

MICE Experiment: Status & Plans

Dan Kaplan



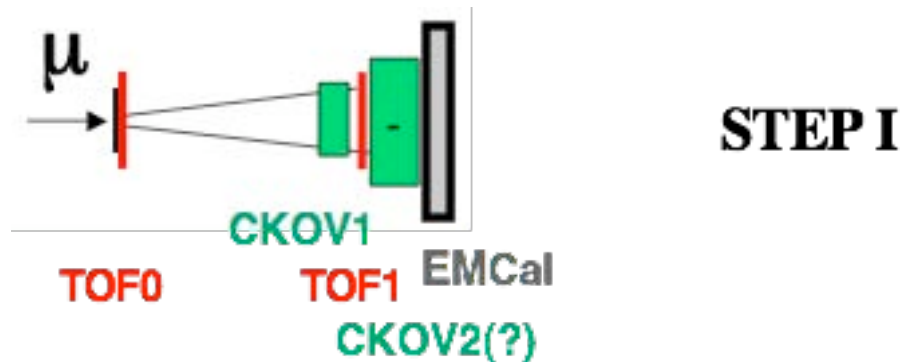
NFMCC Meeting
Illinois Institute of Technology
Sunday, 12 March, 2006

Outline:

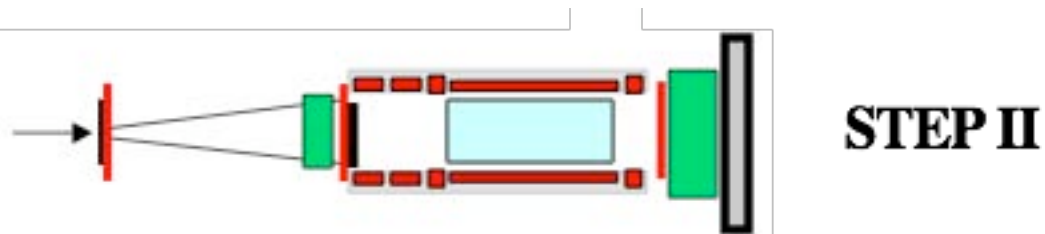
1. MICE Phase I Milestones
2. Beamline
3. Target
4. PID Detectors
5. Spectrometer Solenoids
6. Tracking Detectors
7. DAQ, Controls & F.E. Electronics
8. MICE Phase II Progress

MICE Phase 1:

- Now ≈ 385 days until 1st beam @ RAL!
- Want 1st PID detectors on the floor & working when beam turns on (April '07):



