CEA-RD-4.2a	R2D2 magnet manufacturing folder	Sun 01/10/23	Sun 01/06/25		0%	Late	[Progress bar]											
✓	CEA-RD-4.2b	Cold powering test results analysis	Sat 30/09/23	Tue 01/07/25		0%	Late	[Progress bar]											
<b>WP3.7 KE3920 CIEMAT (Amend.1)</b>								<b>F. Toral, J.C. Perez</b>											
✓	UM-IO-1.1	Identification, refurbishment, and provision of building and service	Tue 02/01/18	Tue 30/01/24	F. Toral, J.C. Perez	82%	Late	[Progress bar]											
✓	UM-IO-1.2	Set-up and commissioning of the Magnet Laboratory	Tue 02/01/18	Sat 30/03/24		29%	Late	[Progress bar]											
✓	UM-IO-2.1	Production of tooling and structure for ERMIC and RMM magnets	Tue 02/01/18	Sun 30/06/24		0%	Late	[Progress bar]											
✓	UM-IO-2.2	Production of practice coils	Tue 02/01/18	Mon 30/12/24		10%	Late	[Progress bar]											
✓	UM-IO-3.1	High field magnet demonstrator: detailed design	Tue 02/01/18	Mon 30/12/24		5%	Late	[Progress bar]											
✓	UM-IO-3.2	High field magnet demonstrator: design and procurement of the tooling	Tue 02/01/18	Thu 30/10/25		0%	Late	[Progress bar]											
✓	UM-IO-3.3	High field magnet demonstrator: manufacturing of the coils	Tue 02/01/18	Tue 30/06/26		0%	Late	[Progress bar]											
✓	UM-IO-3.4	High field magnet demonstrator: magnet assembly and participation to cold tests	Tue 02/01/18	Sun 28/02/27		0%	Late	[Progress bar]											
<b>WP3.8 KE4808 PSI (Amend.2)</b>								<b>A. Milanese, B. Auchman</b>											
✓	CH2-PSI-1.1	Laboratory building	Thu 26/11/20	Tue 01/12/20	A. Milanese, B. Auchman	100%	Complete	[Progress bar]											
✓	CH2-PSI-1.2	Commissioning reports of laboratory equipment	Thu 26/11/20	Wed 01/06/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-1.3	Cryogen-free test station upgrade commissioning report	Thu 26/11/20	Wed 01/06/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-2.1	Sample test reports	Thu 26/11/20	Sat 31/12/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-3.1	Powered- subscale sample test reports	Thu 26/11/20	Sat 31/12/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-3.2	CD2 manufacturing and test report	Thu 26/11/20	Sat 31/12/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-3.3	HFM design concept	Thu 26/11/20	Sat 01/10/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-4.1	Non-insulated round coil manufacturing and test report	Thu 26/11/20	Sat 01/10/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-4.2	Non-insulated racetrack coil manufacturing and test report	Thu 26/11/20	Sat 01/10/22		100%	Complete	[Progress bar]											
✓	CH2-PSI-4.3	Coil-stack manufacturing and test report	Thu 26/11/20	Fri 31/03/23		100%	Complete	[Progress bar]											
<b>WP3.12 KE5655 CEA</b>								<b>E. Rochepault, J. C. Perez</b>											
✓	D1	Non-powered samples	Sat 01/04/23	Thu 02/03/28	E. Rochepault, J. C. Perez	10%	Late	[Progress bar]											
✓	D2.2.1	Debonding test	Sat 01/04/23	Sat 02/03/24		33%	Late	[Progress bar]											
✓	D2.2.2	Sample holder design	Sat 01/04/23	Sat 01/06/24		3%	Late	[Progress bar]											
✓	D3.2	Manufacturing of SMC v2 – Coil	Sat 01/04/23	Wed 02/10/24		24%	Late	[Progress bar]											
✓	D4.2.1	Manufacturing of R2D2 v2 – Coils	Sat 01/04/23	Wed 01/01/25		15%	Late	[Progress bar]											
✓	D4.2.2	Assembly of R2D2 v2 – Magnet	Sat 01/04/23	Sun 02/03/25		0%	Late	[Progress bar]											
✓	D5.1.1	Assembly of a FD Magnet v1	Sat 01/04/23	Mon 01/09/25		0%	Late	[Progress bar]											
✓	D5.1.2	Assembly of FD v1 – Magnet	Sat 01/04/23	Mon 01/12/25		0%	Late	[Progress bar]											
✓	D5.1.3	Manufacturing of FD Coils v2	Sat 01/04/23	Fri 02/07/27		0%	Late	[Progress bar]											
✓	D5.1.4	Assembly of a FD Magnet v2	Sat 01/04/23	Wed 01/09/27		0%	Late	[Progress bar]											
✓	D5.2.1	F2D2 - Engineering Design report	Sat 01/04/23	Sat 01/08/26		0%	Late	[Progress bar]											
✓	D5.2.2	Manufacturing of F2D2 – Coils	Sat 01/04/23	Thu 01/10/26		0%	Late	[Progress bar]											
✓	D5.2.3	Assembly of a F2D2 – Magnet	Sat 01/04/23	Fri 01/01/27		0%	Late	[Progress bar]											
✓	D5.2.4	R2D2/FD/F2D2 - Manufacturing folder	Sat 01/04/23	Thu 02/03/28		0%	Late	[Progress bar]											

# Overview of the RD Line 4 – WP4.1 to 4.5

(CERN, ETHZ)

