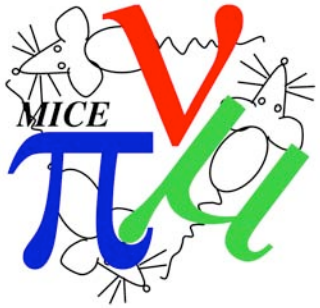


MICE Overview

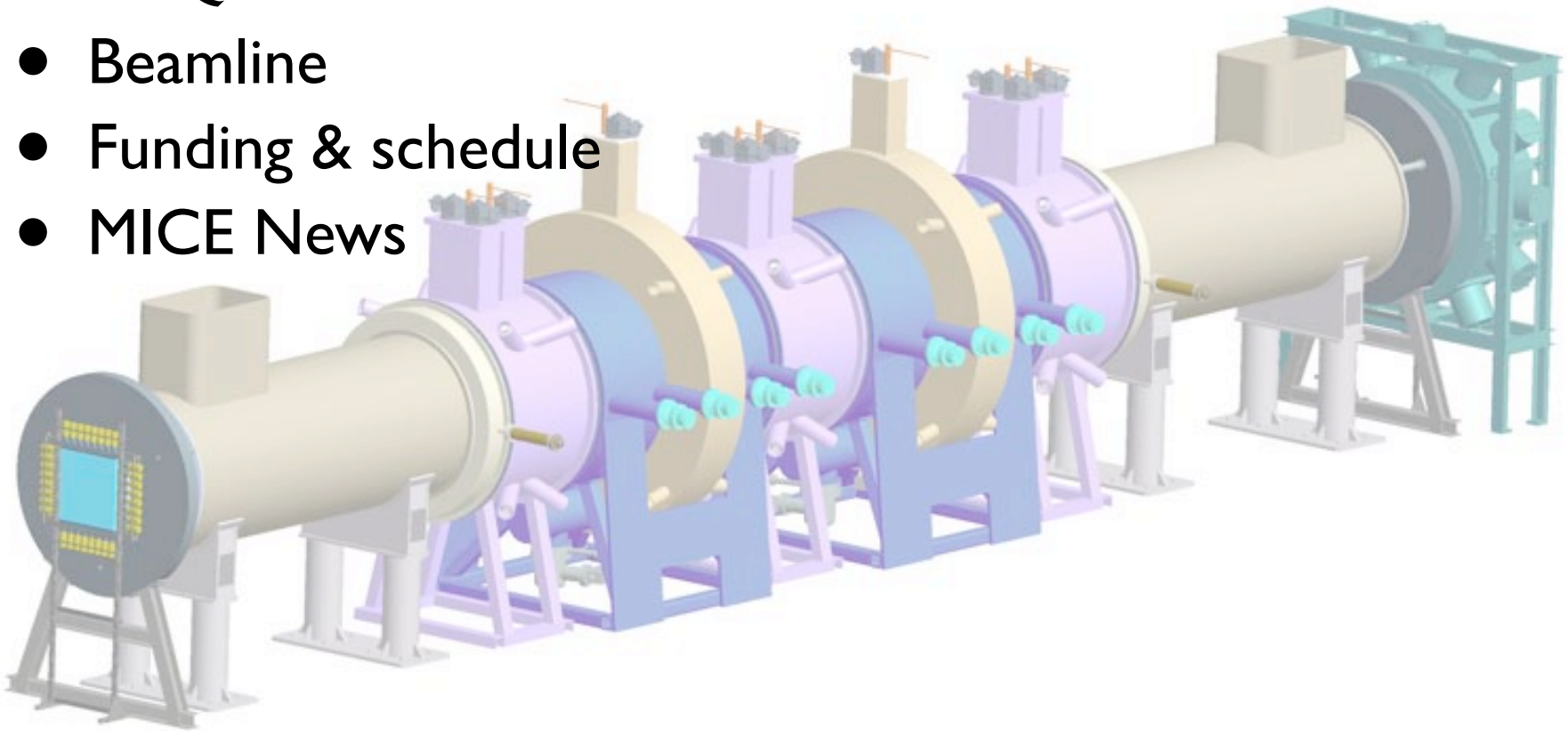
Daniel M. Kaplan

ILLINOIS INSTITUTE OF TECHNOLOGY
Transforming Lives. Inventing the Future. www.iit.edu