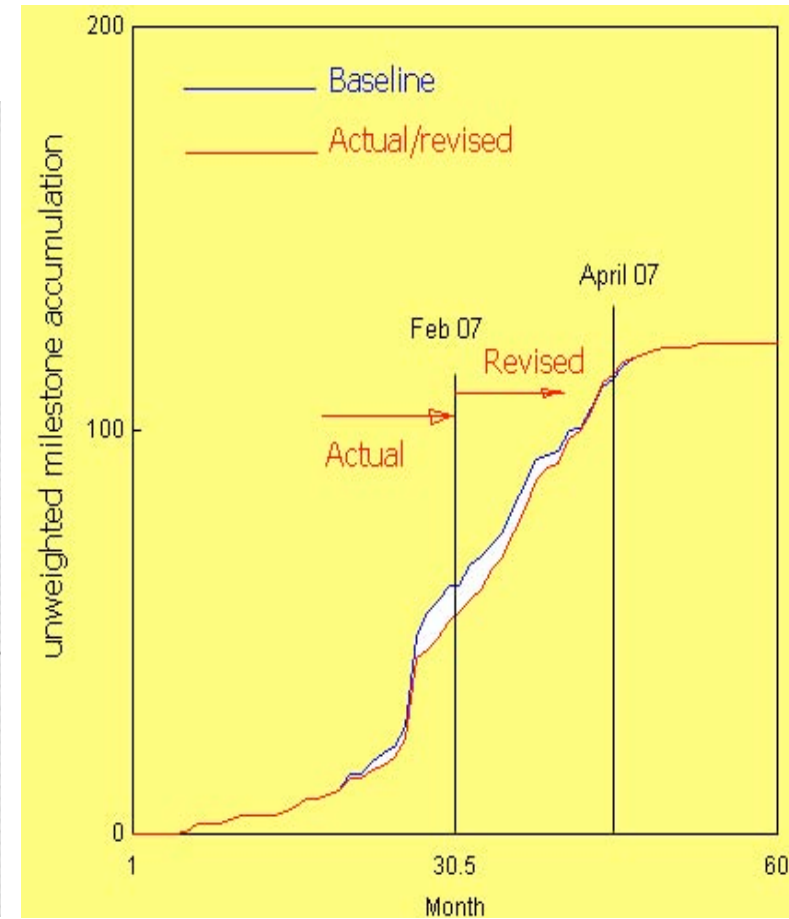
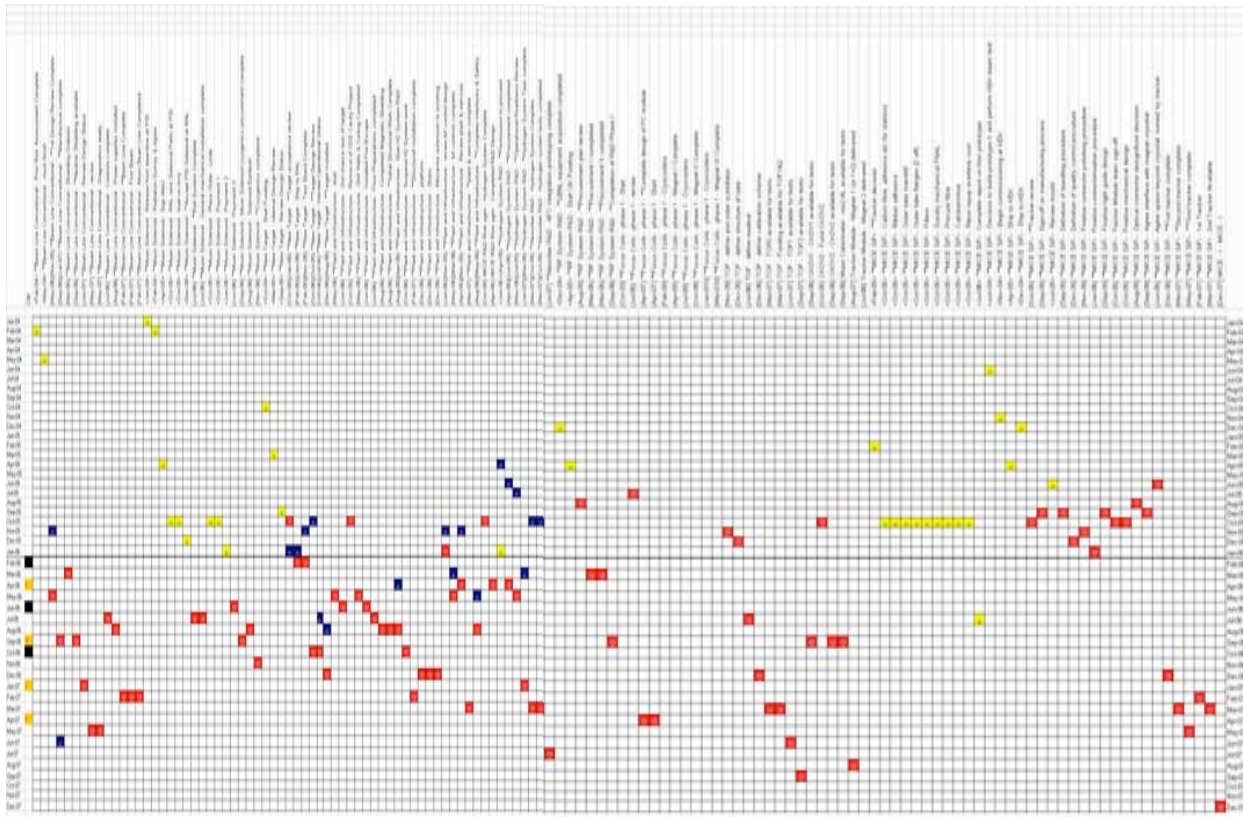
- Want 1st tracker installed & working by Oct. 2007:



- Will require careful management
 - of both detector & solenoid design & construction and of target & beamline work

MICE Phase 1 Progress:

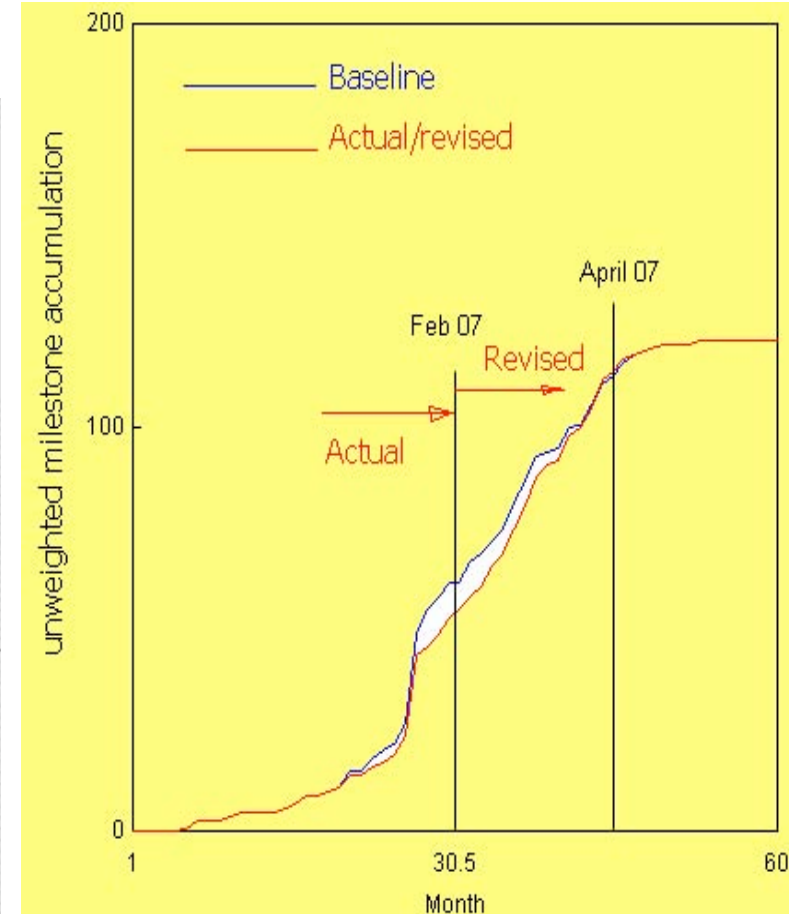
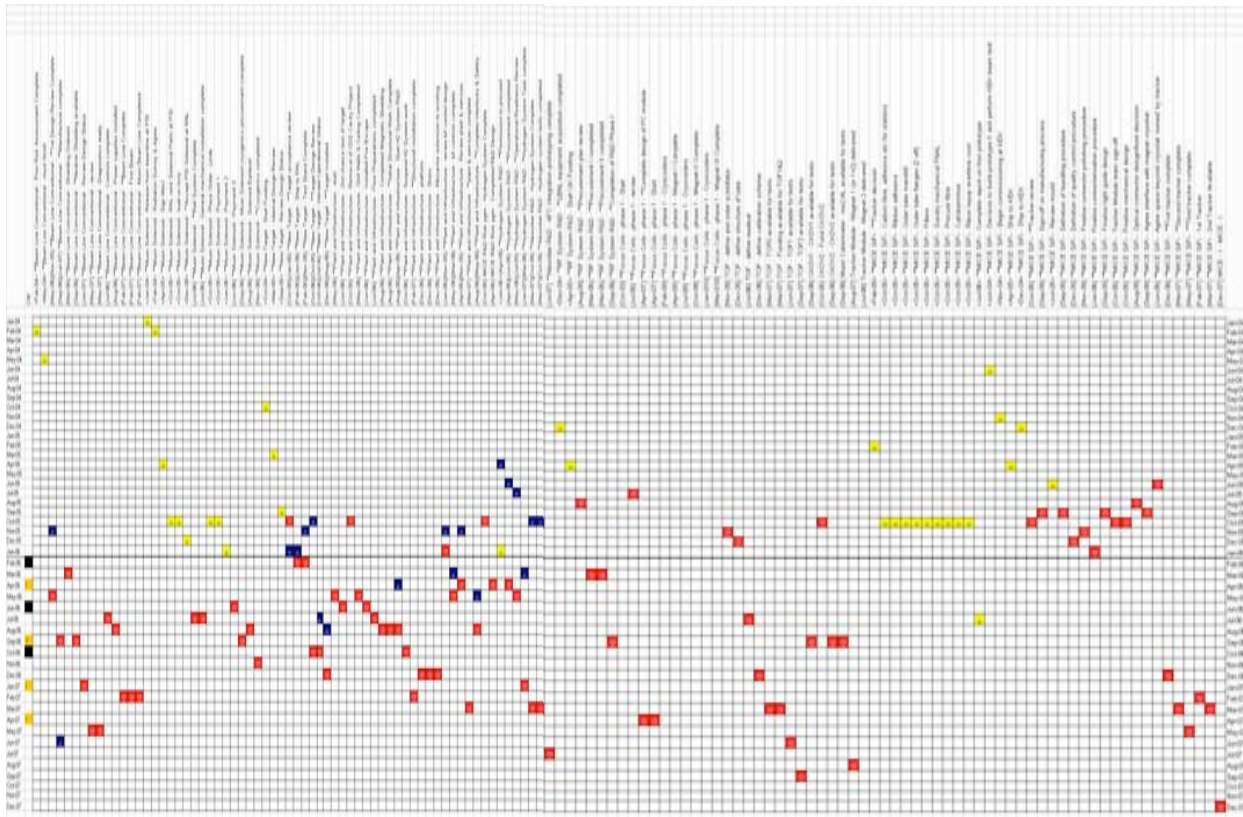
- From P. Drumm Project Manager's Report:



- Earlier shortfall seems recoverable

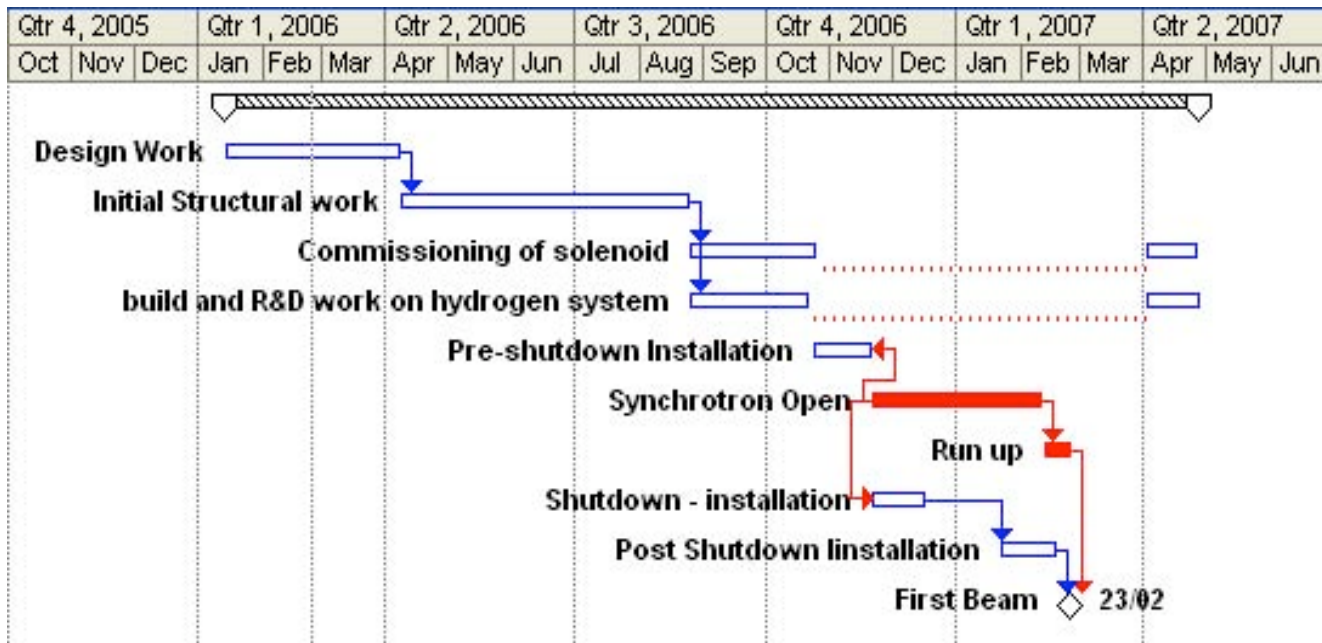
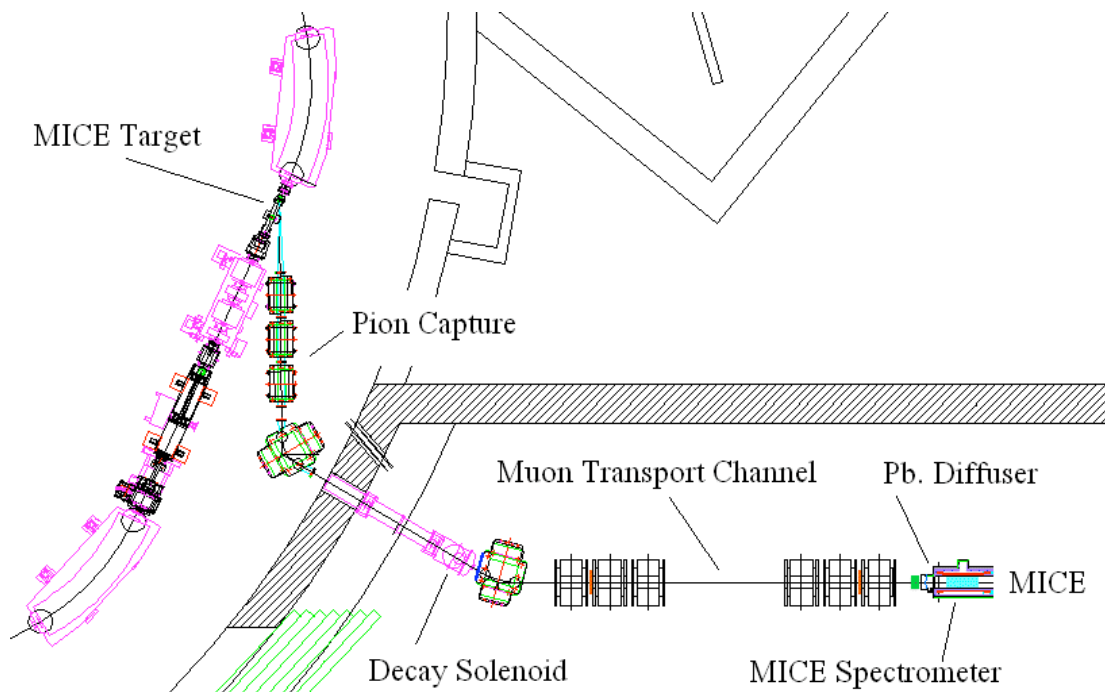
MICE Phase 1 Progress:

- From P. Drumm Project Manager's Report:

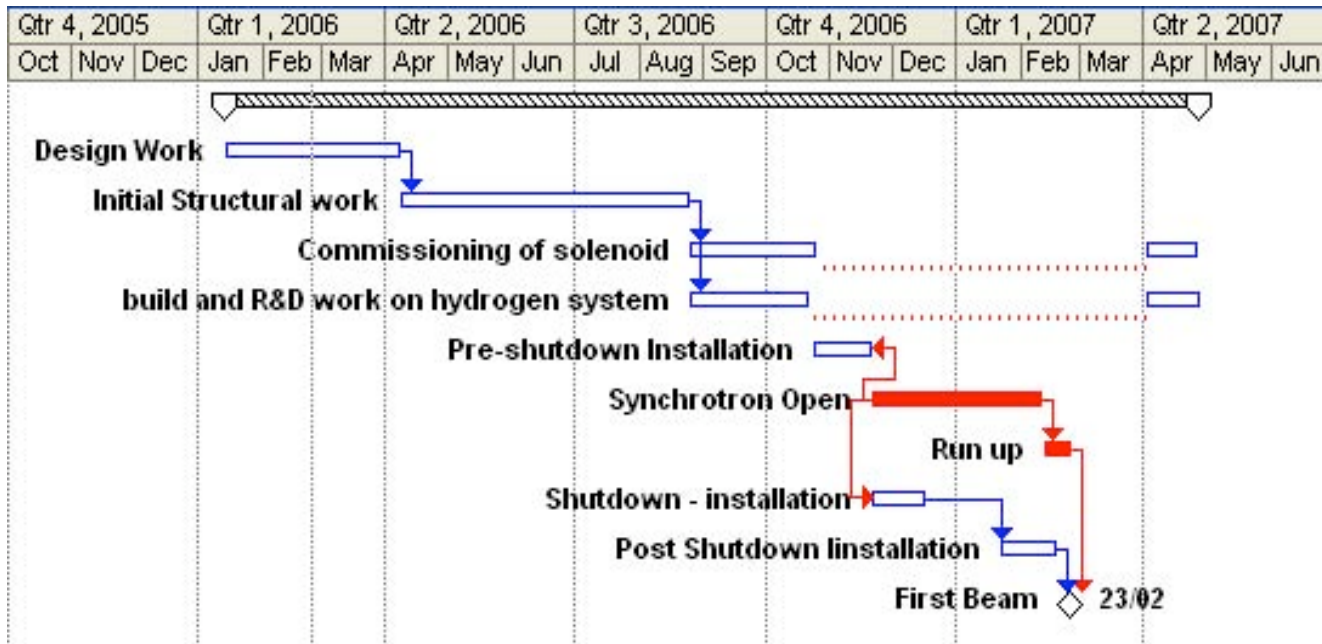


- Earlier shortfall seems recoverable
 - but this “content-free” view is somewhat unenlightening!

- Beamline layout & critical path:



Some Beamline Milestones:



✓ PSI solenoid now delivered

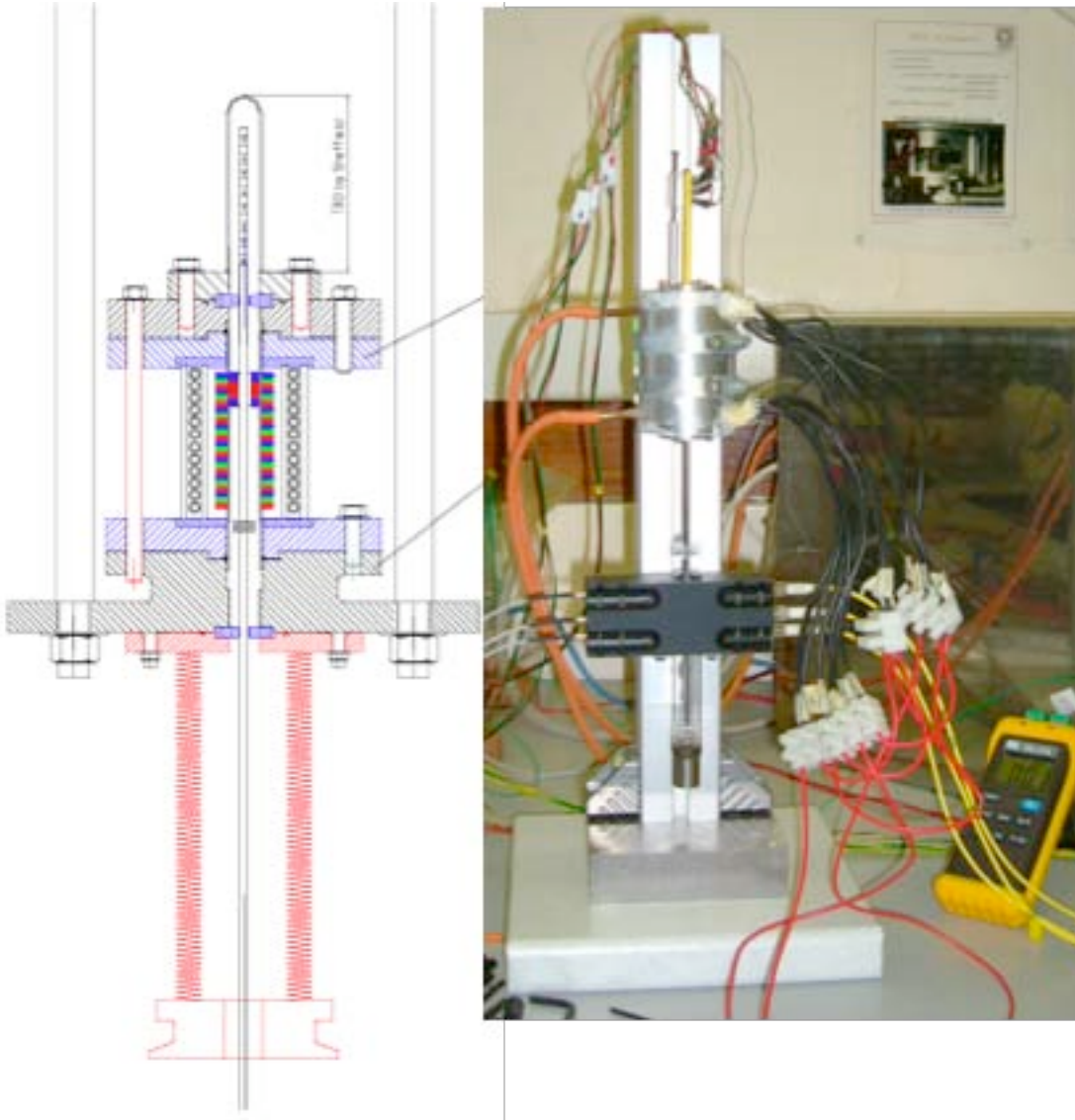
- Still to do:

- Review optics design, build pion-capture section (w/in ISIS area ⇒ need ISIS off)
- In parallel, test PSI solenoid & install (breaches shield wall ⇒ need ISIS off)
- Build muon transport downstream of PSI solenoid (doable with ISIS running)

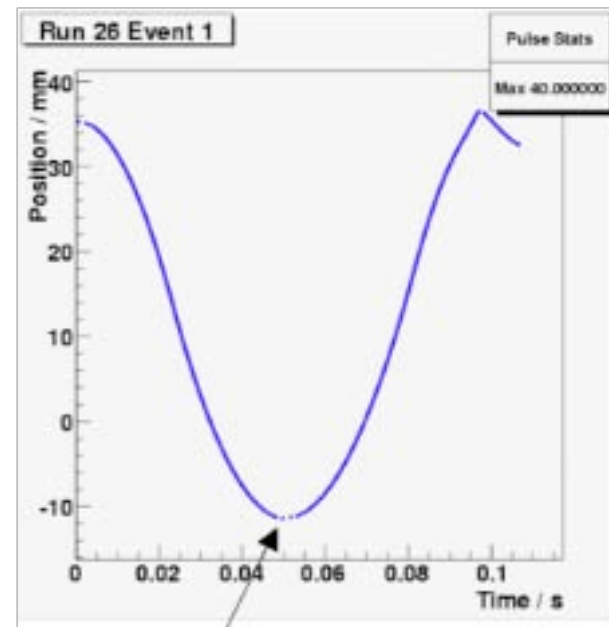
- Beamline-design manpower somewhat thin

ISIS Target

- New target mechanism designed & built by U Sheffield group
 - $10 \times 10 \times 1 \text{ mm}^3$ Ti tgt driven down into beam halo for last ms of ISIS cycle @ $\sim 1 \text{ Hz}$



- Missed original 1/06 ISIS test date
- Bench tests w/ 5A drive ckt successful:



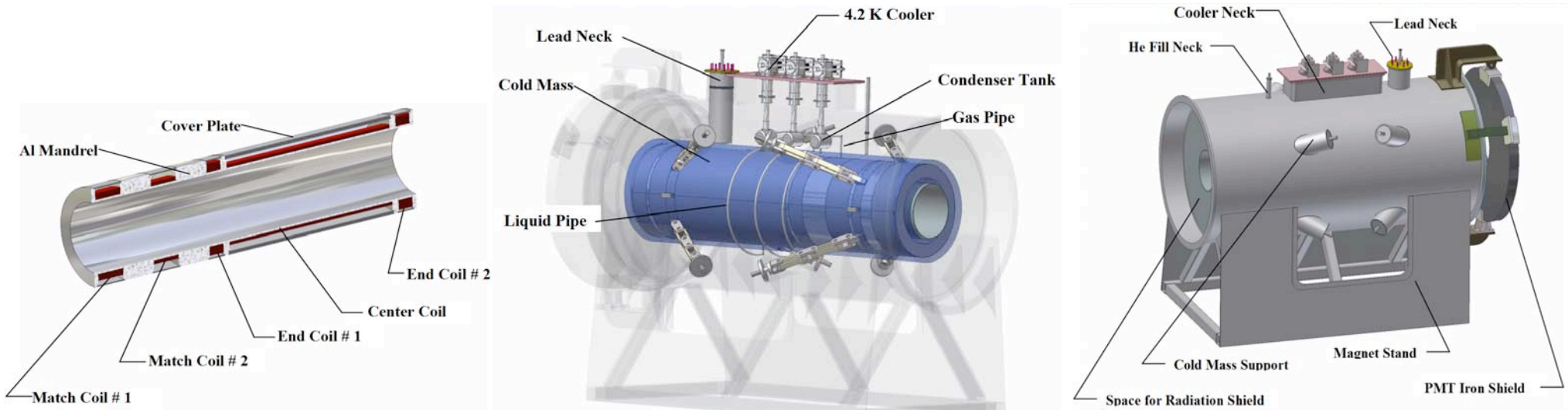
- ⇒ 40A drive ckt needed for ms pulsing
- Test in ISIS now rescheduled for June (looks tight)
- off-the-shelf 40A drive ckt could help