Wc	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	% Com	Status	2023				2024					
					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4		
RD4	RD4	<b>Modelling Tools, Materials Protection and Cryogenics</b>	17%	Late										
	WP4.1	<b>Common modelling and simulation tools for HFM magnets and</b>	0%	Late										
	WP4.1-T1	Database structure of material data in ROXIE and other simulati	0%	Late										S. Russenschuck
	WP4.1-T2	Review of quench simulations in ROXIE (scaling laws, 1D, co-sin	0%	Late										
	WP4.1-T3	Interface review of end-spacer manufacture	0%	Late										
	WP4.1-T4	ROXIE versioning systems, documentation, and use cases (new	0%	Late										
	WP4.1-T5	Database and asset management structure for product cycle de	0%	Late										
	WP4.1-T6	Differential geometry implementation of coil end variants (flar	0%	Late										
	WP4.1-T7	Extension of integrated desing methodology (quench, stress m	0%	Late										
	WP4.1-T8	Environment for open software architecture	0%	Late										
	WP4.1-T9	Dynamic effects in HTS material (status and validation)	0%	Late										
	WP4.1-T10	Support for electromagnetic design of 12 T and 14 T	0%	Late										
	WP4.1-T11	Support for electromagnetic design of HTS demonstrators and p	0%	Future Task										
	WP4.2	<b>Structural materials for HFM magnets - CERN</b>	9%	Late										
	WP4.2-T1	<b>Structural material characterisation</b>	9%	Late										
	WP4.2-T1-D1	Inventory of materials and their mechanical properties	20%	Late										
	WP4.2-T1-D2	Survey and documentation (database) of their thermal mechan	20%	Late										
	WP4.2-T1-D3	Characterisation of new materials	0%	Late										
	WP4.3	<b>Insulation materials for HFM magnet coils and conductors - CER</b>	14%	Late										
	WP4.3-T1	Radiation Resistance	15%	Late										
	WP4.3-T2	Impact of heat treatment on insulating materials	25%	Late										
	WP4.3-T3	Characterization of adhesion	25%	Late										
	WP4.3-T4	Characterization and development of enhanced resins	15%	Late										
	WP4.3-T5	Development of enhanced cable dielectric insulations	0%	Future Task										
	WP4.3-T6	Development of dielectric insulation for HTS	0%	Future Task										
	WP4.4	<b>KE4738 ETHZ</b>	77%	Late										
	CH2-SMG-1.1	Establishing new test setups and procedures	100%	Complete										
	CH2-SMG-1.2	Direction of research for high toughness resins	100%	Complete										
	CH2-SMG-1.3	Interim report on the development of high toughness resins	100%	Complete										
	CH2-SMG-1.4	Interim report on processing high toughness resins	100%	Complete										
	CH2-SMG-1.5	Detailed characterization and optimization of the new referenc	100%	Complete										
	CH2-SMG-1.6	Final written report	0%	Late										
	WP4.5	<b>Quench detection, protection and diagnostic methods for Nb3S</b>	12%	Late										
	WP4.5-T1	<b>Detection Technology Development</b>	8%	Late										
	WP4.5-T1-D1	Optimization of HTS conductor for quench detection	0%	Future Task										
	WP4.5-T1-D2	Advanced signal processing and filtering for detection	0%	Future Task										
	WP4.5-T1-D3	Temperature based detection methods	0%	Future Task										
	WP4.5-T1-D4	Novel quench detection methods	0%	Future Task										
	WP4.5-T1-D5	Impedance based detection methods	45%	Late										
	WP4.5-T2	<b>Conductors for protection</b>	0%	Future Task										
	WP4.5-T2-D1	Architecture and specification - Nb3Sn	0%	Future Task										
	WP4.5-T2-D2	Architecture and specification - HTS	0%	Future Task										
	WP4.5-T3	<b>Protection Limits Development</b>	0%	Future Task										
	WP4.5-T3-D1	Definition of key measures	0%	Future Task										
	WP4.5-T3-D2	Establishing target values	0%	Future Task										
	WP4.5-T3-D3	Simulations for the new measures	0%	Future Task										
	WP4.5-T4	<b>Protection Technology Development</b>	9%	Late										
	WP4.5-T4-D1	Studies of powering schemes	5%	Late										
	WP4.5-T4-D2	Local E-CLIQ development	16%	Late										
	WP4.5-T4-D3	Secondary E-CLIQ development	10%	Late										
	WP4.5-T4-D4	Development of advanced shunts for HTS	0%	Future Task										
	WP4.5-T4-D5	Concepts for protection of HTS coils	15%	On Schedule										
	WP4.5-T4-D6	Non-linear EE development	5%	Late										
	WP4.5-T4-D7	Magnetic coupling for EE	10%	Late										
	WP4.5-T4-D8	Energy recuperation methods	0%	Late										
	WP4.5-T5	<b>Models and Simulations Tools Development</b>	18%	Late										
	WP4.5-T5-D1	HFM protection studies (requests from RDs)	10%	Late										
	WP1.1-T5-D2	Accelerator availability studies	0%	Future Task										
	WP1.1-T5-D3	Properties of diversified conductors	5%	Future Task										
	WP1.1-T5-D4	Conductors in protection	5%	Future Task										
	WP1.1-T5-D5	E-CLIQ tools development	9%	Late										
	WP1.1-T5-D6	HTS quench tools development	9%	Late										
	WP1.1-T5-D7	Advanced EE tools development	10%	Late										
	WP1.1-T5-D8	Coupled structural and quench tools	16%	Late										
	WP1.1-T5-D9	Transient thermal tools	34%	On Schedule										
	WP1.1-T5-D10	Parametrized quench tools	34%	On Schedule										
	WP1.1-T5-D11	New materials in quench simulations	34%	On Schedule										
	WP1.1-T5-D12	Hybrid magnets tools	0%	Future Task										
	WP1.1-T5-D13	CCT magnet tools	25%	Late										



