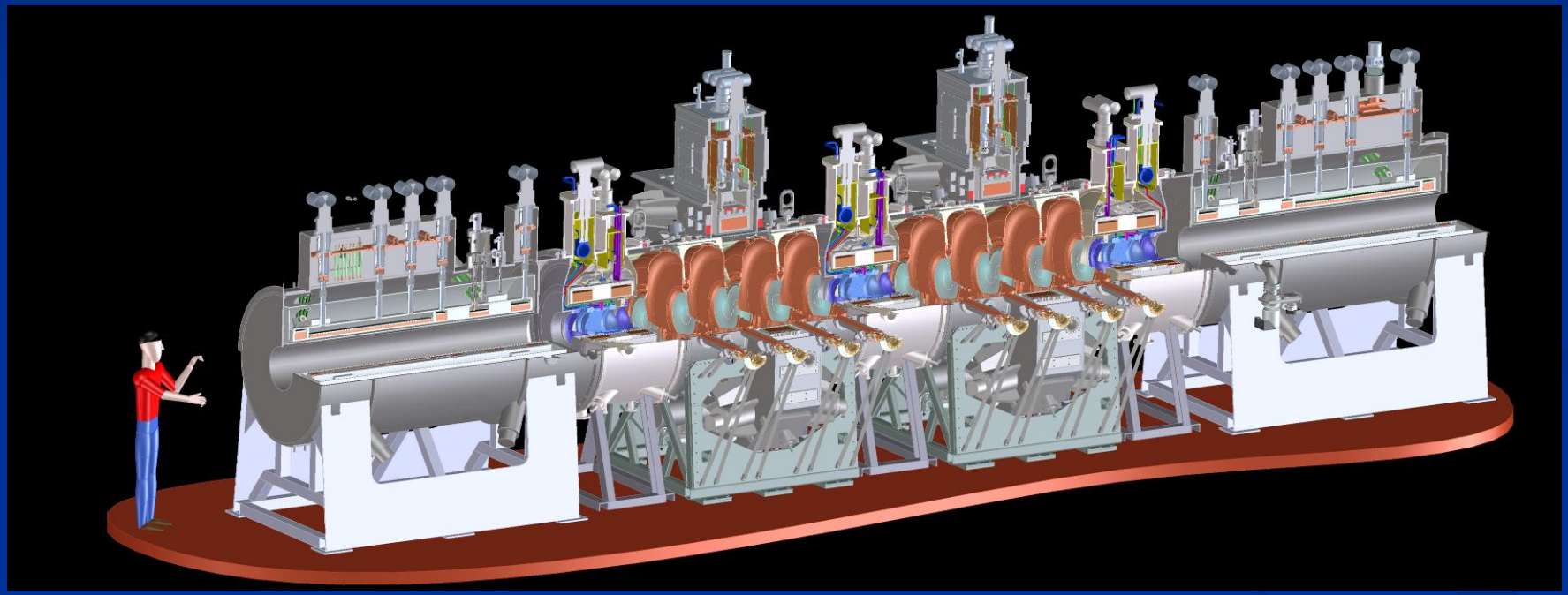
Review of Recent Run



L. Coney – UCR

MICE CM34 – Oct 2012

Outline

- Organization & Preparation
- Shifters
- Goals of Run
- Issues
- Next..

Organization & Preparation

- Micemine Run Plan worked well
- http://micewww.pp.rl.ac.uk/projects/operations/wiki/RunPlan20121012

RunPlan 12 October 2012

We plan to start running on Friday 12 October - starting after lunch when the Hall is clear. We will then run full days for the rest of the weekend (Sat/Sun). This implies that we will need 2 shifters for Friday and 3 for Saturday and Sunday.

Goals of the October Run:
This run has been instituted to test significant upgrades to both the Online Systems and MAUS Software packages. However, if the collaboration would like to collect data for analysis, ideas are welcome. Note that we will not have the use of the Decay Solenoid or the KL detector. We will have TOF0, CKOVa, CKOVb, and TOF1 in the beamline.

