



MICE MPB4

Schedule and milestone overview

- *Top Level schedule and critical path*
- *Summary status of Step IV deliverables*
- *Principal schedule drivers and concerns*
- *Convergence of UK and International schedules*
- *Milestone monitoring*
- *Conclusion*

Andy Nichols, STFC, 31/10/12



Present schedule slide, approved by MICE at CM34,
October



MICE SCHEDULE
update: June 2012

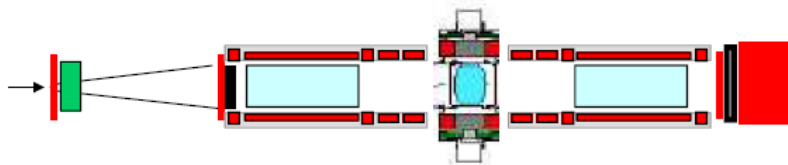
Run date:



STEP I

COMPLETED

~~EMR ran Feb 2013~~



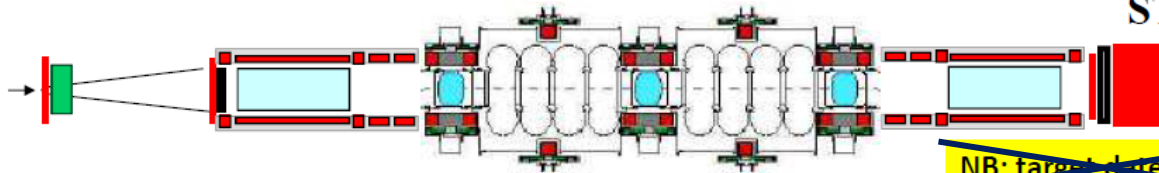
STEP IV

~~Q3 2013
till
Q2 2014~~

Q2 2014

Long shutdown Aug
2014

Under construction:



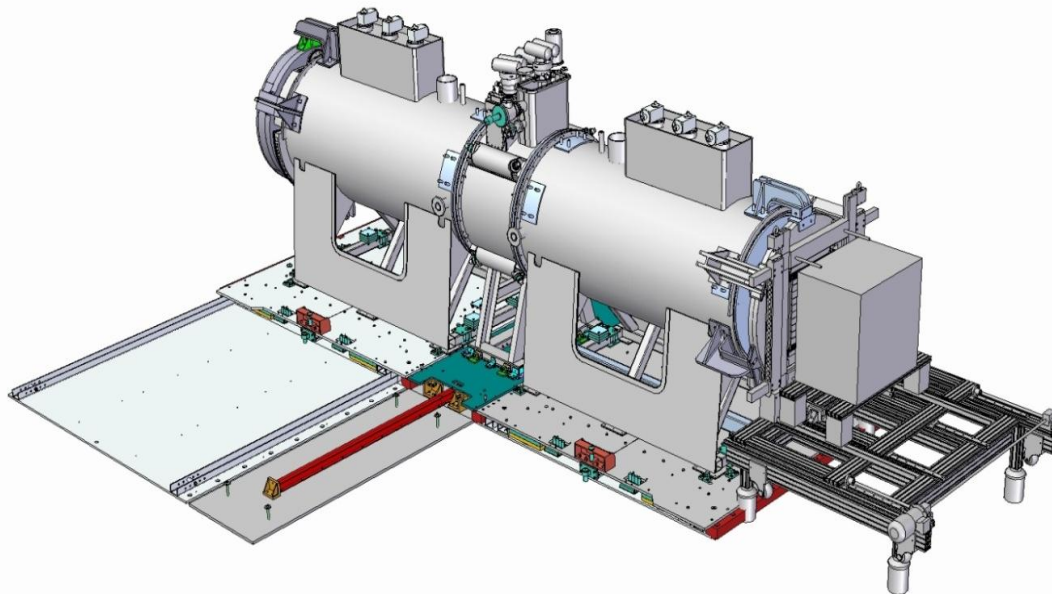
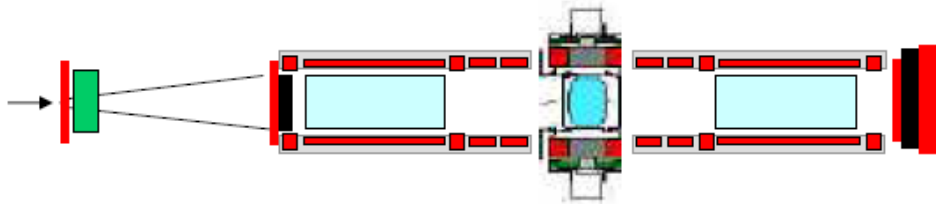
STEP VI