# Overview of the RD Line 4 – WP4.1 to 4.5 (CERN, ETHZ)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	2021	2022	2023	2024	2025	2026	2027	
								H1	H2	H1	H2	H1	H2	H1	H2
RD4	RD4	Modelling Tools, Materials Protection and Cryogenics	Sat 01/02/20	Fri 31/12/27	S. Farinon, C. Garlon	17%	Late								
	WP4.1	Common modelling and simulation tools for HFM magnets and conductors - CERN	Fri 01/01/22	Sun 31/01/23	S. Russenschuck	0%	Late								
	WP4.1-T1	Database structure of material data in ROXIE and other simulation tools	Fri 01/07/22	Sat 01/06/24	S. Russenschuck	0%	Late								
	WP4.1-T2	Review of quench simulations in ROXIE (scaling laws, 1D, co-simulation, document)	Fri 01/07/22	Sun 31/12/23		0%	Late								
	WP4.1-T3	Interface review of end-spacer manufacture	Fri 01/07/22	Sat 01/06/24		0%	Late								
	WP4.1-T4	ROXIE versioning systems, documentation, and use cases (new release)	Fri 01/07/22	Sat 01/06/24		0%	Late								
	WP4.1-T5	Database and asset management structure for product cycle development	Fri 01/07/22	Sat 31/01/26		0%	Late								
	WP4.1-T6	Differential geometry implementation of coil end variants (flared, cloverleaf, con)	Fri 01/07/22	Fri 31/01/25		0%	Late								
	WP4.1-T7	Extension of integrated design methodology (quench, stress management, eddy)	Fri 01/07/22	Sat 31/01/26		0%	Late								
	WP4.1-T8	Environment for open software architecture	Fri 01/07/22	Fri 31/01/25		0%	Late								
	WP4.1-T9	Dynamic effects in HTS material (status and validation)	Fri 01/09/23	Sun 31/01/27		0%	Late								
	WP4.1-T10	Support for electromagnetic design of 12 T and 14 T	Fri 01/07/22	Mon 01/12/25		0%	Late								
	WP4.1-T11	Support for electromagnetic design of HTS demonstrators and hybrid	Sat 01/06/24	Tue 30/09/25		0%	Future Task								
	WP4.2	Structural materials for HFM magnets - CERN	Sun 01/01/23	Tue 30/12/25	C. Garlon	9%	Late								
	WP4.2-T1	Structural material characterisation	Sun 01/01/23	Tue 30/12/25	C. Garlon	9%	Late								
	WP4.2-T1-01	Inventory of materials and their mechanical properties	Sun 01/01/23	Sun 31/12/23		20%	Late								
	WP4.2-T1-02	Survey and documentation (database) of their thermal mechanical	Sun 01/01/23	Sat 30/03/24		20%	Late								
	WP4.2-T1-03	Characterisation of new materials	Sun 01/01/23	Tue 30/12/25		0%	Late								
	WP4.3	Insulation materials for HFM magnet coils and conductors - CERN	Sat 01/01/22	Wed 01/12/27	R. Piccin	14%	Late								
	WP4.3-T1	Radiation Resistance	Sat 01/01/22	Wed 01/12/27	R. Piccin	15%	Late								
	WP4.3-T2	Impact of heat treatment on insulating materials	Tue 01/03/22	Mon 01/12/25		25%	Late								
	WP4.3-T3	Characterization of adhesion	Sat 01/01/22	Mon 01/12/25		25%	Late								
	WP4.3-T4	Characterization and development of enhanced resins	Sat 01/01/22	Wed 01/12/27		15%	Late								
	WP4.3-T5	Development of enhanced cable dielectric insulations	Mon 01/01/24	Wed 01/12/27		0%	Future Task								
	WP4.3-T6	Development of dielectric insulation for HTS	Mon 01/04/24	Wed 01/12/27		0%	Future Task								
	WP4.4	KE378 ETHZ	Sat 01/02/20	Sat 30/03/24	T. Tervoort, R. Piccin	77%	Late								
	CH2-SMG-1.1	Establishing new test setups and procedures	Sat 01/02/20	Sat 30/04/22	T. Tervoort, R. Piccin	100%	Complete								
	CH2-SMG-1.2	Direction of research for high toughness resins	Sat 01/02/20	Sat 30/04/22		100%	Complete								
	CH2-SMG-1.3	Interim report on the development of high toughness resins	Sat 01/02/20	Fri 30/09/22		100%	Complete								
	CH2-SMG-1.4	Interim report on processing high toughness resins	Sat 01/02/20	Thu 30/03/23		100%	Complete								
	CH2-SMG-1.5	Detailed characterization and optimization of the new reference resin	Sat 01/02/20	Sat 30/09/23		100%	Complete								
	CH2-SMG-1.6	Final written report	Sat 01/02/20	Sat 30/03/24		0%	Late								
	WP4.5	Quench detection, protection and diagnostic methods for Nb3Sn and HTS high-field	Wed 01/09/21	Fri 31/12/27	M. Wozniak	12%	Late								
	WP4.5-T1	Detection Technology Development	Wed 01/06/22	Fri 31/12/27	M. Wozniak	8%	Late								
	WP4.5-T1-01	Optimization of HTS conductor for quench detection	Mon 01/01/24	Fri 31/12/27		0%	Future Task								
	WP4.5-T1-02	Advanced signal processing and filtering for detection	Sat 01/06/24	Fri 31/12/27		0%	Future Task								
	WP4.5-T1-03	Temperature based detection methods	Sat 01/06/24	Fri 31/12/27		0%	Future Task								
	WP4.5-T1-04	Novel quench detection methods	Sat 01/06/24	Fri 31/12/27		0%	Future Task								
	WP4.5-T1-05	Impedance based detection methods	Wed 01/06/22	Mon 30/06/25		45%	Late								
	WP4.5-T2	Conductors for protection	Mon 01/01/24	Tue 30/09/25		0%	Future Task								
	WP4.5-T2-01	Architecture and specification - Nb3Sn	Mon 01/01/24	Tue 30/09/25		0%	Future Task								
	WP4.5-T2-02	Architecture and specification - HTS	Mon 01/01/24	Tue 30/09/25		0%	Future Task								
	WP4.5-T3	Protection Limits Development	Wed 01/01/25	Fri 31/12/27		0%	Future Task								
	WP4.5-T3-01	Definition of key measures	Wed 01/01/25	Fri 31/12/27		0%	Future Task								
	WP4.5-T3-02	Establishing target values	Wed 01/01/25	Fri 31/12/27		0%	Future Task								
	WP4.5-T3-03	Simulations for the new measures	Wed 01/01/25	Fri 31/12/27		0%	Future Task								
	WP4.5-T4	Protection Technology Development	Sun 01/01/23	Fri 31/12/27		9%	Late								
	WP4.5-T4-01	Studies of powering schemes	Tue 01/08/23	Sun 02/08/26		5%	Late								
	WP4.5-T4-02	Local E-CLIQ development	Sun 01/01/23	Fri 31/12/27		16%	Late								
	WP4.5-T4-03	Secondary E-CLIQ development	Mon 01/05/23	Fri 31/12/27		10%	Late								
	WP4.5-T4-04	Development of advanced shunts for HTS	Sat 01/06/24	Fri 31/12/27		0%	Future Task								
	WP4.5-T4-05	Concepts for protection of HTS coils	Wed 01/02/23	Fri 31/12/27		15%	Late								
	WP4.5-T4-06	Non-linear EE development	Fri 03/09/23	Tue 01/09/26		5%	Late								
	WP4.5-T4-07	Magnetic coupling for EE	Mon 01/05/23	Fri 31/12/27		10%	Late								
	WP4.5-T4-08	Energy recuperation methods	Fri 01/09/23	Tue 01/09/26		0%	Late								
	WP4.5-T5	Models and Simulations Tools Development	Wed 01/09/21	Fri 31/12/27		18%	Late								
	WP1.1-T5-01	HFM protection studies (requests from RDs)	Sat 01/04/23	Fri 31/12/27		10%	Late								
	WP1.1-T5-02	Accelerator availability studies	Wed 01/01/25	Fri 31/12/27		0%	Future Task								
	WP1.1-T5-03	Properties of diversified conductors	Wed 01/01/25	Fri 31/12/27		5%	Future Task								
	WP1.1-T5-04	Conductors in protection	Wed 01/01/25	Fri 31/12/27		5%	Future Task								
	WP1.1-T5-05	E-CLIQ tools development	Sun 01/01/23	Fri 31/12/27		9%	Late								
	WP1.1-T5-06	HTS quench tools development	Sun 01/01/23	Fri 31/12/27		9%	Late								
	WP1.1-T5-07	Advanced EE tools development	Mon 01/05/23	Fri 31/12/27		10%	Late								
	WP1.1-T5-08	Coupled structural and quench tools	Sun 01/01/23	Fri 31/12/27		16%	Late								
	WP1.1-T5-09	Transient thermal tools	Wed 01/09/21	Fri 31/12/27		34%	Late								
	WP1.1-T5-10	Parameterized quench tools	Wed 01/09/21	Fri 31/12/27		34%	Late								
	WP1.1-T5-11	New materials in quench simulations	Wed 01/09/21	Fri 31/12/27		34%	Late								
	WP1.1-T5-12	Hybrid magnets tools	Wed 01/01/25	Fri 31/12/27		0%	Future Task								
	WP1.1-T5-13	CCT magnet tools	Sun 01/05/22	Fri 31/12/27		25%	Late								