PID Detectors

- TOF0:
 - D. Adams & T. Roberts sims \Rightarrow 40 x 40 cm² active area, 4 cm segmentation
 - Bicron BC-420 scintillator bars 40 x 4 x 2.5 cm³ ordered
 - PMTs avail. from HARP
- TOF1 & 2:
 - Need to settle PMT B shielding: 2nd Fe washer needed? (avoid fine-mesh PMTs)
- CKOV1 in tricky momentum range: 2 sol'ns in contention
 - RICH / DISC counter \Rightarrow high channel count (& cost?)
 - aerogel-combination thresh. counters \Rightarrow high-density aerogel (R&D)
- New sims (R. Sandström) suggest CKOV2 may not be needed
 - but not yet fully definitive
- EMCal sims suggest non-sampling (all-scint.) design optimal
 - may want 1-layer spaghetti as pre-shower
- June Frascati Beam Test to settle some of these questions

Spectrometer Solenoid(s)

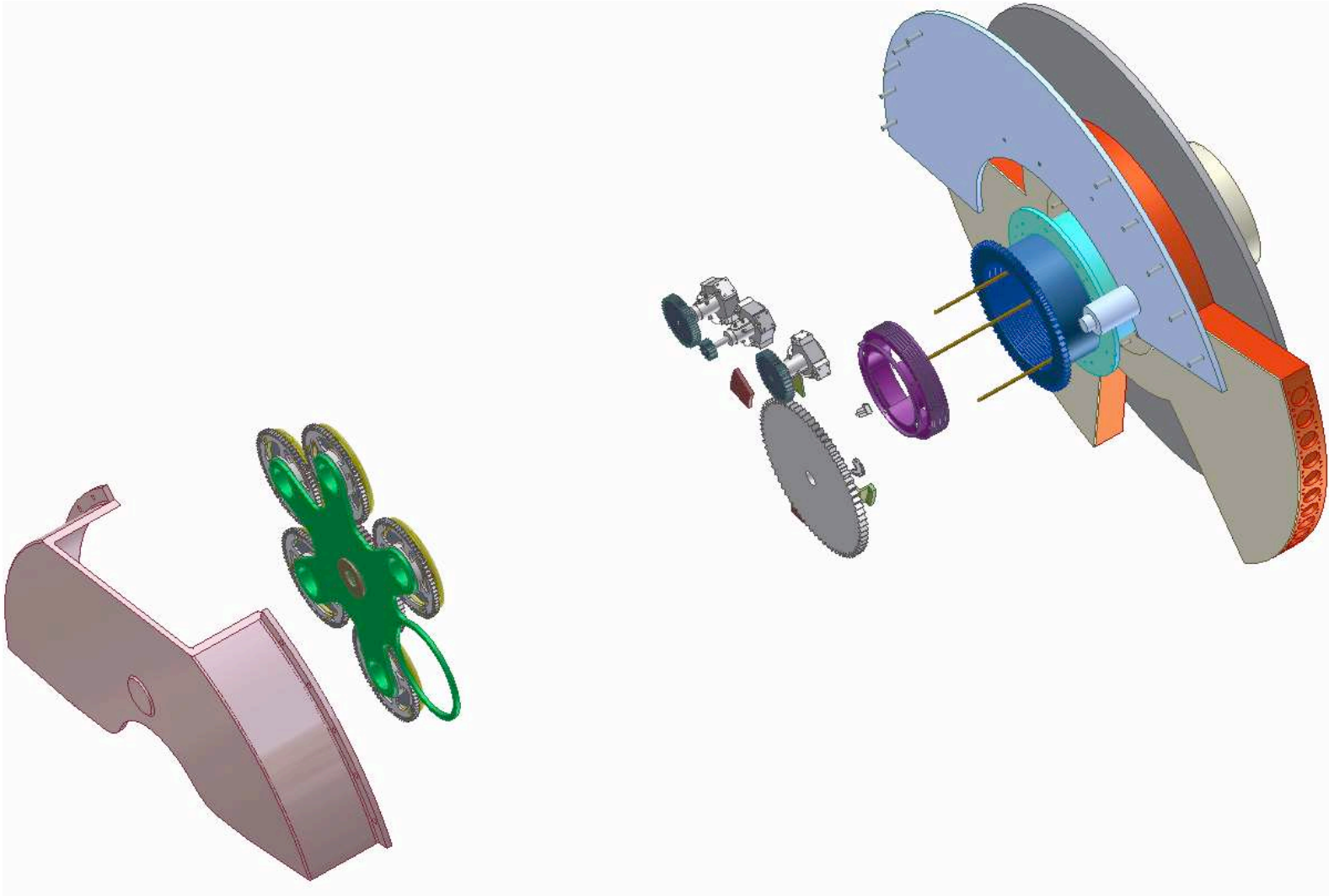
- Superconductor ordered (LBNL/IIT), fab in progress for April delivery
- Solenoid spec / bid pkg in prep @ LBNL/Oxford, mid-March goal



- Will order one or 2 solenoids depending on bid price / available funds
- Anticipate few-month bid/ordering process, delivery ~1y a.r.o.
 - ⇒ on track for Fall '07 installation @ RAL
 - need plan for mapping field:
 - o Ziptrack @ FNAL?
 - o CMS mapper @ CERN?
- Progress on cooling approach & cryocooler selection

