

WBS	Risk Type	RI-ID	Title	Summary	Owner	Risk Mitigations	Probability	Cost Impact	Schedule Impact	Technical Impact	Probability Score	Impact Score - Cost	Impact Score - Schedule	Risk Rank	Risk Responses	Risk Status
302.1 - Project Management	Threat	RT-302-1-014	Congress new construction approval delay beyond FY18	If congress delays new construction approval beyond FY18, then the project must continue using OPC rates instead of the more favorable TEC rates, resulting in a cost increase	Giorgio Apollinari		15.00%	225 -- 2700 k\$	months	0 (?) - Not yet defined	2 (L)	3 (H)	0 (N)	2 (Medium)		Closed - Retired
302.2.01 - Magnets Design, Integration and Coordination	Threat	RT-302-2-01-001	Magnet Prototypes Development takes longer than estimated	If the development of magnet prototypes takes longer than estimated, then CD-3b (construction start for coils and magnets) will be delayed and production of coils and magnets will be delayed	Giorgio Ambrosio	The mitigation plan includes several elements: - a series of short models is being assembled and tested by LARP in order to demonstrate the design features, assess the safe pre-stress range, and develop/test assembly procedures; - LARP has successfully tested a 4m long MQXF coil; - LARP, that is in charge of MQXFA1 assembly and test, is planning a re-assembly and re-test; - the HL-LHC-AUP project plan has in the baseline a re-assembly and re-test of MQXFA2. - Each prototype will have one extra coil available (prototype coils are fabricated off-project under LARP). - Each prototype has its own structure in order to avoid/reduce delays to the second prototype in case the first prototype needs rework.	55.00%	5 -- 10 k\$	0.5 -- 3 -- 6 months	0 (N) - negligible technical impact	4 (H)	1 (L)	1 (L)	2 (Medium)	Prototype is disassembled, limiting coil is replaced with spare coil and/or prestress is changed, and prototype is re-tested.	Closed - Retired
302.2.01 - Magnets Design, Integration and Coordination	Threat	RT-302-2-01-009	Coil shipping or handling damage	If there is coil damage during shipping or handling activities, then there will be schedule delay and cost due to the need to repair or replace the damaged items.	Giorgio Ambrosio	Shipping fixtures were designed and validated during the prototyping phase. Coils are shipped with instrumentations for recording accelerations (at pre-set frequency and all peaks) during shipment. All coils are shipped using dedicated truck.	50.00%	1 -- 5 -- 556 k\$	0 -- 0.5 months	0 (N) - negligible technical impact	4 (H)	2 (M)	1 (L)	3 (High)	Items after shipment and shipment data (shock indicators and accelerometers) are inspected in order to assess shipper reliability. In case of concerns shipping fixtures and/or shipping method and/or shipper will be changed. If accelerometers show peak accelerations above threshold, analysis of the event and its impact on the coil will be performed to decide if the coil is acceptable or not.	Closed - Retired
302.2.01 - Magnets Design, Integration and Coordination	Threat	RT-302-2-01-010	Magnet shipping or handling damage	If magnet is damaged during shipping and handling activities, then there will be schedule delay and cost due to the need to repair or replace the damaged magnet.	Giorgio Ambrosio	The magnet shipping fixtures will be designed and validated during the prototyping phase. The shipping fixture and method are based on and past experience by LARP and projects with similar deliverables as HL-LHC AUP. Instrumentation including accelerometers for recording accelerations (at pre-set frequency and all peaks) will be installed to monitor and record g-forces during shipping. All magnets will be shipped using dedicated truck.	5.00%	10 -- 3131 k\$	0.5 -- 2 months	0 (N) - negligible technical impact	1 (VL)	3 (H)	1 (L)	2 (Medium)	Magnets after shipment and shipment data (shock indicators and accelerometers) will be inspected in order to assess shipper reliability. In case of concerns shipping fixtures and/or shipping method and/or shipper will be changed. If accelerometers show peak accelerations above threshold, analysis of the event and its impact on the item will be performed to decide if the magnet is acceptable or not.	Closed - Retired
302.4.04 - Cryo-assemblies Horizontal Test	Threat	RT-302-4-04-005	Inadequate Test Facility Crane Capacity	If the 25-ton IB1 Crane is undersized to lift the Q1/Q3 Cryo-assembly, then a crane upgrade will be needed causing cost increase and potential schedule delays to cryo-assembly testing. Current Cryo-assembly functional requirements assume that the cryostat and lifting fixture will total less than 25 T in weight. This risk may retire in Dec. 2017	Antonios Vouris		25.00%	440 k\$	0 months	0 (N) - negligible technical impact	3 (M)	1 (L)	0 (N)	1 (Low)	Upgrade the existing 25 T crane	Closed - Managed