# Overview of the RD Line 4 – WP4.6 (CERN)

Wc Par	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	% Compl	Status	2023				2024				
					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	
	▲ WP4.6	<b>Cryogenic and thermal management studies for HFM magnets - CERN</b>	17%	Late									
	▲ WP4.6-T1	<b>Innovative large scale cryogenic infrastructure options towards reduced helium consumption</b>	44%	Late									
	WP4.6-T1-D1	Case studies studies for future accelerators under consideration	50%	On Schedule									
	WP4.6-T1-D2	Review of sustainable cooling options using superfluid, saturated and s	50%	On Schedule									
	WP4.6-T1-D3	Review of alternative cooling schemes at temperatures above 20 K	25%	Late									
	▲ WP4.6-T2	<b>Thermal properties of magnet components at cryogenic temperatures</b>	23%	Late									
	WP4.6-T2-D1	Thermal conductivity, thermal diffusivity and specific heat of pure epo:	5%	Late									
	WP4.6-T2-D2	Thermal expansion/contraction of pure epoxy resins (WP4.4)	50%	On Schedule									
	WP4.6-T2-D3	Superfluid He permeability of pure epoxy resins (WP4.4)	50%	On Schedule									
	WP4.6-T2-D4	Thermal conductivity, thermal diffusivity and specific heat of magnet a	10%	Late									
	WP4.6-T2-D5	Thermal conductivity, thermal diffusivity and specific heat of coil mock	10%	Future Task									
	WP4.6-T2-D6	Yellow Report on low temperature thermal properties of magnet comp	0%	Future Task									
	▲ WP4.6-T3	<b>Thermal design, modelisation and validation of coils towards reduced r</b>	11%	Late									
	WP4.6-T3-D1	Study on Nb3Sn-coils at 1.9 K (RD3)	50%	On Schedule									
	WP4.6-T3-D2	Study on Nb3Sn-coils at 4.5 K (RD3)	20%	Late									
	WP4.6-T3-D3	Study on Nb3Sn-coils at 5.0 K (RD3)	20%	Late									
	WP4.6-T3-D4	Summary review report on thermal design options for Nb3Sn-coils (RD:	0%	Future Task									
	WP4.6-T3-D5	Study on Alternative wires (HTS, iron-based...)-coils at 1.9 K (RD2)	10%	On Schedule									
	WP4.6-T3-D6	Study on Alternative wires (HTS, iron-based...)-coils at 4.5 K (RD2)	10%	On Schedule									
	WP4.6-T3-D7	Study on Alternative wires (HTS, iron-based...)-coils at > 5.0 K (RD2)	10%	On Schedule									
	WP4.6-T3-D8	Study on Hybrid coils (RD2 & RD3)	0%	Late									
	WP4.6-T3-D9	Summary review report on thermal design options for Alternative (HTS	0%	Late									
	WP4.6-T3-D10	Demonstrator of reduced helium content cooling variants for Nb3Sn	0%	Future Task									
	WP4.6-T3-D11	Demonstrator of reduced helium content cooling variants for HTS, iron-	0%	Future Task									
	WP4.6-T3-D12	Heat extraction measurement of coil-packs (RD2 & RD3)	0%	Late									
	▲ WP4.6-T4	<b>Modelisation of full cold mass designs' thermal performance</b>	0%	Future Task									
	WP4.6-T4-D1	Robust performance Nb3Sn 12T-dipole (WP3.3)	0%	Future Task									
	WP4.6-T4-D2	Ultimate performance Nb3Sn dipole (WP3.5)	0%	Future Task									
	WP4.6-T4-D3	HTS, iron-based, MgB2,... (non-Nb3Sn) magnets (RD2)	0%	Future Task									
	▲ WP4.6-T5	<b>Small scale, variable temperature-range HTS-coils and splice characteri</b>	5%	Late									
	WP4.6-T5-D1	HTS splice tests in 5T background field	10%	On Schedule									
	WP4.6-T5-D2	Small HTS coils tests 4 K - 70 K	0%	Late									
	▲ WP4.6-T6	<b>Thermal aspects of quench protection with WP4.5</b>	3%	Future Task									
	WP4.6-T6-D1	Experimental demonstration of External-CLIQ concepts in a cryogenic e	10%	Future Task									
	WP4.6-T6-D2	Studies of energy extraction and energy recuperation for magnet chain	0%	Future Task									
	WP4.6-T6-D3	Quantifying the impact of new, reduced He content cooling schemes on	0%	Future Task									
	▲ WP4.6-T7	<b>Test stands for HFM measurements</b>	55%	Late									
	WP4.6-T7-D1	Dedicated thermal conductivity, diffusivity and specific heat test stand	40%	Late									
✓	WP4.6-T7-D2	Upgrade of thermal expansion/contraction test stand	100%	Complete									
✓	WP4.6-T7-D3	Upgrade of Superfluid He permeability test stand	100%	Complete									
✓	WP4.6-T7-D4	Upgrade of test stand for heat extraction measurement of coil packs	100%	Complete									
	WP4.6-T7-D5	Upgrade of variable temperature range test stand for HTS coils and splic	0%	Late									
	WP4.6-T7-D6	Test stand for demonstrator of reduced helium content cooling variant:	10%	Future Task									