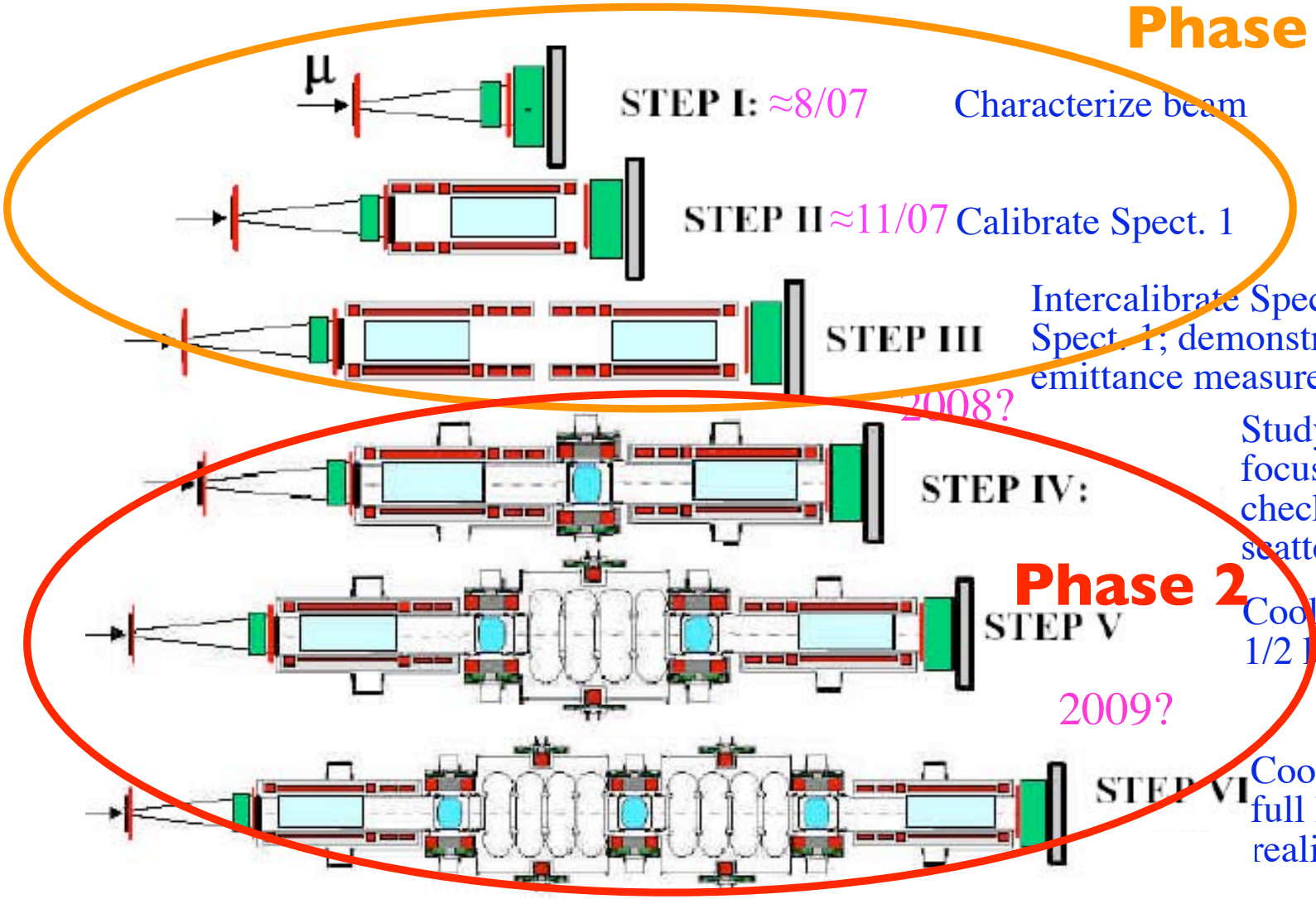
NFMCC Meeting
UCLA
31 Jan. 2007

Outline

- MICE steps and phases
- PID detectors
- Spectrometers
- DAQ
- Beamline
- Funding & schedule
- MICE News