We will be running with our previous limit of 2 V while using the beam bump. This may change when we have a chance to perform an activation run, but we were unable to do so before this User Run.

1. Overall Online
   - new OS installed on all MLCR computers
   - new master server; new account setups
   - new UPSs installed
2. DAQ
   - final live data test of new system - upgraded version of DATE & SL
   - new interface with C&M
3. C&M
   - full read/write from CDB
   - overall system test of Step I Run Control
   - expert testing/feedback on Run Control
   - new HV user documentation
4. Software
   - online test server setup functional
   - new control room branch of MAUS
   - improved TOF/CKOV online plots
5. Data processing
   - ~~auto-run of datamover after run~~
   - auto-run of data processing /MC generation on Grid

Organization & Preparation

- Run plan continued…
- Used to schedule shifters and software experts
- Used to lay out daily plan

Daily schedule

October	Fri 12	Sat 13	Sun 14
estimated hours	noon - 8pm	10- 7pm	10 - 7pm
MOM	Gamet	Gamet	Gamet
Lead shifter	Heidt	Heidt	Hanlet
Shifter 2	Dobbs	Hanlet	Taylor
Shifter 3	Hanlet	Taylor - post training	Dobbs?
BLOC	Coney	Coney	Coney
SOC	See Below	See Below	See Below
Experimenter	Karadzhov/Hanlet	Hanlet	
Aim	Target run-in	Run Control test	Reference Run
	DAQ operation test	CDB	Proton absorber data
	Run Control	Online Plots	D1 scan data ~ 2 hrs
	Reference Run/Online Plots	Reference Run -> archive Online Plots	
	send data -> Janusz	Zero Suppressed DAQ?	pion beam - Q789 OFF
		Proton Absorber Data	
Beam?	Yes - pion beam	Yes	Yes
Additional Personnel	Yordan, Chris Rogers	Durga by phone	

Organization & Preparation

- Run plan wiki page used to define beamline configurations for data requested (although not primary goal for this run period)

Beamline Configurations - D1 Field Strength Test:

Particle Species	p at Tgt	p@D1	p@D2	p@Tof0	Proton Absorber	Q1	Q2	Q3	D1	DS	D2	Q4	Q5	Q6	Q7	Q8	Q9	Ran?	Similar Run(s)
	MeV/c	MeV/c	MeV/c	MeV/c	mm	A	A	A	A	A	A	A	A	A	A	A	A		DAQ run #
pion	430	426.7	?	?	83	91.62	167.56	102.58	297	---	158.12	282.96	379.47	251.83	263.79	399.44	341.52		
pion	430	?	?	?	83	91.62	167.56	102.58	320	---	158.12	282.96	379.47	251.83	263.79	399.44	341.52		
pion	430	?	?	?	83	91.62	167.56	102.58	344.53	---	158.12	282.96	379.47	251.83	263.79	399.44	341.52		
pion	430	?	?	?	83	91.62	167.56	102.58	369	---	158.12	282.96	379.47	251.83	263.79	399.44	341.52		

Beamline Configurations for Proton Absorber Study - requires GVA1 trigger:

Particle Species	p at Tgt	p@D1	p@D2	p@Tof0	Proton Absorber	Q1	Q2	Q3	D1	DS	D2	Q4	Q5	Q6	Q7	Q8	Q9	Ran?	Similar Run(s)
	MeV/c	MeV/c	MeV/c	MeV/c	mm	A	A	A	A	A	A	A	A	A	A	A	A		DAQ run #
Empty Proton Absorber																			
pion	155.88	150	145.56	140.8	0	32.4	59.2	36.2	113.7	---	56.3	95.5	128.1	84.6	60.79	91.06	76.44		
pion	204.5	200.02	196.7	193.3	0	43.1	78.7	48.1	150.4	---	75.2	130.3	174.7	115.7	107.7	162.8	138.7		
pion	254	250.1	247.3	244.4	0	53.8	98.3	60.2	188.3	---	93.67	164.3	220.3	146.1	144.6	218.8	186.8		
15 mm Proton Absorber																			
pion	204.5	200.02	196.7	193.3	15	43.1	78.7	48.1	150.4	---	75.2	130.3	174.7	115.7	107.7	162.8	138.7		
pion	254	250.1	247.3	244.4	15	53.8	98.3	60.2	188.3	---	93.67	164.3	220.3	146.1	144.6	218.8	186.8		
pion	293.7	290.1	287.5	284.8	15	62.3	114	69.8	219.9	---	108.2	191.3	256.5	170.1	172.4	260.9	222.9		
pion	313.6	310.1	307.5	304.9	15	66.6	131.8	74.6	236.3	---	115.5	204.7	274.5	182.1	186	281.5	240.5		
29 mm Proton Absorber																			
pion	293.7	290.1	287.5	284.8	29	62.3	114	69.8	219.9	---	108.2	191.3	256.5	170.1	172.4	260.9	222.9	Y	4305
pion	313.6	310.1	307.5	304.9	29	66.6	121.8	74.6	236.3	---	115.5	204.7	274.5	182.1	186	281.5	240.5		

Shifters…

- As of CM33, we have a shifter training regime
- And have trained some people to be qualified shifters (intro role) and Lead Shifters (more advanced)
- However…
- Recent running has made the need for more qualified/trained individuals very clear

Trained shifters

Note: Lead Shifters may also act as the secondary shifter.
New personnel are welcome but must go through the training procedure before taking shifts.

- Lead Shifter
  - Chris Heidt - only available Fri/Sat
  - Pierrick Hanlet
  - Ray Gamet - already designated MOM
  - Maria Leonova
  - Henry Nebrensky - unavailable
- Shifter
  - Adam Dobbs
  - Paul Kyberd
  - Matt Littlefield
  - Justin Christensen - unavailable
  - Sio-Chong Lo - unavailable
- Partially Trained Personnel
  - Ed Overton - unavailable
  - Edward Santos

Need New/More Shifters

- Recognized the need for training – now need to implement training
- Difficult to do while running – difficult to properly train w/o running
- Need some training w/o beam but with equipment
- Develop training schedule
  - Corollary – develop training updates when new equipment arrive
  - Need all MOMs able to lead/arrange training
- Sign up more MICE – THIS MEANS YOU!
- Cannot exploit tiny group of (primarily UK-based) dependable individuals
- This becomes even more true for Step IV running

Goals of Running

- Test significant upgrades and changes to both the Online Systems and MAUS software packages – NOT to take data

- Overall Online
  - New OS installed on all MLCR computers
  - New master server, new account setups, new UPSs
- DAQ
  - Final live data test of new DAQ system – upgraded DATE & OS
  - New interface with C&M
  - New DAQ hardware
- C&M
  - Full read/write from CDB
  - Overall system test of Step I Run Control
  - Expert testing/feedback on Run Control
  - New HV user docs
- Software
  - Online test server setup functional
  - New control room branch of MAUS
  - Improved TOF/CKOV online plots

Goals of Running

- DAQ – Yordan's talk
- C&M – Pierrick's talk
- Software – Chris Rogers' talk this morning

- Mixed results – confirm that we DO need regular running
  - Partially successful
  - Unfortunately – not smooth run – while this was expected due to the many changes, many of the problems were not anticipated
  - No real useful data until Sunday….although this was not the goal of the run

Recent Run – Issues

- Target
  - Fatal error in operation – related to laser gain
    - Discovered *before* frame lowered – required remote expert intervention
  - Target DAQ display (RATS) did not start correctly – would not update – required remote expert intervention
  - ISIS beam loss did not correlate – tripped ISIS (3V+) when target DAQ showed below 2V
  - Needed expert every day
- HV controls
  - SY527 remote control not working – required C&M expert on site to fix (related to ongoing work for *new* HV system – interfered)
- Luminosity monitor
  - Power supply turned OFF incorrectly (left at 10.7 V instead of ramped down)
  - DAQ crate not turned ON
  - Suspect result of UPS installation – systems not returned to original state