# Overview of the RD Line 4 – WP4.6 (CERN)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	2021 H1	2021 H2	2022 H1	2022 H2	2023 H1	2023 H2	2024 H1	2024 H2	2025 H1	2025 H2	2026 H1	2026 H2	2027 H1	2027 H2
	▲ WP4.6	<b>Cryogenic and thermal management studies for HFM magnets - CERN</b>	Thu 01/09/22	Fri 31/12/27	P. Borges de Sousa, R. va	17%	Late														
	▲ WP4.6-T1	<b>Innovative large scale cryogenic infrastructure options towards reduced accelerat</b>	Sun 01/01/23	Wed 31/12/25		44%	Late														
	WP4.6-T1-D1	Case studies studies for future accelerators under consideration	Sun 01/01/23	Wed 31/12/25	P. Borges de Sousa, R. va	50%	On Schedule														
	WP4.6-T1-D2	Review of sustainable cooling options using superfluid, saturated and supercritic	Sun 01/01/23	Wed 31/12/25		50%	On Schedule														
	WP4.6-T1-D3	Review of alternative cooling schemes at temperatures above 20 K	Sun 01/01/23	Tue 31/12/24		25%	Late														
	▲ WP4.6-T2	<b>Thermal properties of magnet components at cryogenic temperatures</b>	Thu 01/09/22	Fri 31/12/27		23%	Late														
	WP4.6-T2-D1	Thermal conductivity, thermal diffusivity and specific heat of pure epoxy resins (V	Thu 01/09/22	Fri 31/12/27		5%	Late														
	WP4.6-T2-D2	Thermal expansion/contraction of pure epoxy resins (WP4.4)	Sun 01/01/23	Fri 31/12/27		50%	On Schedule														
	WP4.6-T2-D3	Superfluid He permeability of pure epoxy resins (WP4.4)	Sun 01/01/23	Wed 31/12/25		50%	On Schedule														
	WP4.6-T2-D4	Thermal conductivity, thermal diffusivity and specific heat of magnet and cold-me	Sun 01/01/23	Fri 31/12/27		10%	Late														
	WP4.6-T2-D5	Thermal conductivity, thermal diffusivity and specific heat of coil mock-ups (RD2	Mon 01/01/24	Wed 31/03/27		10%	Future Task														
	WP4.6-T2-D6	Yellow Report on low temperature thermal properties of magnet components	Fri 01/01/27	Fri 31/12/27		0%	Future Task														
	▲ WP4.6-T3	<b>Thermal design, modelisation and validation of coils towards reduced magnets' h</b>	Sun 01/01/23	Fri 31/12/27		11%	Late														
	WP4.6-T3-D1	Study on Nb3Sn-coils at 1.9 K (RD3)	Sun 01/01/23	Wed 31/12/25		50%	On Schedule														
	WP4.6-T3-D2	Study on Nb3Sn-coils at 4.5 K (RD3)	Sun 01/01/23	Wed 31/12/25		20%	Late														
	WP4.6-T3-D3	Study on Nb3Sn-coils at 5.0 K (RD3)	Sun 01/01/23	Wed 31/12/25		20%	Late														
	WP4.6-T3-D4	Summary review report on thermal design options for Nb3Sn-coils (RD2)	Mon 01/09/25	Wed 31/12/25		0%	Future Task														
	WP4.6-T3-D5	Study on Alternative wires (HTS, iron-based...)-coils at 1.9 K (RD2)	Sat 30/09/23	Wed 30/09/26		10%	On Schedule														
	WP4.6-T3-D6	Study on Alternative wires (HTS, iron-based...)-coils at 4.5 K (RD2)	Sat 30/09/23	Wed 30/09/26		10%	On Schedule														
	WP4.6-T3-D7	Study on Alternative wires (HTS, iron-based...)-coils at > 5.0 K (RD2)	Sat 30/09/23	Wed 30/09/26		10%	On Schedule														
	WP4.6-T3-D8	Study on Hybrid coils (RD2 & RD3)	Sat 30/09/23	Wed 30/09/26		0%	Late														
	WP4.6-T3-D9	Summary review report on thermal design options for Alternative (HTS, iron-base	Sat 30/09/23	Wed 30/09/26		0%	Late														
	WP4.6-T3-D10	Demonstrator of reduced helium content cooling variants for Nb3Sn	Mon 30/09/24	Fri 31/12/27		0%	Future Task														
	WP4.6-T3-D11	Demonstrator of reduced helium content cooling variants for HTS, iron-based, Mg	Mon 30/09/24	Fri 31/12/27		0%	Future Task														
	WP4.6-T3-D12	Heat extraction measurement of coil-packs (RD2 & RD3)	Sat 30/09/23	Thu 31/12/26		0%	Late														
	▲ WP4.6-T4	<b>Modelisation of full cold mass designs' thermal performance</b>	Mon 01/01/24	Thu 31/12/26		0%	Future Task														
	WP4.6-T4-D1	Robust performance Nb3Sn 12T-dipole (WP3.3)	Mon 01/01/24	Tue 31/12/24		0%	Future Task														
	WP4.6-T4-D2	Ultimate performance Nb3Sn dipole (WP3.5)	Wed 01/01/25	Wed 31/12/25		0%	Future Task														
	WP4.6-T4-D3	HTS, iron-based, MgB2,... (non-Nb3Sn) magnets (RD2)	Wed 01/01/25	Thu 31/12/26		0%	Future Task														
	▲ WP4.6-T5	<b>Small scale, variable temperature-range HTS-coils and splice characterisation</b>	Fri 01/09/23	Fri 31/12/27		5%	Late														
	WP4.6-T5-D1	HTS splice tests in ST background field	Fri 01/09/23	Fri 31/12/27		10%	On Schedule														
	WP4.6-T5-D2	Small HTS coils tests 4 K - 70 K	Fri 01/09/23	Fri 31/12/27		0%	Late														
	▲ WP4.6-T6	<b>Thermal aspects of quench protection with WP4.5</b>	Mon 01/01/24	Fri 03/12/27		3%	Future Task														
	WP4.6-T6-D1	Experimental demonstration of External-CLIQ concepts in a cryogenic environmer	Mon 01/01/24	Thu 02/12/27		10%	Future Task														
	WP4.6-T6-D2	Studies of energy extraction and energy recuperation for magnet chain: impact or	Tue 02/01/24	Fri 03/12/27		0%	Future Task														
	WP4.6-T6-D3	Quantifying the impact of new, reduced He content cooling schemes on magnet p	Wed 03/01/24	Thu 02/12/27		0%	Future Task														
	▲ WP4.6-T7	<b>Test stands for HFM measurements</b>	Thu 01/09/22	Sat 31/05/25		55%	Late														
	WP4.6-T7-D1	Dedicated thermal conductivity, diffusivity and specific heat test stand	Thu 01/09/22	Fri 01/12/23		40%	Late														
	WP4.6-T7-D2	Upgrade of thermal expansion/contraction test stand	Thu 01/09/22	Sat 31/12/22		100%	Complete														
	WP4.6-T7-D3	Upgrade of Superfluid He permeability test stand	Sun 01/01/23	Fri 01/12/23		100%	Complete														
	WP4.6-T7-D4	Upgrade of test stand for heat extraction measurement of coil packs	Sun 01/01/23	Sun 31/12/23		100%	Complete														
	WP4.6-T7-D5	Upgrade of variable temperature range test stand for HTS coils and splices	Fri 01/09/23	Sun 31/12/23		0%	Late														
	WP4.6-T7-D6	Test stand for demonstrator of reduced helium content cooling variants including	Mon 01/01/24	Sat 31/05/25		10%	Future Task														



