MICE bimonthly project update ♯1

1 Introduction

In its feedback following the November 2014 review of the MICE project, the Resource Loaded Schedule Review panel asked for bi-monthly updates on progress. This is the first such update. The updated project dashboard may be found at `http://micewww.pp.rl.ac.uk/dashboard/`.

2 Schedule

Since the November 2014 review, changes to the re-baselined schedule have been minimal. The project dashboard and slip chart are shown in figure 1. The critical path is shown in figure 2. Two milestones have slipped:

- **Compressors ready for Cooling Channel Tests:** Installation of the final cooling-water connections to the compressors has slipped because labour allocated for this activity was re-directed to advance the installation of the PRY-support structures. The support structures are now complete, ready for the installation of the PRY-support legs. The slip in the compressor-ready milestone is on the order of 2 weeks.
- **Rack Room 2 Complete:** The shipment of materials from the spectrometer-solenoid manufacturer to the Daresbury Laboratory was a few weeks later than anticipated. This has had a knock-on effect on the construction of the racks and the subsequent installation of the racks into Rack Room 2 at RAL. In conjunction with the delay in delivery there were problems with securing the manpower required to carry out the construction and cabling at the Daresbury Laboratory and during the installation of the equipment at RAL. The racks have been brought to RAL in a single shipment. This was desirable to avoid splitting the single set of electrical engineers responsible for building-up the racks at DL and making them ready for operation at RAL.

Software and Computing:
On the recommendation of the RLSR panel the milestones for the Software and Computing project have now been included in the baseline schedule along with the tasks and activities required to achieve these milestones. The milestones are shown in figure 3. Progress against these milestones will be reported in the bi-monthly progress reports and in future reports to the RLSR panel and the MPB.

	South side yoke material delivered	South side return yoke installation complete	North side yoke material delivered	Compressors ready for Cooling channels tests	Rack Room 2 Complete	North side return yoke installation complete	MICE step IV installation complete	Combined magnet operational tests complete	End of Step IV Operations	Partial Return Yoke materials arrive at RAL	RF Cavities arrive at RAL	Step IV De-Commissioning complete	RF Amplifier delivered	RF Amplifier 1 ready for electrical commissioning	RF Amplifier 2 ready for electrical commissioning	Installation of PRY South starts	Installation of RF Cavities and Chambers starts	Installation of PRY North complete	Cooling Demonstration complete	Cooling Demonstration commissioning complete	End of data taking in the Cooling Demonstration configuration
Baseline	16/03/15	01/04/15	28/04/15	29/01/15	02/02/15	14/05/15	02/06/15	11/08/15	01/06/16	10/05/16	18/05/16	22/07/16	31/08/16	06/10/16	07/11/16	14/12/16	19/01/17	01/02/17	24/03/17	02/05/17	31/03/18
Dec-14	16/03/15	01/04/15	28/04/15	29/01/15	02/02/15	14/05/15	02/06/15	11/08/15	01/06/16	10/05/16	18/05/16	22/07/16	31/08/16	06/10/16	07/11/16	14/12/16	19/01/17	01/02/17	24/03/17	02/05/17	31/03/18
Jan-15	16/03/15	01/04/15	28/04/15	13/02/15	25/02/15	14/05/15	02/06/15	11/08/15	01/06/16	10/05/16	18/05/16	22/07/16	31/08/16	06/10/16	07/11/16	14/12/16	19/01/17	01/02/17	24/03/17	02/05/17	31/03/18
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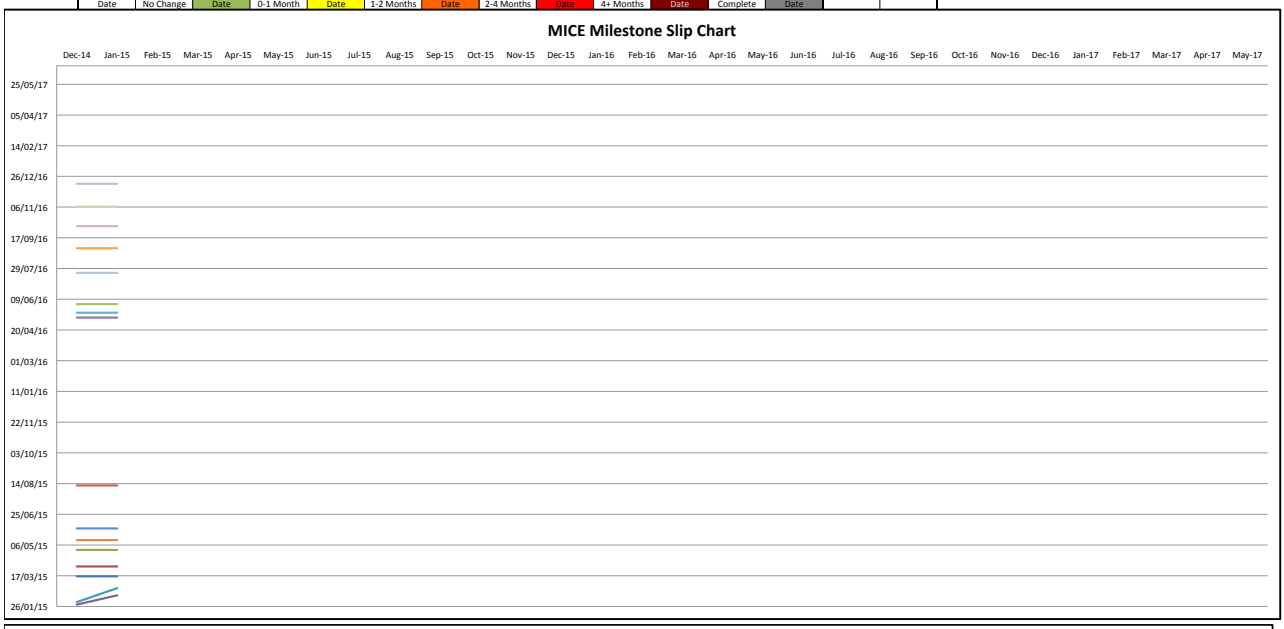
	Date	No Change	Date	0-1 Month	Date	1-2 Months	Date	2-4 Months	Date	4+ Months	Date	Complete	Date								