Recent Run – Issues

- DAQ – crashed/needed expert intervention
- C&M
  - Some new applications not working
  - Application launcher start issues
  - Neutron monitor readout not working
  - All required on-site expert intervention – in addition to new systems being tested
- Online Monitoring
  - Gone – result of changeover to new DAQ – will probably *not* be easy to resurrect
- Online Reco/MAUS
  - Did not work – new plot upgrades could not be tested – bug, plots not filled
  - Software group is assessing prep process and will debug offline
  - Will need to test at later date
- Datamover
  - Crashed first time run
  - Crashed again when attempted to fix
  - Need expert phone or debugging documentation

Way Forward..

- We are making progress
  - Previously we were focused on getting the basics going – Implementation of necessary functionality
  - Now – move focus to *reliability*
- Need to ***KEEP THINGS WORKING!***
- Schedule regular 3-day weekend runs
- MAUS – already using "release" system of changes
- C&M
  - need do same with the controls and monitoring code
  - Stabilize applications
  - Development computer/system separate from iocpc1/iocpc2
  - Coordination between C&M developers *must* happen
- DAQ – staged upgrades – especially with new equipment

Regular Running

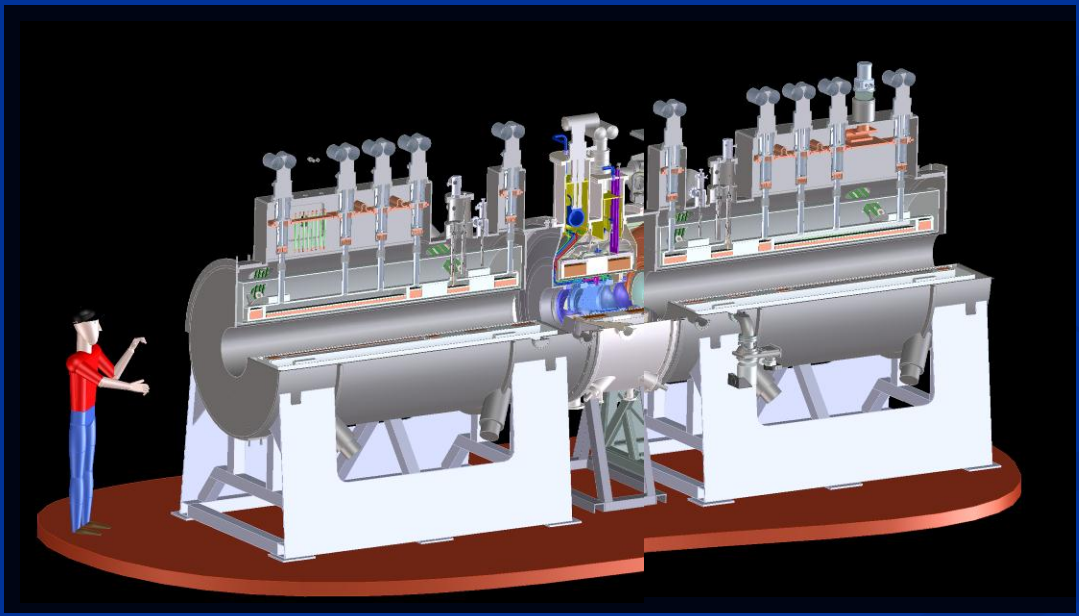
- Why?
  - Implement changes
  - Operate equipment long idle
  - Practice
  - Train shift personnel
  - Learn
- NEED coordination of vital personnel
  - Worked (almost) this time
  - CDB expert on leave
  - MAUS expert in US in advance of run
- Software/on call experts/remote availability
  - If you are responsible for a system you must be contact-able

Summary

- While not exactly smooth…run last weekend accomplished much of what needed to do
- Clear need for more trained shift personnel
- Clear need for regularly scheduled running