# Overview of the RD Line 5 – WP5.1 to 5.5 (CERN)

Wc	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	% Compt	Status	2023	2024						
Pat					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
RDS	RDS	<b>Infrastructures and Measurement Techniques</b>	5%	Late								
	WP5.1	<b>Test infrastructure needs for the HFM R&amp;D programme - CERN</b>	5%	Late								
	WP5.1-T1	Integration studies, tooling and manufacturing for Nb3Sn and HTS magnets	0%	Future Task								
	WP4.1-T2	Integration studies, tooling and manufacturing for magnet tests in 14 T	0%	Future Task								
	WP5.1-T3	Refurbishment of mechanics test station (LN2)	0%	Future Task								
	WP5.1-T4	Anticryostat for the vertical station (Cluster D) Uppsala Collaboration	15%	Late								
	WP5.1-T5	New insert for Cluster D	20%	Late								
	WP5.1-T6	Anticryostat for the horizontal cryostat station	0%	On Schedule								
	WP5.1-T7	Software and control updates for operation	3%	Late								
	WP5.1-T9	Cryocooler refurbishment (calibration of instruments)	0%	Future Task								
	WP5.1-T10	G-cluster reliability upgrade	5%	Late								
	WP5.2	<b>Infrastructure needs for conductors - CERN</b>	6%	Late								
	WP5.2-T1	<b>Infrastructure for Cabling and Characterisation</b>	16%	Late								
	WP5.2-T1-D1	Procurement and installation of new critical current stations (B<math>218T</math> and	0%	Late								
	WP5.2-T1-D1-M1	Conceptual design including integration in B163 and ancillaries (e.g. cu	100%	Complete								
	WP5.2-T1-D1-M2	Elaboration of specifications including interfaces and drawings of comp	70%	Late								
	WP5.2-T1-D1-M3	Tender process, procurement and fabrication of magnets and test stati	20%	On Schedule								
	WP5.2-T1-D1-M4	Assembly of the critical current stations including Data Acquisition soft	0%	Future Task								
	WP5.2-T1-D1-M5	Commissioning of the stations	0%	Future Task								
	WP5.2-T1-D2	<b>Procurement and installation of new cabling machine (up to about 60 s</b>	7%	Late								
	WP5.2-T1-D2-M1	Elaboration of Technical Specification of cabling machine	30%	Late								
	WP5.2-T1-D2-M2	Tender process	0%	Future Task								
	WP5.2-T1-D2-M3	Electronics and software for cabling and QA/QC	0%	Late								
	WP5.2-T1-D2-M4	Study for installation of potential insulation/braiding machines	20%	Late								
	WP5.2-T1-D2-M5	Procurement and fabrication of the cabling machine	0%	Future Task								
	WP5.2-T1-D2-M6	Installation and commissioning of cabling machine	0%	Future Task								
	WP5.2-T1-D3	<b>Upgrade of FRESCA stations</b>	0%	Future Task								
	WP5.2-T1-D3-M1	Sample insert design and fabrication for 60-strand cables and including	0%	Future Task								
	WP5.2-T1-D3-M2	FRESCA 2 testing of 60-strand cable sample	0%	Future Task								
	WP5.2-T1-D3-M3	Conceptual study for potential FRESCA 3 station with B<math>215T</math> (size, requi	0%	Future Task								
	WP5.2-T1-D4	<b>Procurement and installation of new cabling machine (up to about 60 s</b>	0%	Late								
	WP5.2-T1-D4-M1	Supply of spare solenoid for existing Ic stations (B=15-17 T), upgrade VS	0%	Late								
	WP5.2-T1-D4-M1a	Supply of spare solenoid for existing Ic stations (B=15-17 T), upgrade VS	20%	Late								
	WP5.2-T1-D4-M1b	Supply of spare solenoid for existing Ic stations (B=15-17 T), upgrade VS	0%	Late								
	WP5.2-T1-D4-M1c	Supply of spare solenoid for existing Ic stations (B=15-17 T), upgrade VS	0%	Late								
	WP5.2-T1-D4-M2	Design and fabrication of adapted sample insert and sample holder for	0%	Future Task								
	WP5.2-T1-D4-M3	Study of infrastructure requirements for HTS conductors	0%	Future Task								
	WP5.2-T1-D4-M4	Supply of a furnace for thermal expansion measurement during heat tr	0%	Late								
	WP5.2-T1-D4-M5	Supply of a reaction oven for strand/cable samples	0%	Future Task								
	WP5.2-T1-D4-M6	Supply of a tensile/twisting machine for cable check	0%	Late								
	WP5.2-T1-D4-M7	Design and construction of a test facility for current leads, cables and s	0%	Late								
	WP5.2-T1-D4-M8	Inserts for split coil (10 T) and solenoid (20 T)	0%	Future Task								
	WP5.3	<b>Infrastructure needs for demonstrator and short magnet models - CERN</b>	10%	Late								
	WP5.3-T1-D1	Upgrade of manufacturing facilities	10%	Late								
	WP5.4	<b>Infrastructure needs for the construction of full-scale prototypes - CERN</b>	0%	Late								
	WP5.4-T1-D1	Reaction furnace	0%	Late								
	WP5.4-T1-D2	Vacuum pressure impregnation station	0%	Future Task								
	WP5.4-T1-D3	Marble and metrology needs	0%	Future Task								
	WP5.4-T1-D4	Reconfiguration of winding machine and forming / curing press	0%	Future Task								
	WP5.5	<b>Transducers, instrumentation and measurement equipment needs for</b>	5%	Late								
	WP5.5-T1	Measurement system for the 12 T robust short models at ambient temper	0%	Late								
	WP5.5-T2	Measurement system for the 12 T robust short models at cryogenic tem	0%	Late								
	WP5.5-T3	Measurement system for the 12 T long prototypes at ambient temperat	0%	Future Task								
	WP5.5-T4	Instruments for measurements of the 12 T long prototypes at cryogenic	0%	Future Task								
	WP5.5-T5	Measurement system for the 14+ T (Mirror and single aperture)	0%	Future Task								
	WP5.5-T6	Measurement system for the 14+ T (Double aperture)	0%	Future Task								
	WP5.5-T7	Review of instrumentation needs for HTS magnets	20%	Late								
	WP5.5-T8	Instrumentation for the racetrack coils with bore	0%	Future Task								
	WP5.5-T9	Data acquisition system with on-line processing	100%	Complete								
	WP5.5-T10	Data acquisition system for small-amplitude signals (Improvement of C	20%	Late								
	WP5.5-T11	DAQ control software for new acquisition systems	0%	Future Task								
	WP5.5-T12	New integrators, sensors and calibration	0%	Future Task								
	WP5.5-T13	Off-The-shelf magnetic measurement system for collaborations	20%	Late								