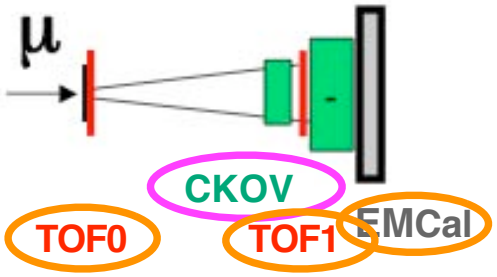


Avatars of MICE



MICE Phase I

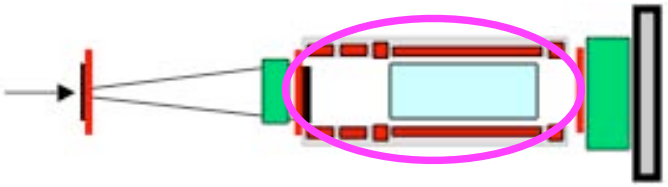
- Want 1st PID detectors installed & working when beam turns on (≈ Aug. '07)



STEP I

US (NFMCC) Responsibilities...
INFN Responsibilities...

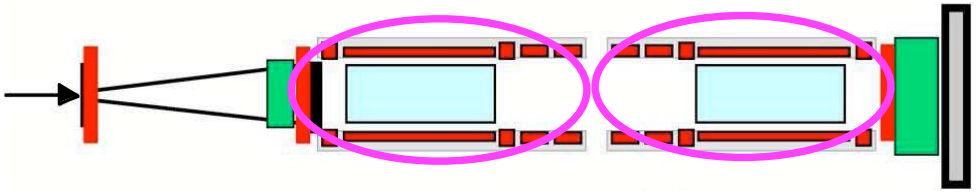
- Want 1st tracker installed & working by ≈ Nov. '07...



...(in whole or in part)

STEP II

...and, if possible, 2nd tracker shortly thereafter:

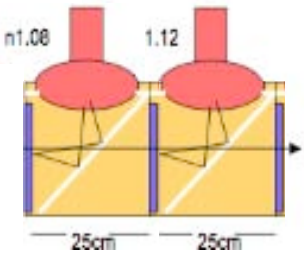


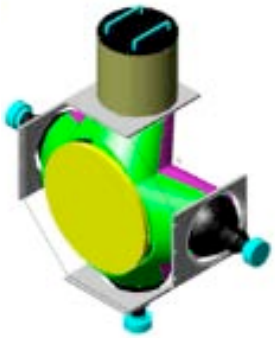
STEP III

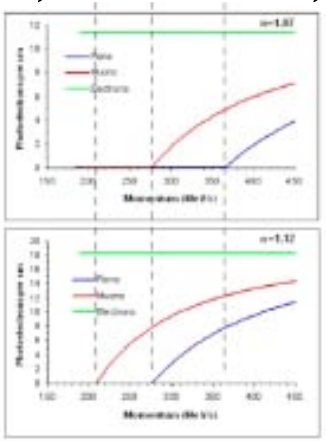
CKOV

UMiss + G. Gregoire

- Needs to operate in tricky momentum region: $200 \lesssim p_\mu \lesssim 300\ \mathrm{MeV}/c$ (no single good radiator)
- Solution: dual radiators (aerogel, n = 1.08, 1.12)