- Installation of the final cooling water connections has slipped due to labour being directed toward completion of the PRY base support structures. the base structures are now complete and ready to recieve the first shipment of support structure frames for installation.
- The shipment of materials from the Spectrommeter Solenoid manufacturing site to the Daresbury Laboratory was a few weeks later than expeted and has had a knock on effect to the construction of the racks and instalaltion into the Rack Room 2. In conjuction with this the Daresbury Laboratory had a shortfall of labour that could be applied to the construction and cabling of the racks at DL and also for the installation period at RAL. The desire was to have all racks completed before transportation and subsiquent installation on site at RAL.

Figure 1: Dashboard and Slip chart for the MICE Project. The colour code indicates changes in dates refereed to the baseline presented at the November 2014 review of the project.

WBS	Name	Finish Date	Risks_Level	Risk_Impact	Risk Level Duration	Probability	Delay due to risk
4.1.3.2.2.1	Install Vacuum cable management	19/01/2015					19/01/2015
4.1.3.2.2.2	Install Vacuum equipment cables and terminate	04/02/2015					04/02/2015
3.1.4	North side yoke material delivered	28/04/2015	(RISK)-(R2)	Contractor late delivery	40	0.25	08/05/2015
4.2.1.5	Fit North side yoke plates	14/05/2015					24/05/2015
4.2.1.6	North side return yoke installation complete	14/05/2015	(RISK)-(R4)	Installation time extension	10	0.5	29/05/2015
4.2.5.9.1	North side PRY in place by Feb 2015	14/05/2015					29/05/2015
4.2.5.9.2	Cryostat stands - North side in place	19/05/2015					03/06/2015
4.2.5.9.3	Move North side cryostats to hall and place in position	21/05/2015					05/06/2015
4.2.5.10.3	Reform and connect external waveguides to fit from PP to Cryostat - After North PRY installation	27/05/2015	(RISK)-(R3)		20	0.5	21/06/2015
4.2.5.10.4	Errect trellis to support external waveguides - After North PRY installation	29/05/2015					23/06/2015
4.2.6	Re-install TOF2, KL, EMR	02/06/2015					27/06/2015
4.2.7	MICE step IV installation complete	02/06/2015					27/06/2015
5.2	Spectrometer Solenoid preparation for lattice operation	07/07/2015	(RISK)-(R2)	Items found to be non operational in field ramping	40	0.5	21/08/2015
5.3	Combined magnet operation	11/08/2015	(RISK)-(R2)	Extended period for training all magnets together - delay stepIV	40	0.5	15/10/2015
5.6	End of STEP IV Operations	02/06/2016	(RISK)-(R3)	Additional data runs required to complete matrix	20	0.5	16/08/2016
6.2.2.1	Disconnect Northside Waveguides	06/06/2016	(RISK)-(R5)	Expert Personnel not available	5	0.75	23/08/2016
6.2.2.3	Disconnect Southside Waveguides	06/06/2016	(RISK)-(R5)	Expert Personnel not available	5	0.75	27/08/2016
6.2.2.4	Move South sideTracker Cryostat to R9	08/06/2016					29/08/2016
6.2.3.1	Remove TOF1 & KL & EMR	14/06/2016	(RISK)-(R5)	Expert Personnel not available	5	0.75	08/09/2016
6.2.3.2	Move TOF, KL & EMR to R9	15/06/2016					09/09/2016