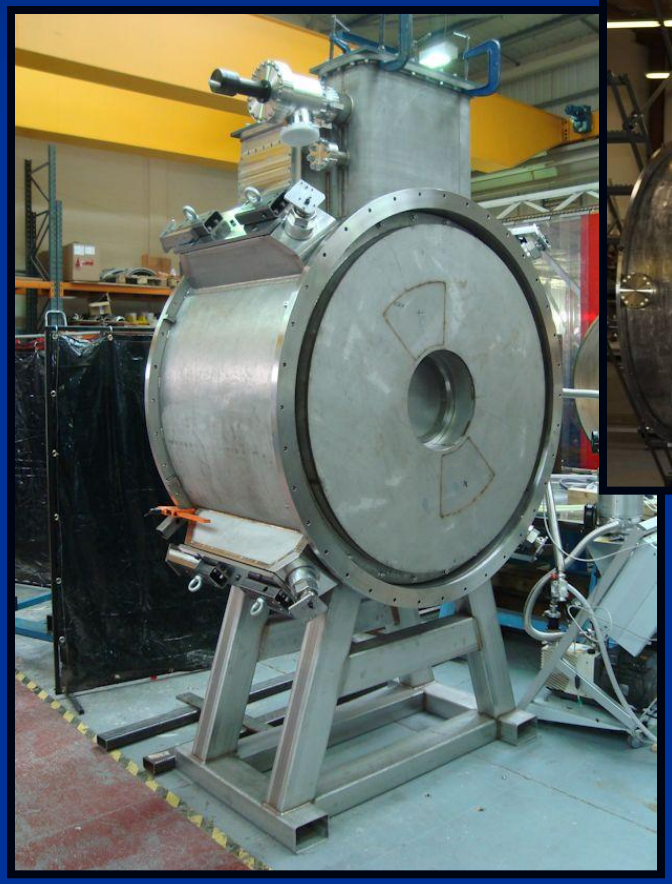
MICE Step IV

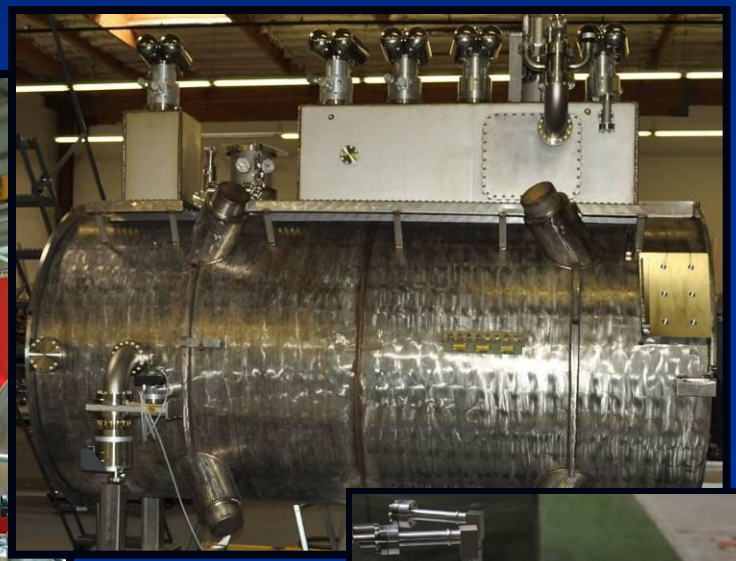
- Includes both Spectrometer Solenoids
- Two trackers installed within the SS magnets
- One AFC (Focus Coil magnet & Absorber)



New Equipment…

- We will have much more in the Hall!