# Overview of the RD Line 5 – WP5.1 to 5.5 (CERN)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	2021		2022		2023		2024		2025		2026		2027	
								H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2		
<b>RD5</b>	<b>RD5</b>	<b>Infrastructures and Measurement Techniques</b>	<b>Fri 01/07/22</b>	<b>Wed 01/12/27</b>		<b>5%</b>	<b>Late</b>														
	<b>WP5.1</b>	<b>Test infrastructure needs for the HFM R&amp;D programme - CERN</b>	<b>Fri 01/07/22</b>	<b>Wed 01/12/27</b>	<b>S. Russenschuck, F. J. Ma</b>	<b>5%</b>	<b>Late</b>														
		WPS.1-T1	Integration studies, tooling and manufacturing for Nb3Sn and HTS magnet test in t	Mon 01/01/24	Wed 01/01/25	S. Russenschuck, F. J. Ma	0%	Future Task													
		WPS.1-T2	Integration studies, tooling and manufacturing for magnet tests in 14 T background	Wed 01/01/25	Wed 01/07/26		0%	Future Task													
		WPS.1-T3	Refurbishment of mechanics test station (LN2)	Fri 01/03/24	Sun 01/03/26		0%	Future Task													
		WPS.1-T4	Anticryostat for the vertical station (Cluster D) Uppsala Collaboration	Fri 01/07/22	Sat 01/02/25		15%	Late													
		WPS.1-T5	New insert for Cluster D	Fri 01/07/22	Sat 01/02/25		20%	Late													
		WPS.1-T6	Anticryostat for the horizontal cryostat station	N/A	N/A		0%	On Schedule													
		WPS.1-T7	Software and control updates for operation	Sat 01/07/23	Wed 01/12/27		3%	Late													
		WPS.1-T9	Cryocooler refurbishment (calibration of instruments)	Fri 01/03/24	Sun 01/03/26		0%	Future Task													
		WPS.1-T10	G-cluster reliability upgrade	Sat 01/07/23	Tue 01/12/26		5%	Late													
	<b>WP5.2</b>	<b>Infrastructure needs for conductors - CERN</b>	<b>Fri 30/09/22</b>	<b>Thu 30/09/27</b>	<b>T. Boutboul</b>	<b>6%</b>	<b>Late</b>														
		<b>WP5.2-T1</b>	<b>Infrastructure for Cabling and Characterisation</b>	<b>Fri 30/09/22</b>	<b>Mon 30/11/26</b>		<b>16%</b>	<b>Late</b>													
		WPS.2-T1-D1	Procurement and installation of new critical current stations (B±18T and 10T split r	Fri 30/09/22	Sun 01/11/26	T. Boutboul	0%	Late													
		WPS.2-T1-D1-M1	Conceptual design including integration in B163 and ancillaries (e.g. current leads	Fri 30/09/22	Wed 01/03/23		100%	Complete													
		WPS.2-T1-D1-M2	Elaboration of specifications including interfaces and drawings of components ma	Fri 31/03/23	Fri 01/12/23		70%	Late													
		WPS.2-T1-D1-M3	Tender process, procurement and fabrication of magnets and test station ancillan	Thu 28/09/23	Tue 31/03/26		20%	On Schedule													
		WPS.2-T1-D1-M4	Assembly of the critical current stations including Data Acquisition software	Sat 31/01/26	Mon 01/06/26		0%	Future Task													
		WPS.2-T1-D1-M5	Commissioning of the stations	Thu 30/04/26	Mon 30/11/26		0%	Future Task													
		<b>WP5.2-T1-D2</b>	<b>Procurement and installation of new cabling machine (up to about 60 strands)</b>	<b>Sat 01/10/22</b>	<b>Tue 30/06/26</b>		<b>7%</b>	<b>Late</b>													
		WPS.2-T1-D2-M1	Elaboration of Technical Specification of cabling machine	Sun 01/01/23	Fri 01/12/23		30%	Late													
		WPS.2-T1-D2-M2	Tender process	Fri 01/12/23	Tue 30/04/24		0%	Future Task													
		WPS.2-T1-D2-M3	Electronics and software for cabling and QA/QC	Sat 30/09/23	Sun 30/11/25		0%	Late													
		WPS.2-T1-D2-M4	Study for installation of potential insulation/braiding machines	Sat 01/10/22	Mon 30/10/23		20%	Late													
		WPS.2-T1-D2-M5	Procurement and fabrication of the cabling machine	Tue 30/04/24	Fri 31/10/25		0%	Future Task													
		WPS.2-T1-D2-M6	Installation and commissioning of cabling machine	Wed 01/10/25	Tue 30/06/26		0%	Future Task													
		<b>WP5.2-T1-D3</b>	<b>Upgrade of FRESCA stations</b>	<b>Wed 31/01/24</b>	<b>Sun 30/05/27</b>		<b>0%</b>	<b>Future Task</b>													
		WPS.2-T1-D3-M1	Sample Insert design and fabrication for 60-strand cables and including transverse	Fri 31/01/25	Sat 30/01/27		0%	Future Task													
		WPS.2-T1-D3-M2	FRESCA 2 testing of 60-strand cable sample	Wed 31/03/27	Sun 30/05/27		0%	Future Task													
		WPS.2-T1-D3-M3	Conceptual study for potential FRESCA 3 station with B±15T (size, requirements ar	Wed 31/01/24	Sat 31/01/26		0%	Future Task													
		<b>WP5.2-T1-D4</b>	<b>Procurement and installation of new cabling machine (up to about 60 strands)</b>	<b>Sat 01/10/22</b>	<b>Thu 30/09/27</b>		<b>0%</b>	<b>Late</b>													
		WPS.2-T1-D4-M1	Supply of spare solenoid for existing Ic stations (B±15-17T), upgrade VSM and ma	Sun 01/01/23	Tue 01/07/25		0%	Late													
		WPS.2-T1-D4-M1a	Supply of spare solenoid for existing Ic stations (B±15-17T), upgrade VSM and ma	Sun 01/01/23	Sat 01/04/23		20%	Late													
		WPS.2-T1-D4-M1b	Supply of spare solenoid for existing Ic stations (B±15-17T), upgrade VSM and ma	Mon 01/05/23	Fri 01/12/23		0%	Late													
		WPS.2-T1-D4-M1c	Supply of spare solenoid for existing Ic stations (B±15-17T), upgrade VSM and ma	Sat 01/07/23	Tue 01/07/25		0%	Late													
		WPS.2-T1-D4-M2	Design and fabrication of adapted sample insert and sample holder for HTS and sp	Mon 01/09/25	Mon 01/03/27		0%	Future Task													
		WPS.2-T1-D4-M3	Study of infrastructure requirements for HTS conductors	Mon 01/01/24	Fri 01/01/27		0%	Future Task													
		WPS.2-T1-D4-M4	Supply of a furnace for thermal expansion measurement during heat treatment in	Sat 01/04/23	Mon 01/04/24		0%	Late													
		WPS.2-T1-D4-M5	Supply of a reaction oven for strand/cable samples	Mon 01/01/24	Tue 01/07/25		0%	Future Task													
		WPS.2-T1-D4-M6	Supply of a tensile/twisting machine for cable check	Sat 01/10/22	Wed 01/11/23		0%	Late													
		WPS.2-T1-D4-M7	Design and construction of a test facility for current leads, cables and splices	Mon 01/05/23	Sun 01/09/24		0%	Late													
		WPS.2-T1-D4-M8	Inserts for split coil (10 T) and solenoid (20 T)	Mon 01/06/26	Thu 30/09/27		0%	Future Task													
	<b>WP5.3</b>	<b>Infrastructure needs for demonstrator and short magnet models - CERN</b>	<b>Thu 01/06/23</b>	<b>Tue 31/12/24</b>	<b>J. C. Perez</b>	<b>10%</b>	<b>Late</b>														
		WPS.3-T1-D1	Upgrade of manufacturing facilities	Thu 01/06/23	Tue 31/12/24	J. C. Perez	10%	Late													
	<b>WP5.4</b>	<b>Infrastructure needs for the construction of full-scale prototypes - CERN</b>	<b>Wed 01/03/23</b>	<b>Sat 01/08/26</b>	<b>A. Milanese</b>	<b>0%</b>	<b>Late</b>														
		WPS.4-T1-D1	Reaction furnace	Wed 01/03/23	Sun 01/03/26	A. Milanese	0%	Late													
		WPS.4-T1-D2	Vacuum pressure impregnation station	Mon 01/01/24	Fri 01/05/26		0%	Future Task													
		WPS.4-T1-D3	Marble and metrology needs	Sun 01/09/24	Mon 01/06/26		0%	Future Task													
		WPS.4-T1-D4	Reconfiguration of winding machine and forming / curing press	Sun 01/09/24	Sat 01/08/26		0%	Future Task													
	<b>WP5.5</b>	<b>Transducers, instrumentation and measurement equipment needs for the HFM R</b>	<b>Sun 01/01/23</b>	<b>Wed 01/12/27</b>	<b>S. Russenschuck, L. Fisca</b>	<b>5%</b>	<b>Late</b>														
		WPS.5-T1	Measurement system for the 12 T robust short models at ambient temperature	Sun 01/01/23	Sun 01/12/24	S. Russenschuck, L. Fisca	0%	Late													
		WPS.5-T2	Measurement system for the 12 T robust short models at cryogenic temperature	Sat 01/07/23	Mon 01/12/25		0%	Late													
		WPS.5-T3	Measurement system for the 12 T long prototypes at ambient temperature	Mon 01/07/24	Tue 01/12/26		0%	Future Task													
		WPS.5-T4	Instruments for measurements of the 12 T long prototypes at cryogenic tempera	Tue 01/07/25	Wed 01/12/27		0%	Future Task													
		WPS.5-T5	Measurement system for the 14+ T (Mirror and single aperture)	Wed 01/01/25	Wed 01/12/27		0%	Future Task													
		WPS.5-T6	Measurement system for the 14+ T (Double aperture)	Tue 01/07/25	Wed 01/12/27		0%	Future Task													
		WPS.5-T7	Review of instrumentation needs for HTS magnets	Sun 01/01/23	Mon 01/01/24		20%	Late													
		WPS.5-T8	Instrumentation for the racetrack coils with bore	Mon 01/01/24	Wed 01/07/26		0%	Future Task													
		WPS.5-T9	Data acquisition system with on-line processing	Sun 01/01/23	Sat 01/07/23		100%	Complete													
		WPS.5-T10	Data acquisition system for small-amplitude signals (improvement of DMM)	Sat 01/07/23	Sun 01/12/24		20%	Late													
		WPS.5-T11	DAQ control software for new acquisition systems	Mon 01/01/24	Sun 01/12/24		0%	Future Task													
		WPS.5-T12	New integrators, sensors and calibration	Mon 01/01/24	Thu 01/07/27		0%	Future Task													
		WPS.5-T13	Off-The-shelf magnetic measurement system for collaborations	Sun 01/01/23	Mon 01/07/24		20%	Late													