6.2.4.1	Remove North side PRY	24/06/2016	(RISK)-(R5)	Lifting equipment missing / damaged	5	0.25	19/09/2016
6.2.5.1	Disconnect all magnet cooling lines, instrumentation and power	05/07/2016	(RISK)-(R4)	Expert Personnel not available	10	0.25	03/10/2016
6.2.5.2	Move Upstream Spectrometer Solenoid magnet to R9	06/07/2016	(RISK)-(R5)	Expert Personnel not available	5	0.25	05/10/2016
6.2.5.3	Move Downstream Spectrometer Solenoid magnet to R9	07/07/2016	(RISK)-(R5)	Expert Personnel not available	5	0.25	07/10/2016
6.2.5.4	Move Focus Coil Magnet to R9	11/07/2016	(RISK)-(R5)	Expert Personnel not available	5	0.25	12/10/2016
6.2.5.5	All Channel Magnets moved out of the Hall	11/07/2016		Expert Personnel not available			12/10/2016
6.2.4.3	Remove South side PRY	20/07/2016	(RISK)-(R5)	Lifting equipment missing / damaged	5	0.25	23/10/2016
6.2.4.5	Remove Downstream underfloor supports	22/07/2016	(RISK)-(R5)	Lifting equipment missing / damaged	5	0.25	26/10/2016
6.2.4.6	PRY Material removed from the Hall	22/07/2016					26/10/2016
6.2.7	Step IV De-Commissioning Complete	22/07/2016					26/10/2016
6.4.1.1	Remove step IV false floor plates	02/08/2016					06/11/2016
6.3.1.2.1.1	Install waveguides	11/08/2016	(RISK)-(R5)	Expert Personnel not available - clash with current equipment	5	0.25	16/11/2016
6.3.1.2.2.1	Install all waveguides	11/08/2016	(RISK)-(R5)	Expert Personnel not available - clash with current equipment	5	0.25	17/11/2016
6.4.1.2	Begin drilling and tapping holes in the false floor suffcient for MDIC	26/08/2016	(RISK)-(R3)	Floor strength found to be insufficient	20	0.2	06/12/2016
6.4.1.3	Fit intermediate surface (tiled steel plates) for the false floor MDIC position	05/09/2016	(RISK)-(R5)	Inacurate drilling	5	0.2	17/12/2016
6.4.1.4	Trial RF Cavities base plate Installation including survey and marking out	08/09/2016					20/12/2016
6.4.1.5	Drill and tap threaded holes in the false floor intermediate surface	14/09/2016	(RISK)-(R5)	Tooling failures	5	0.2	27/12/2016
6.4.1.6	Create level surface with washers at bolt locations (survey level)	23/09/2016					05/01/2017
6.4.1.7	Install base plate - RF Cavities base plates	27/09/2016	(RISK)-(R3)		20	0.25	14/01/2017
6.4.1.8	Install through bolts and survey, level and tighten the complete arrangement	04/10/2016					21/01/2017
6.4.1.9	Trial AFC #1 base plate installation including survey and marking out	10/10/2016					27/01/2017
6.4.1.10	Drill and tap threaded holes in the false floor intermediate surface	14/10/2016	(RISK)-(R5)	Tooling failures	5	0.2	01/02/2017
6.4.1.11	Create level surface with washers at bolt locations (survey level)	18/10/2016					05/02/2017
6.4.1.12	Install base plate - AFC #1	21/10/2016	(RISK)-(R3)		20	0.25	13/02/2017
6.4.1.13	Install through bolts and survey, level and tighten the complete arrangement	26/10/2016					18/02/2017
6.4.1.14	Trial AFC #2 base plate installation including survey and marking out	01/11/2016					24/02/2017
6.4.1.15	Drill and tap threaded holes in the false floor intermediate surface	07/11/2016	(RISK)-(R5)	Tooling failures	5	0.2	03/03/2017
6.4.1.16	Create level surface with washers at bolt locations (survey level)	10/11/2016					06/03/2017