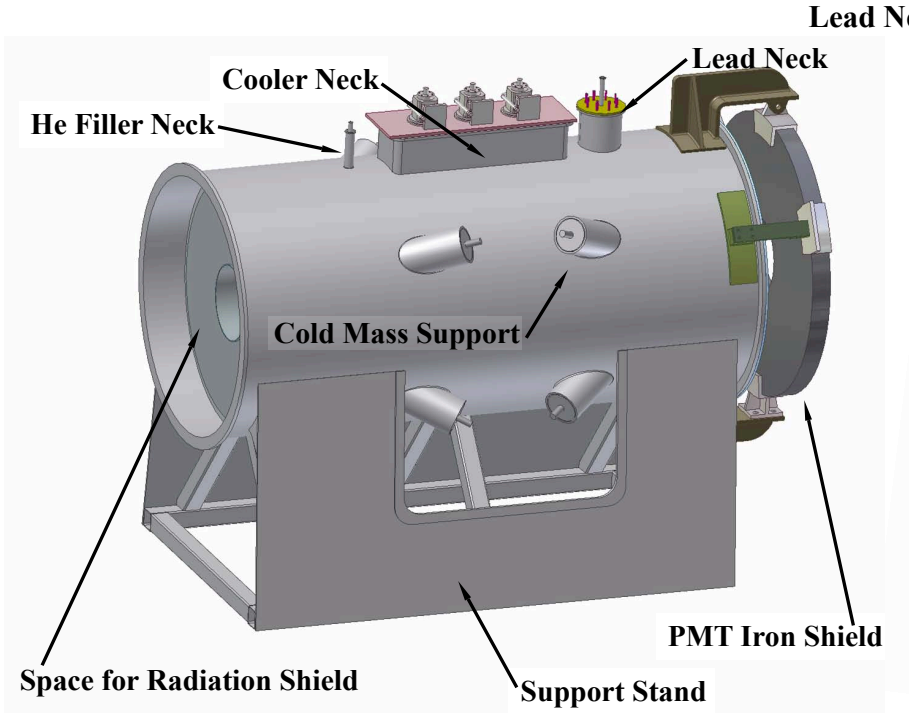
- Design reviewed Oct. 12–13, 2006 @ RAL, response in preparation
- Successful aerogel beam test @ FNAL sum '06