Diffuser

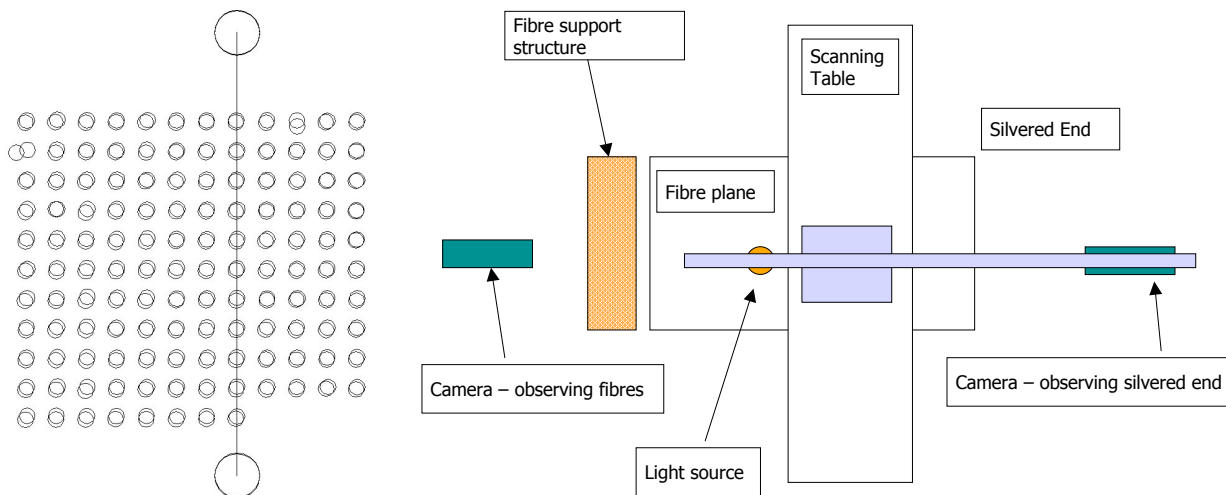
- S. Yang/W. Lau (Oxford): ingenious design for rapid, automated absorber exchange inside entrance of 1st spect. solenoid



- Handles up to 5 thicknesses (heavy liquid also a poss.?)

Tracker(s)

- KEK beam test: $\approx 40\%$ -lower light yield in new (4th) SciFi station than in cosmic tests @ D0 of earlier (3-stn) proto (Osaka/FNAL/ICL)
- Problem appears to be misalignment of new optical connectors
⇒ need to start holes with centering drill to avoid wandering of thin (1mm) drill bit (or else injection-mold connectors)
- Detailed investigation also found mirror reflectivity $\approx 15\% <$ that in D0
– yet to be understood
- QA-procedure R&D stepping up
– expect to head off & fix any future problems prior to installation in solenoid

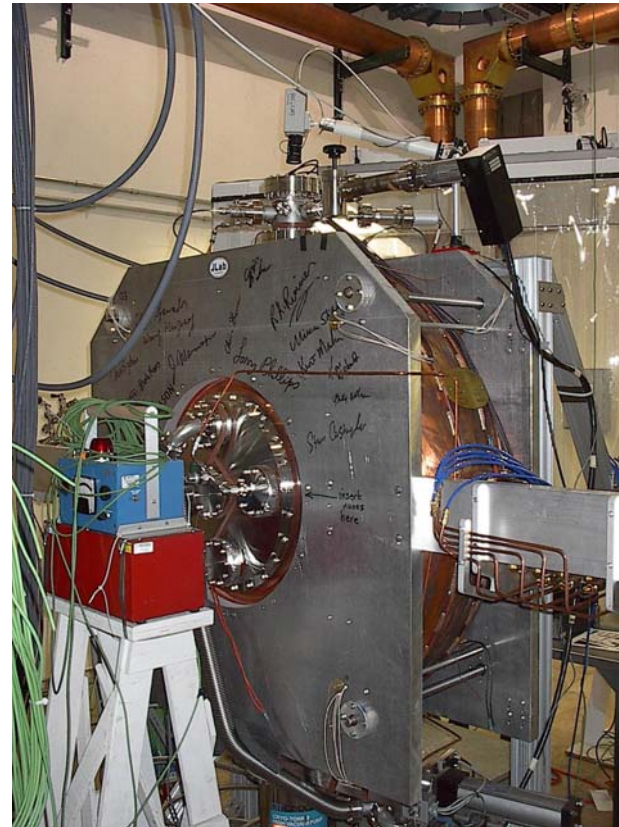


DAQ, Controls & F.E. Electronics

- Two workshops have stimulated progress
- Some decisions taken:
 - use AFE II for SciFi DAQ
 - use ALICE on-line software
 - use VME
 - use Linux PCs
 - use EPICs
- Still too many alternative options for some subsystems (TOF, EMCal)
- Plan (J.-S. Graulich, U. Geneva): prototype & test at Frascati T.B.

Phase II Progress

- RF P/S refurb started @ Daresbury Lab for May test:



- 201MHz cavity test under way @ MTA

LH2 R&D

- Hydride bed ordered
- Safety review passed
- Official response to Review Committee recommendations in prep (nothing major)

News

- Kyoto group (Y. Mori et al.) applied to join collaboration, application accepted
- Next MICE meeting dates:
 - June 8–11 Fermilab
 - Oct 8–11 RAL

Summary.

- Much progress
- Deadlines growing more serious
- Manpower a bit thin
- Continuing to attract new collaborators and seek add'l funds
- Starting to get exciting!