6.4.1.17	Install base plate - AFC #2	15/11/2016	(RISK)-(R3)		20	0.25	16/03/2017
6.4.1.18	Install through bolts and survey, level and tighten the complete arrangement	17/11/2016					18/03/2017
6.4.1.19	Trial spectrometer #2 base plate Installation including survey and marking out	23/11/2016					24/03/2017
6.4.1.20	Drill and tap threaded holes in the false floor intermediate surface	29/11/2016	(RISK)-(R5)	Tooling failures	5	0.2	31/03/2017
6.4.1.21	Create level surface with washers at bolt locations (survey level)	06/12/2016					07/04/2017
6.4.1.22	Install base plate - Spectrometer Solenoid Downstream	09/12/2016	(RISK)-(R3)		20	0.25	15/04/2017
6.4.1.23	Install through bolts and survey, level and tighten the complete arrangement	15/12/2016					21/04/2017
6.4.1.24	Base Plate work complete	15/12/2016					21/04/2017
6.5.1.1	Installation of PRY starts	15/12/2016					21/04/2017
6.5.1.2	Survey Floor & PRY legs	16/12/2016					22/04/2017
6.5.1.3	Cut shim	19/12/2016					25/04/2017
6.5.1.4	Install frame legs (inc drilling plates)	22/12/2016	(RISK)-(R4)	Inacuracy of the frame / floor drillling	10	0.1	29/04/2017
6.5.1.5	Survey PRY legs	23/12/2016					30/04/2017
6.5.1.6	Fit south side yoke plates	03/01/2017	(RISK)-(R4)	Inaccuracy of the plates / frame setup	10	0.1	12/05/2017
6.5.1.7	South side SS return yoke installation complete	03/01/2017	(RISK)-(R3)	Additional machining or replacement of parts	20	0.3	18/05/2017
6.5.2	South PRY Installation complete	03/01/2017					18/05/2017
6.11.1	Install Spectrometer Solenoid #2 rail system	06/01/2017					21/05/2017
6.11.2	Install Spectrometer Solenoid #2supports to floor	10/01/2017					25/05/2017
6.11.3	Install Spectrometer Solenoid #2 and align	19/01/2017	(RISK)-(R4)	Expert Personnel not available	10	0.5	08/06/2017
6.11	Spectrometer Solenoid #2 installation	19/01/2017	(RISK)-(R4)	Expert Personnel not available	10	0.2	10/06/2017
6.9.3.2	Place online and couple to magnets	06/02/2017	(RISK)-(R4)	Delays in delivery of shielding	10	0.25	01/07/2017
6.9.3.3	Vac Pump/LLRF tests	20/02/2017	(RISK)-(R4)	Pump and bake needs additional time	10	0.5	20/07/2017
6.9.3.4	Bake	20/02/2017					20/07/2017
6.9.3.5	LLRF Tests	27/02/2017	(RISK)-(R3)	Additional testing time required	20	0.5	06/08/2017
6.15	MDIC installation complete	27/03/2017	(RISK)-(R2)	Delay due to currently non-dritical items reaching critical path	40	0.5	23/09/2017
6.10.1	HPRF tests	27/03/2017	(RISK)-(R3)	Additional testing time required	20	0.5	03/10/2017
6.16.1	Cooling Channel magnet Commissioning	03/05/2017	(RISK)-(R2)	3 of the 4 magnets have been commisioning together in Step IV	40	0.25	19/11/2017
6.16.2.1	Test and condition cavities, with B field, 1MW	03/05/2017	(RISK)-(R2)	Additional testing time required - testing in the MTA	40	0.5	09/12/2017
6.16.2.2	RF cavity testing with B field complete	03/05/2017					09/12/2017
6.17	Combined magnet and operational tests complete	03/05/2017	(RISK)-(R2)	Delay due to currently non-dritical items reaching critical path	40	0.5	29/12/2017
6.18	MDIC Data taking Period	30/03/2018					25/11/2018