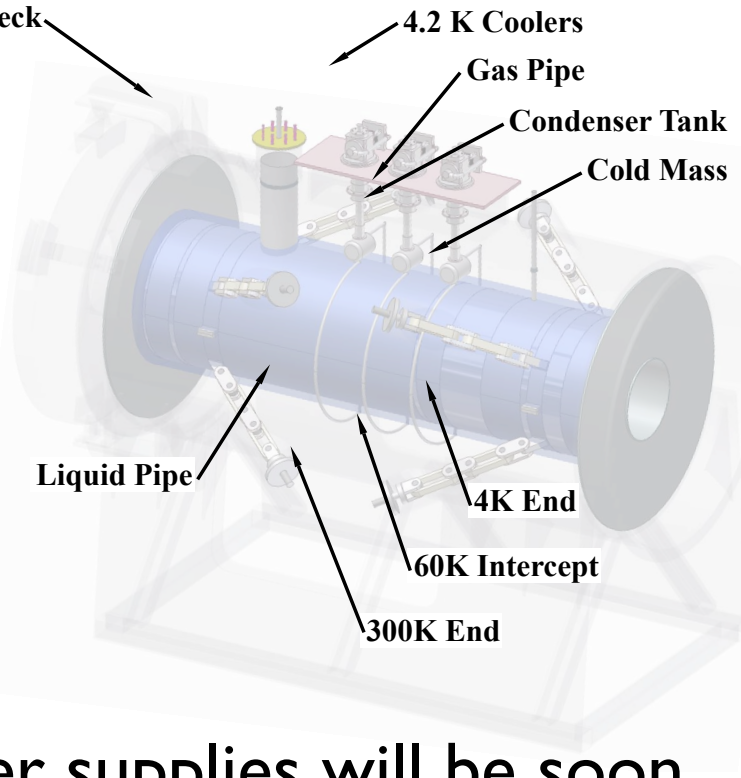
➡ see Cremaldi talk

Spectrometer Solenoids

LBNL + IIT

- Design complete, fabrication in progress



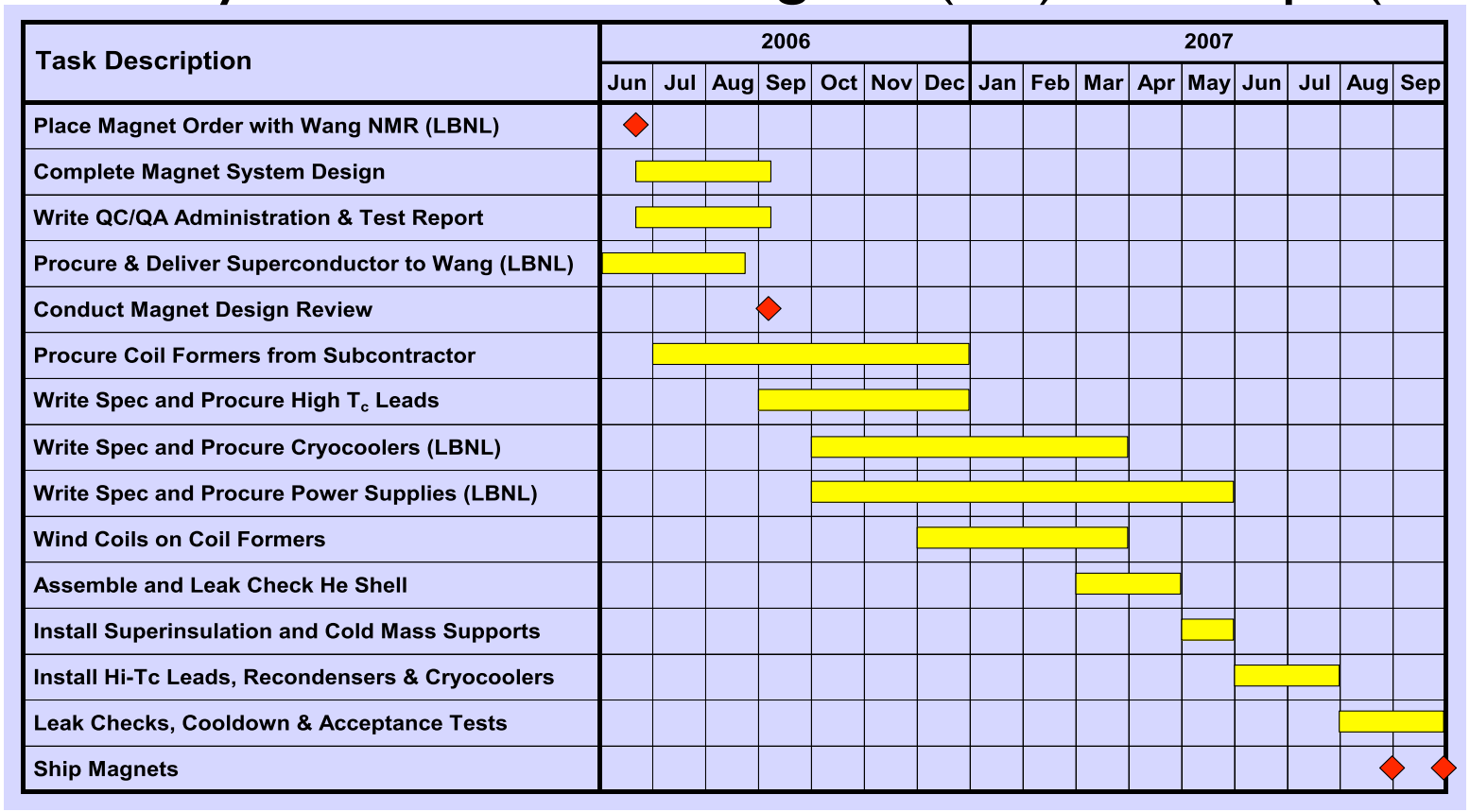


- Cryocoolers on order; power supplies will be soon

➡ see Virostek talk

Spectrometer Solenoids

- Delivery scheduled end-Aug '07 (1st), end-Sept (2nd)



- delivery first to Fermilab for field mapping
- delivery to RAL ≈ 2 months later