# Overview of the RD Line 6 – WP6.1 (CERN)

Wc Pat	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	% Comj	Status	2023				2024					
					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4		
	<b>RD6</b>	<b>RD6</b>												
		<b>WP6.1</b>												
		<b>WP6.1 - T1</b>												
		WP6.1-T1-D1	Collective intelligence - industry sector selection	100%	Complete									
		WP6.1-T1-D2	IP landscape and publications analysis - trends identification	30%	On Schedule									
		WP6.1-T1-D3	In-depth interviews with HFM RD line coord. & WP leaders	10%	Future Task									
		WP6.1-T1-D4	In-depth interviews and workshops with key industrial players	0%	Future Task									
		<b>WP6.1 - T2</b>	<b>HFM value proposition</b>	<b>0%</b>	<b>Future Task</b>									
		WP6.1-T2-D5	Industry-specific needs identification	0%	Future Task									
		WP6.1-T2-D6	Public value proposition document	0%	Future Task									
		WP6.1-T2-D7	Scientific and industrial key stakeholder landscape	0%	Future Task									
		<b>WP6.1 - T3</b>	<b>Dissemination</b>	<b>0%</b>	<b>Future Task</b>									
		WP6.1-T3-D8	Dissemination schedule and activities planning	0%	Future Task									
		WP6.1-T3-D9	HFM Value proposition promotion	0%	Future Task									
		WP6.1-T3-D10	Partnerships	0%	Future Task									
		<b>WP6.1 - T4</b>	<b>Liaison with related projects and institutes</b>	<b>10%</b>	<b>Late</b>									
		WP6.1-T4-D11	Coordination of HFM Impact Forum	10%	Late									

E. Chesta, L. Kretschmar



# Overview of the RD Line 6 – WP6.1 (CERN)

Work Package	Tasks, deliverables	TASK/DELIVERABLE DESCRIPTION	Start	Finish	Resource Names	% Complete	Status	2021	2022	2023	2024	2025	2026	2027	
								H1	H2	H1	H2	H1	H2	H1	H2
RD6	RD6	Scientific and Societal Impact Forum	Wed 01/12/21	Tue 31/12/30	E. Chesta, L. Kretzschmar	10%	Late								
	WP6.1	Scientific and societal impact of the HFM R&D - CERN	Wed 01/12/21	Tue 31/12/30	E. Chesta, L. Kretzschmar	10%	Late								
	WP6.1 - T1	Addressable needs assessment	Wed 01/12/21	Wed 30/12/26	E. Chesta, L. Kretzschmar	26%	On Schedule								
	WP6.1-T1-D1	Collective intelligence - industry sector selection	Wed 01/12/21	Sat 31/12/22	E. Chesta, L. Kretzschmar	100%	Complete								
	WP6.1-T1-D2	IP landscape and publications analysis - trends identification	Thu 01/12/22	Wed 31/12/25		30%	On Schedule								
	WP6.1-T1-D3	In-depth interviews with HFM RD line coord. & WP leaders	Fri 01/12/23	Tue 31/12/24		10%	Future Task								
	WP6.1-T1-D4	In-depth interviews and workshops with key industrial players	Mon 01/01/24	Wed 30/12/26		0%	Future Task								
	WP6.1 - T2	HFM value proposition	Thu 01/05/25	Thu 30/12/27	E. Chesta, L. Kretzschmar	0%	Future Task								
	WP6.1-T2-D5	Industry-specific needs identification	Thu 01/05/25	Thu 30/12/27		0%	Future Task								
	WP6.1-T2-D6	Public value proposition document	Fri 01/08/25	Sun 30/08/26		0%	Future Task								
	WP6.1-T2-D7	Scientific and industrial key stakeholder landscape	Sat 02/08/25	Thu 30/12/27		0%	Future Task								
	WP6.1 - T3	Dissemination	Sat 30/01/27	Tue 31/12/30	E. Chesta, L. Kretzschmar	0%	Future Task								
	WP6.1-T3-D8	Dissemination schedule and activities planning	Sat 30/01/27	Sun 31/12/28		0%	Future Task								
	WP6.1-T3-D9	HFM Value proposition promotion	Sun 30/01/28	Mon 31/12/29		0%	Future Task								
	WP6.1-T3-D10	Partnerships	Wed 31/01/29	Tue 31/12/30		0%	Future Task								
	WP6.1 - T4	Liaison with related projects and institutes	Sun 01/01/23	Mon 30/12/30	E. Chesta, L. Kretzschmar	10%	Late								
	WP6.1-T4-D11	Coordination of HFM Impact Forum	Sun 01/01/23	Mon 30/12/30		10%	Late								