~~NB: target date 2016~~

2018

Possibility of Step V
At 2017

STEP IV



Subsystem	Date
Spectrometer solenoid #1 + #2	Q3 2013
Fibre tracker #1 + #2	Ready
Focus coil #1	Nov '12
LH ₂ system A	TBC
Solid absorber(s)	TBC
Liquid absorber	Ready
Diffuser	Ready
Virostek plate & TOF cage assy	Ready
Substation upgrade	Ready
EMR installation	Mar'13
Radiation shutter	Ready
AFC Moving platform #1	Ready
SS platforms Installation	Ready
Magnetic shielding plan	TBC

Step IV ready Q2, 2014



ID	Task Name	2011		2012		2013		2014		2015		2016		2017		2018		2019	
		H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	
3	Milestones - Top Level	[Timeline bar from 2011 H2 to 2019 H2]																	
75	MICE Step VI Installation & commissioning	[Timeline bar from 2011 H2 to 2019 H2]																	
95	Shipping	[Timeline bar from 2011 H2 to 2018 H2]																	
117	Spectrometer Solenoids (Tracker)	[Timeline bar from 2011 H2 to 2013 H2]																	
118	Spectrometer Solenoid Upstream	[Timeline bar from 2011 H2 to 2013 H2]																	
119	Prepare for shipment	[Timeline bar from 2011 H2 to 2012 H1]																	
120	Ship Upstream Solenoid to UK	[Timeline bar from 2011 H2 to 2012 H1]																	
121	Upstream Solenoid arrives at RAL	[Timeline bar from 2011 H2 to 2012 H1]																	
122	Spectrometer Solenoid Downstream	[Timeline bar from 2011 H2 to 2013 H2]																	
123	Prepare for shipment	[Timeline bar from 2011 H2 to 2012 H1]																	
124	Ship Downstream Solenoid to UK	[Timeline bar from 2011 H2 to 2012 H1]																	
125	Downstream Solenoid arrives at RAL	[Timeline bar from 2011 H2 to 2012 H1]																	
192	Installation	[Timeline bar from 2011 H2 to 2019 H2]																	
841	MICE Step IV Installation	[Timeline bar from 2011 H2 to 2014 H2]																	
919	Spectrometer Solenoid - Upstream	[Timeline bar from 2011 H2 to 2012 H2]																	
920	Upstream Spectrometer Solenoid & Virostek plate Installation	[Timeline bar from 2011 H2 to 2012 H1]																	
923	Cool down spectrometer	[Timeline bar from 2011 H2 to 2012 H1]																	
924	magnetic field set up (5wks training)	[Timeline bar from 2011 H2 to 2012 H1]																	
925	magnet field mapping	[Timeline bar from 2011 H2 to 2012 H1]																	
956	Spectrometer Solenoid - Downstream	[Timeline bar from 2011 H2 to 2013 H2]																	
957	Downstream Spectrometer Solenoid & Virostek plate Installation	[Timeline bar from 2011 H2 to 2013 H1]																	
960	Cool down spectrometer	[Timeline bar from 2011 H2 to 2013 H1]																	
961	magnetic field set up (5wks training)	[Timeline bar from 2011 H2 to 2013 H1]																	
962	magnet field mapping	[Timeline bar from 2011 H2 to 2013 H1]																	
963	Tracker Installation - Downstream	[Timeline bar from 2011 H2 to 2014 H2]																	
988	Re-install TOF2, KL & EMR	[Timeline bar from 2011 H2 to 2014 H2]																	
989	Reposition spectrometer #1 and align	[Timeline bar from 2011 H2 to 2014 H2]																	
990	Re train all magnets	[Timeline bar from 2011 H2 to 2014 H2]																	
991	MICE step IV installation complete	[Timeline bar from 2011 H2 to 2014 H2]																	
992	MICE Step V Installation	[Timeline bar from 2011 H2 to 2016 H2]																	
1036	MICE Step VI Installation	[Timeline bar from 2011 H2 to 2019 H2]																	

Critical path for Step IV, courtesy Alan Grant

Principal Schedule drivers and concerns

- *As usual, the major deliverables are the main influence:*
 - **Spectrometer solenoids**
 - *Recent delay with vent line blockage and heater controls*
 - *Decision to ship both magnets at once is sensible – makes planning easier on both sides*
 - *Training behaviour is clearly a schedule and resource issue*
 - **Magnetic shielding**
 - *Work underway on default plan for Step IV*
 - *But local return yoke is being engineered in parallel*
 - *MICE will need a branch point in early/mid 2013*
 - *Cannot discuss Step IV schedule implications of return yoke now*
 - **Coupling magnets**
 - *Manufacturing plan is now much more robust*
 - *Resource-limited delivery schedule will be presented*
 - *Plan out to Steps V & VI will be a close match with UK flat funding profile*