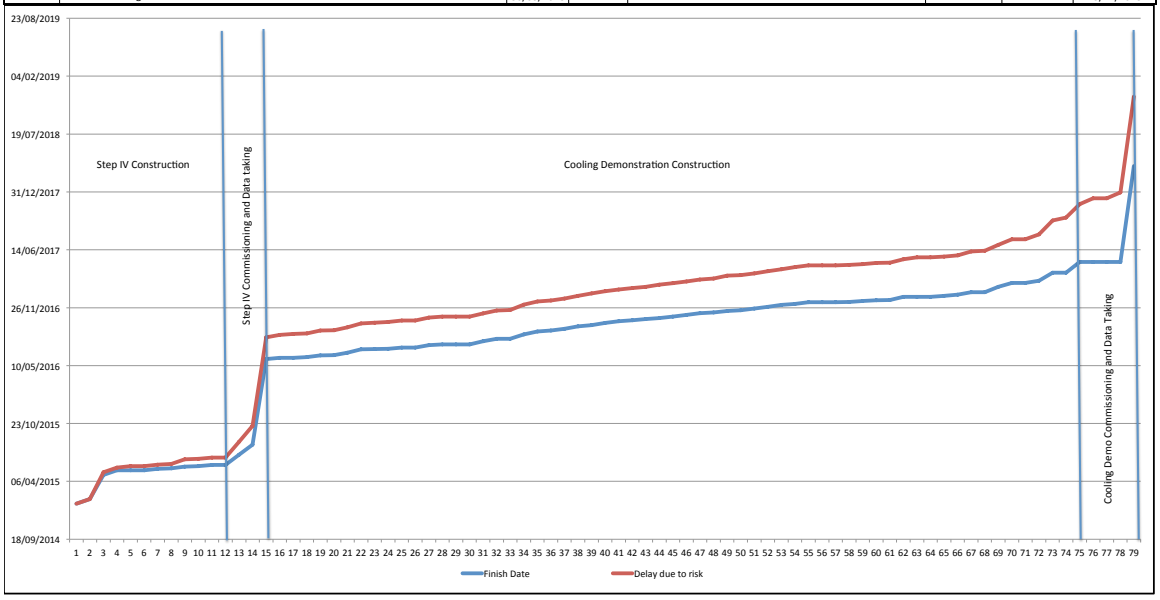


Figure 2: Critical Path to the completion of the MICE project. Commissioning and data-taking periods for both the Step IV and the cooling demonstration are shown. The vertical lines indicate the end of construction of each separate stage of the project.

