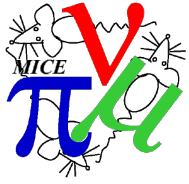


MICE Project in the US: Completion of Efforts

Mark Palmer

BNL

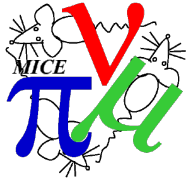
March 7, 2017



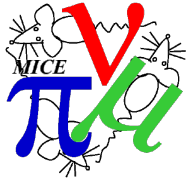
Outline



- US Program – After the April 2016 Review
 - Initial Revised Project Plan
 - Further Updates to Plan
 - Current Status
- US Involvement Moving Forward
 - Project Risk Retirement
 - Continuing Effort:
 - Experimental Support
 - Support for Students and Post-Docs
- Conclusion



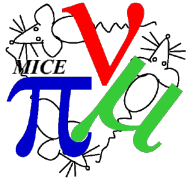
US PROGRAM – AFTER APRIL 2016 MPB/RLS REVIEW



Initial Revised Project Plan



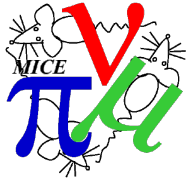
- After funding agency decision to only support MICE Step IV:
 - DOE Actions:
 - FY17 funding support would be capped at US \$1M
 - Versus originally planned US \$3M
 - Contingency for Magnet Support would extend thru March 31st, 2017
 - US Muon Accelerator Program directed to:
 - Complete quench protection system upgrades and provide support for operation of the Spectrometer Solenoids
 - Complete Spectrometer Solenoid magnet repair package documents
 - Terminate RF Module production effort
 - Focus on enabling program post-docs and graduate students to finish their research projects
 - Any “carryover” funds after March 31, 2017 can be used for:
 - Post-doc and student support to complete their research
 - Continued experimental involvement at individual institutions



Further Updates to Plan



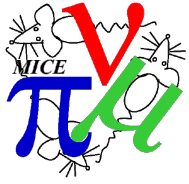
- At the request of the MICE Collaboration, a proposal was made to DOE to complete construction of the RF Modules:
 - Shipping not to be included in US costs
 - Subsequent discussions allowed US funds for shipping of the hardware
 - Hardware is being prepared for shipment to the UK (see A. Bross presentation)
- Also confirmed that US experimenters would be able to participate in a planned May-June 2017 timeframe ISIS run
 - Based on initial US budget projections



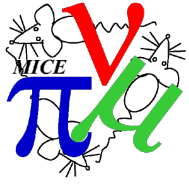
Current Status



- Experimental operations through March 31st are now complete. Looking forward:
 - US can continue to support safe magnet operations and maintenance while funds remain
 - Contingency funds, however, are no longer available for any major hardware effort
- US Continuing Resolution
 - We note that the funding outlook after April 28, 2017 remains less than clear
 - Has serious implications for when US experimental support will likely run out



US INVOLVEMENT MOVING FORWARD



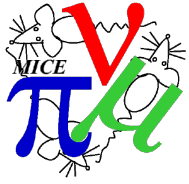
Risk Retirement



- \$ 697 K (US) weighted cost
- Some risks require transfer
 - No support can be promised for RF module installation and commissioning – of course we will help in any way we can
 - No support can be promised if a major SS magnet issue arises after March 31st – again we will help in any way we can