Principal Schedule drivers and Concerns

- *We will now be significantly later with Step IV (around Q2, 2014)*
 - *Means that running can start only just before the long ISIS shutdown in (August 2014, six months)*
 - *The intense construction period can only begin when the solenoids get here – Summer 2013*
 - *Need to re-plan installation for 2013 (again):*
 - *Magnetic shielding implementation*
 - *TIARA milestone for RF; installation of first amplifier*
 - *Limited LH2 work (the majority cannot start until the liquid absorber is being integrated in Step IV)*
 - *EMR run in February 2013*
 - *Commissioning of the AFC module*
- *Keeping the team together and motivated will be difficult*



Convergence of UK and International schedules

- *The UK project schedule obviously needs to map onto those of the remaining international deliverables:*
 - *EMR (UNIGE)*
 - *Spectrometer solenoids (US)*
 - *RFCC modules (US)*
- *The EMR delivery, installation and running has already been incorporated in the UK schedule*
- *A resource-limited delivery plan for the solenoids and CC magnets and the overall installation will be presented today*
- *This has been constructed by Alan Grant, Ken Long, Alan Bross, Mark Palmer and Richard & Peter from FNAL*
- *The dates discussed today are based on that schedule*



Milestone monitoring and control

- *MICE WBS has been re-defined to reflect the project's evolution:*
- *Level 2 Managers identified and invited to report on their major milestones each week – tracking is looked after by Gail Hanson*
 - *2.1 – Project Management - Nichols*
 - *2.1.2 – Schedule co-ordination – Grant*
 - *2.2 – Muon beamline maintenance – Nebrensky*
 - *2.3 – Engineering and infrastructure – Hayler*
 - *2.4 - Detectors and Instrumentation – Bross*
 - *2.5 – Magnet systems – Preece*
 - *2.6 – LH2 delivery – Watson*
 - *2.7 – RF systems – Ronald*
 - *2.8 – Computing – Colling*
 - *2.9 – Operations - Coney*



MICE	Level 2	Level 3	Level 4	
	2.1-Project Management			Nichols
		2.1.1-UK Project management		Grant
		2.1.2-Schedule coordination		Hanson
		2.1.3-Hall schedule		Grant
		2.1.4-Hall Management		Greenall
	2.2-MICE-Muon-Beamline Maintenance			Nebrensky
		2.2.1-Target		Hodgson
			2.2.1.1-Assembly	Tarrant
			2.2.1.2-Stator	Barber
			2.2.1.3-DAQ&Cntrl	Smith
			2.2.1.4-Software	Hodgson
		2.2.2-Decay-solenoid		Bayliss
		2.2.3-Conventional magnets		Nebrensky
		2.2.4-Diffuser		Blackmore
	2.3-MICE-Hall Engineering and infrastructure			Hayler
		2.3.1-Integration engineering		Tarrant
		2.3.2-Virostek shielding		Hayler
		2.3.3-Services		Nichols
		2.3.4-Radiation shutter		Hayler
		2.3.5-Integration-of-Step-IV		Hayler
		2.3.6-Integration-of-Step-VI		Virostek
	2.4-MICE-Detectors and instrumentation			Bross
		2.4.1-TOF		Bonesini
		2.4.2-cKOV		Cremaldi
		2.4.3-Tracker		Long
			2.4.3.1-Trigger-distribution	MacWaters
		2.4.4-EMR		Asfandiyarov
			2.4.4.1-EMR Mechanics	Cadoux
		2.4.5-KL		Tortora
		2.4.6-Luminosity monitor		Soler
	2.5-MICE-Magnet systems			Preece
		2.5.1-Focus-coil-module		Bradshaw
		2.5.2-Coupling magnets		Gourlay
		2.5.3-spectrometer solenoids		Virostek



2.6-MICE Liquid hydrogen delivery system and absorbers	2.6.1-Control engineering 2.6.2-Cryogenic support 2.6.3-liquid hydrogen absorber 2.6.4-Solid absorbers	Watson Warburton Courthold Ishimoto Snopok
2.7-RF Systems	2.7.1-RF Power source 2.7.2-RF Cavities 2.7.3-RF Power distribution 2.7.4-Low level RF	Ronald Moss DeMello Grant Corlett
2.8-Computing	2.8.1-Software 2.8.2-Grid 2.8.3-Networking 2.8.4-Computing support	Colling Rogers Nebrensky Macwaters Wilson
2.9-Operations	2.9.1-Online reco. 2.9.2-DAQ/Trigger 2.9.3-Controls & Monitoring 2.9.4-MLCR	Coney Coney Karadzhov Hanlet Macwaters