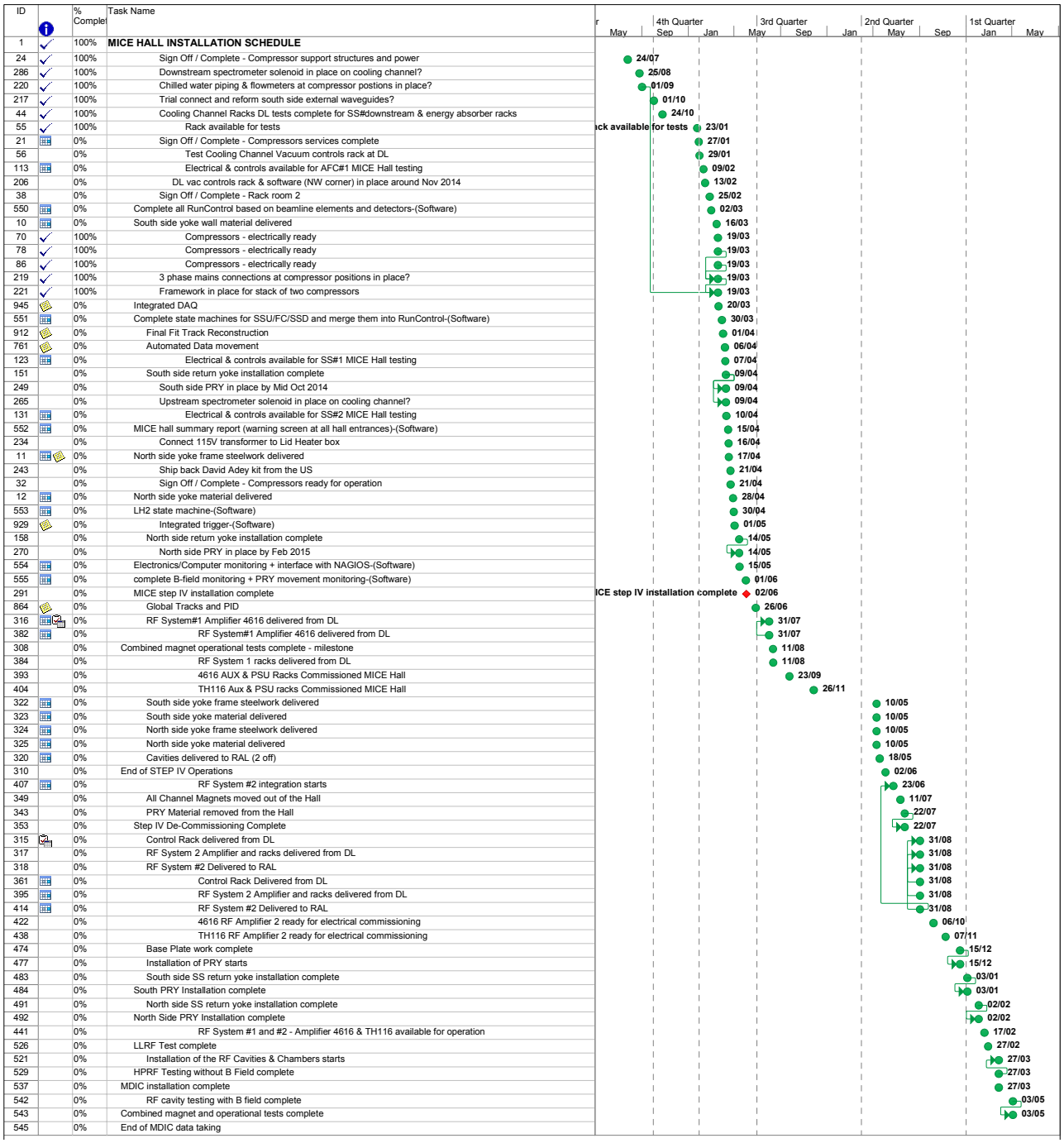


Figure 3: Chart showing the milestones defined for the MICE project. The Software and computing project milestones are now included in the waterfall plot.