MAP_RevisedRiskRegister_6feb2016.xls

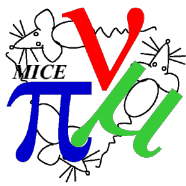
ID	MAP WBS	Risk Description	Potential Impact on Project	Risk Score			Ownership	Proposed Action	Post-Action			Comment/Conclusion	Estimated Cost of Mitigation				Estimated Mitigation Duration (Working Days)	Estimated Mitigation Probability (%)	Weighted Costs (K\$)	Weighted Durations (Working Days)	Targeted Retirement Date	Status (Active or Retired)	
				L	I	LxI			L	I	LxI		SWF (K\$)	M&S (K\$)	OH (K\$)	Total (K\$)							
2	5.2.1.5.1.14 5.2.1.5.1.15	RF Module #1 & #2 Assembly	Likely impact is a months-scale delay due to module fit-up issues	2	2	4	MAP	Execute design and/or fabrication corrections at LBNL.	1	1	1	completed, ready for shipping to RAL.	25	50	36.5	111.5	40	30%	33.45	12	6-Feb-2017	Retired	
5	5.4.1.2.3.12 5.4.1.2.3.13	MICE Cooling Demonstration Partial Yoke Fit-Up Completion	Likely impact is a multi-month delay due to need to reorder steel & re-machine large parts.	1	2	2	MAP	Execute design and/or fabrication corrections at vendor.	1	2	2	completed, has been delivered to RAL.	25	253	74.5	352.5	390	30%	105.76	117	6-Feb-2017	Retired	
6	5.6.2.1.3 5.6.2.1.4	RF Module #1 & #2 Integration Issues at RAL.	May require design changes or corrections. Potentially results in months-scale field engineering delays.	2	4	8	MAP	Correct all identified issues (eg, vacuum performance) in the field.	1	2	2	since STFC removed RF as part of MICE scope – risk retired. If RF is reinserted into MICE scope, integration will not occur until after September 30, 2017, after which US will no longer be involved in MICE.	150	75	167.3	392.3	80	30%	117.68	24	6-Feb-2017	Retired	
7	5.6.2.2.3 5.6.2.2.4	Spectrometer Solenoid integration and commissioning issues at RAL. Delays in readiness for SS commissioning and operations	Delay of MICE Step IV commissioning and experimental operations.	3	4	12	MAP	Assess failure and repair magnet(s), power and quench protection systems. Likely delay of > 3 months in commissioning schedule.	1	3	3	to repair the solenoid magnets. If the solenoid magnets suffer another major failure after April 1, 2017, they will not be repaired.	200	100	223	523	80	50%	261.50	40	6-Feb-2017	Retired	
9	5.6.2.4.3 5.6.2.4.4	MICE Cooling Demonstration Partial Yoke Shielding Integration Issues at RAL.	Likely impact is a multi-month delay due to need to re-machine large parts.	1	4	4	MAP	Re-do integration engineering for partial yoke solution in MICE Hall.	1	3	3	since STFC removed RF as part of MICE scope, the Cooling Demo PRY is not required.	25	50	36.5	111.5	80	10%	11.15	8	6-Feb-2017	Retired	
10	5.2.1.5.4.5 5.2.1.5.4.6	RF Modules # 1 & #2 Installation and Commissioning at RAL	Need to have US MICE augment UK technical staff	4	3	12	MAP	Send US engineers & techs to RAL to aid in the UK installation & commissioning	1	3	3	since STFC removed RF as part of MICE scope – risk retired. If RF is reinserted into MICE scope, integration will not occur until after September 30, 2017, after which US will no longer be involved in MICE.	130	0	110	240	80	70%	168.00	56	6-Feb-2017	Retired	
Totals for All Items (Active Risks Only)													200	100	223	523			0.0	0			



Continuing Effort



- US Experimental Team will be supported through remaining funds held at each institution
 - NOTE: Availability of US laboratory personnel is expected to decrease rapidly – mid-summer to Fall time frame
 - All US laboratory staff must move to other assignments if their positions are to be preserved
 - Considerable efforts are underway to push that process forward
- US plan has set aside funds to support completion of US graduate student and post-doc support
 - Will not touch these funds for any other purposes
 - We expect strong engagement with theses and paper contributions through mid-2018



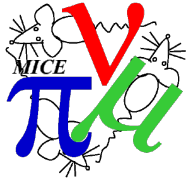
Early Career Scientists Funded by US MAP/MICE in US FY17 & beyond