MICE Revised WBS – Level II WP Managers shown in red

Spectrometer solenoid milestone progress Reported and updated weekly

Upstream spectrometer solenoid – Steve Virostek/Steve Gourlay - revised for MICO 204

Task	Baseline	Status	Revised baselines										
Cold mass aligned to vacuum vessel survey points - COMPLETE	11/2/11		1/17/12										
Vacuum vessel closed - COMPLETE	12/22/11		2/14/12	2/20/12	2/28/12								
Ready for training	1/9/12		3/14/12	3/20/12	3/27/12	4/12/12	4/21/12	5/22/12	Complete - but problem	11/2/12			
Ready for shipping	2/13/12		4/27/12	5/3/12	5/10/12	5/24/12	5/31/12	6/20/12	7/23/12	12/4/12			
Arrival at RAL	3/26/12		6/8/12	6/14/12	6/21/12	7/5/12	7/12/12	8/1/12	8/17/12	12/27/12	8/23/13		

Downstream spectrometer solenoid – Steve Virostek/Steve Gourlay - revised for MICO 204

Task	Baseline	Status	Revised baselines										
Cold mass on support beam - COMPLETE	11/2/11		1/17/12										
Assembly starts	12/21/11		2/28/12	3/16/12	4/18/12	4/30/12	5/2/12	5/28/12	5/30/12	Complete			
Cold mass aligned to vacuum vessel survey points	2/16/12		3/27/12	4/13/12	4/30/12	5/18/12	5/22/12	6/15/12	6/17/12	6/21/12	7/12/12	11/8/12	
Vacuum vessel closed	3/9/12		4/18/12	5/7/12	5/8/12	5/28/12	5/30/12	6/25/12	6/27/12	6/29/12	7/20/12	1/11/13	
Ready for training	4/13/12		5/18/12	6/6/12	6/7/12	6/27/12	6/29/12	7/25/12		7/31/12	8/21/12	2/22/13	
Ready for shipping	5/25/12		7/3/12	7/20/12	7/23/12	8/9/12	9/14/12		9/16/12		10/7/12	5/2/13	
Arrival at RAL	7/3/12		8/14/12	8/31/12	9/3/12	9/20/12	10/26/12		10/28/12	11/16/12	11/1/12	8/23/13	

Engineering infrastructure and AFC milestone profile
 Magnetic shielding will be incorporated in the infrastructure WP



Step IV infrastructure – Tim Hayler - revised for MICO 195

Task	Baseline	Status	Revised baselines														
Manufacture of the TOF cage test frame complete	2/15/12		2/23/12	Complete													
Design of the Spectrometer Solenoid (SS) support frame complete	2/27/12		3/26/12	Complete													
Manufacture of the Virostek plate brackets complete	3/15/12		Complete														
Build of the step IV rolling platforms and restraint beams for both the SS complete	4/9/12		Complete														
Assembly of the TOF cage on the test frame and subsequent testing complete	4/16/12		7/2/12	Complete													
He window manufacture and testing complete	4/23/12		6/15/12	Complete													
Manufacture of both the SS support frames complete	5/1/12		6/15/12	7/20/12	Complete												
Installation of the SS support frames in the step IV position complete	9/3/12																
Manufacture of a prototype for local magnetic shielding and testing complete	5/7/12		7/20/12	Complete													
Mechanically Ready for the AFC and SS installation	6/1/12		8/1/12														
Radiation shield manufacture and testing complete	6/6/12		8/14/12	Complete													

AFCs – Tom Bradshaw – revised for MICO 204

Task	Baseline	Status	Revised baselines														
AFC #1 at RAL	4/30/12		5/15/12	6/1/12	8/31/12	9/14/12	10/31/12										
Absorber integration and test	7/1/12		10/31/12	1/31/13	3/11/13												
AFC #2 at RAL	6/1/12		9/14/12	1/1/13	3/18/13												
Absorber integration and test	8/31/12		11/30/12	3/31/13													

Conclusion

- *The enforced delay to Step IV is unfortunate.*
 - *Motivating the team during the hiatus will be difficult*
 - *The proximity of the long ISIS shutdown is now very awkward*
- *But we now have a better idea of reconciling aspirations with available resources*
- *It's clear that concentrating the right level of engineering effort in the right place for as long as it takes brings results – need to apply across the project*
- *And the first major deliverable, FC#1 is now at RAL!*