Step IV: Operations & Online

- Moving toward Step IV running
  - Many configurations to test/run
  - Long term running/every opportunity taken
  - All ISIS cycles – every day – Differs from past Operations
  - Develop idea of not-so-remote control room
  - Develop plan for staffing & commissioning of cooling channel
- Develop robust system of Operations
  - Includes all facets of Online Group (DAQ, C&M, Online Reconstruction/Analysis, Infrastructure)
- Goal – next phase of Operations
  - Functional
  - Safe/Secure
  - Reliable
  - Easy to use

Step IV – Operations

- Continue:
  - Pre-run prep
  - Further simplify running
- Improve:
  - Automate procedures → fewer errors
  - Move from spreadsheet → only ConfigDB
  - Increase Online Reconstruction capabilities
    - Complete suite of detectors, Online analysis, Global reco
  - Reduce required number of shifters…
- New equipment arriving – plan for support & expertise
- Modify procedures to include SC magnets and LH2 system
- Train shift personnel
  - Develop plan to staff multitude of shifts

Step IV – Operations

- Safety
  - Need understand implications under STFC rules of new equipment
  - Made arrangements to meet with Jane Vickers (ISIS safety) to begin preparation/planning
  - Need understand from experts what each system entails/requires for operation
- PPS
  - Need understand implementation of system with SC magnets and LH2 system
- Hall Access
  - Limited – not every day – scheduled access only
  - Increase efficiency of data-taking
  - Hall search dropped *twice* in 3 days last weekend. Not acceptable.
- Experts must be available

General Operations

- SS1, SS2, Tracker1, Tracker2, FC, solid absorbers, LH2 absorber & system

- SS commissioning
  - How will this work? How long?
  - Access needed to magnet? How often?

- Tracker commissioning
  - How done? How long? Plan for alignment?
  - Analysis immediate? Or delayed?
  - What access required?

- LH2 + FC system commissioning
  - Needs 1 month
  - Once LH2 system in place – not coming out again

Operations Organization

- Overall Operations Manager
  - Local, familiar with STFC safety and operational systems
  - Provide oversight, link between MOMS, safety responsibility from project manager
- Monthly MOMs
  - On call for 1 month – Daily running duties as now
- MICE Shift personnel
  - Currently 2 shifters for ~8 hour shift
  - Prefer to move to 1 MICE shifter
- Current on-call experts – BLOC, SOC, TROC
- New system-specific experts – 3 per system – not necessarily current MICE
  - Magnet & cryo experts – maintenance of magnet systems, manage cryogens and vac pumping rigs & instrumentation, cooling and powering expert, quench behavior expert
  - LH2 expert – control engineering knowledge, safety procedures

Step IV Operations

- Given current MICE schedule for Step IV equipment and installation…
- We *must* be prepared for 24/7 running in order to get Step IV data before ISIS shutdown in August 2014

- Can our systems handle this?
  - Target ok? Magnets ok?
  - DAQ ok? Controls ok? Datamover ok?
  - Shift coverage ok?

- Another reason to limit Hall access.

Floor Open..

- Questions?
- Suggestions?
- Volunteers?

Step IV: Operations & Online

- Functional
  - DAQ – incorporate all detectors – improve rate
  - DAQ upgrades
  - All C&M for each element
  - Alarm Handler values set appropriately
  - Add capability to Online Reco/Analysis
  - Automate run infrastructure – Run Control
  - Automatic use – read/write to Configuration Database

- Safe/Secure
  - Incorporated fully commissioned PPS
  - Implemented formal shifter training
  - Updated Operations/Online documentation & instructions
  - Developing comprehensive list of safety-critical maintenance
  - Updating safety paperwork – developing overall system for MICE
  - Using new target controller with all necessary interlocks & BPS
  - Online system security reviewed – improvements made
  - Access limited to micenet

Step IV: Operations & Online

- Easy to use
  - Simplified Ops procedures – single key exchange ISIS
  - MICE control access to Hall
  - Improving Online Reconstruction/Data Quality plots
  - Need add Online Reco for KL/EMR/Accel Analysis
  - Run Control
  - Mature Alarm Handler
- Reliable
  - New OS implemented – automatic updates
  - Automatic/systematic backups in place
  - New DAQ and C&M computers installed
  - UPS coverage for critical systems
  - Developing "stockroom" of spares – crates/computers/etc
  - Automatic write to EPICS Archiver
  - Extensive remote monitoring of equipment/computers/hardware/environment in EPICS
  - Archive of all software – Launchpad repository