Early Career Scientists Funded by MAP/MICE in US FY2017 and Beyond

Inst.	FTE*	position	name
IIT	3 mo. @ 0.5	Post-Doc	Ben Freemire (took another position in January 2017)
IIT	4 mo. @ 1.0	Senior RA	Pierrick Hanlett (took another position in February 2017)
IIT	1.0	Senior RA	Durga Rajaram (in residence at RAL)
IIT	1.0	Graduate Student	Tanaz Mohayai (supported through finishing in Spring 2018)
ICL	3 mo. @ 0.5	Post-Doc	Jean-Baptiste Lagrange (took another position Dec 2016)
FNAL	0.56	Peoples Fellow	Daniel Bowring (will take another position in Oct 2017)
FNAL	1.0	Post-Doc	Ao Liu (will support until term expires in April 2018)

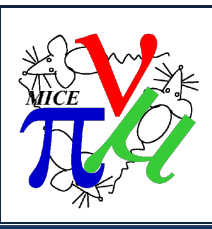
* indicates fraction of year supported at average rate of 0.5 or 1 FTE



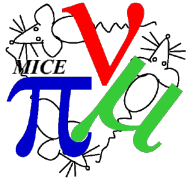
MAP Effort



- MAP support is rapidly ramping down as manpower moves on or is re-assigned:
 - October 2016 ~10 FTEs (roughly 50% at FNAL)
 - February 2017 ~8 ½ FTEs
 - April 2017 Estimate ~7 ½ FTEs
- By October 2017, we expect that there will be very limited MICE-US support (at most, roughly half the April manpower levels) available on MAP carryover funds.



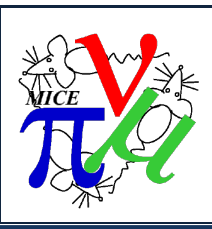
CONCLUSION



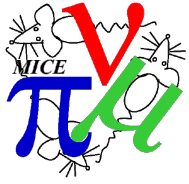
Wrap-Up of US Contributions



- The US MAP team is happy to have contributed to getting useful data to provide detailed insight into the muon ionization cooling process
- Effective at the end of this month, construction project support will conclude
- A modest amount of scientific and experimental support will continue to be available over the next several months
 - Availability of DOE laboratory staff is highly dependent on the US funding landscape and laboratory priorities
 - Some student and post-doc support continues for another ~1 year



BACKUPS



FY17 MAP/MICE support of Scientists (FNAL actuals thru 1/17)



MAP-MICE FY17 Support - 3march2017

\$K US
with OH FTE

IIT - from SOW - actually in FY16 funding				
03-03-02-23				
HP RF Cavity in Magnetic Field	42	0.5	Post-Doc	Ben Freemire (took another position in January 2017)
04-01-01-12				
MICE Step IV Commssioning & Operations	498	0.21	Professor	Dan Kaplan
		0.21	Professor	Yagmur Torun
		0.29	Professor	Pavel Snopok
		1	Senior RA	Pierrick Hanlett (took another position in February 2017)
		1	Senior RA	Durga Rajaram (in residence at RAL)
		1	Graduate Student	Tanaz Mohayai (supported through finishing in Spring 2018)
Imperial College London	11	0.12	Post-Doc	Jean-Baptiste Lagrange (took another position Dec 2016)
Fermilab - from FY17 Budget	1881			
		0.56	Peoples Fellow	Daniel Bowring
		0.96	Scientist	Alan Bross
		0.18	Scientist	Sandor Feher
		0.2	Scientist	Peter Garbincius
		1	Post-Doc	Ao Liu (term expires April 2018)
		0.38	Engineer	Al Moretti
		0.39	Scientist	David Neuffer
		0.64	Scientist	Milorad Popovic
		0.12	Scientist	Katsuya Yonehara
		0.29	other categories	

Current BNL Effort: << 1 FTE (most manpower assigned to eRHIC R&D)

Current LBNL Effort: Rapidly ramping to 0 with completion of RF Modules