Tracker

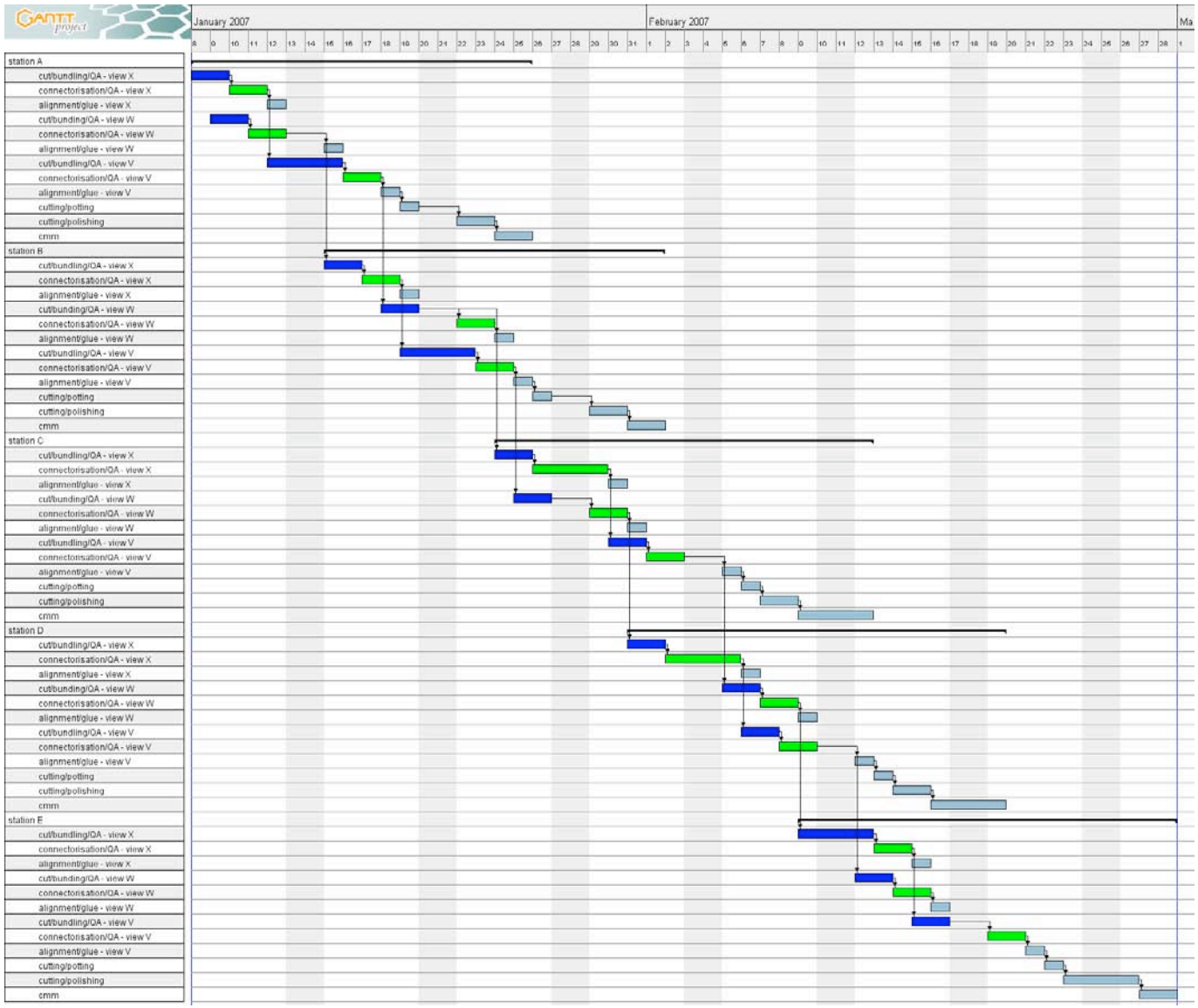
UK + JP + US

- Large, international task coord. by K. Long, ICL
- Regular phone meetings and workshops
- Plan: will build 15 stations and choose the best 10

➡ can choose the stations for Tracker 1 once 10 stations have been completed and tested

➡ see Ellis talk

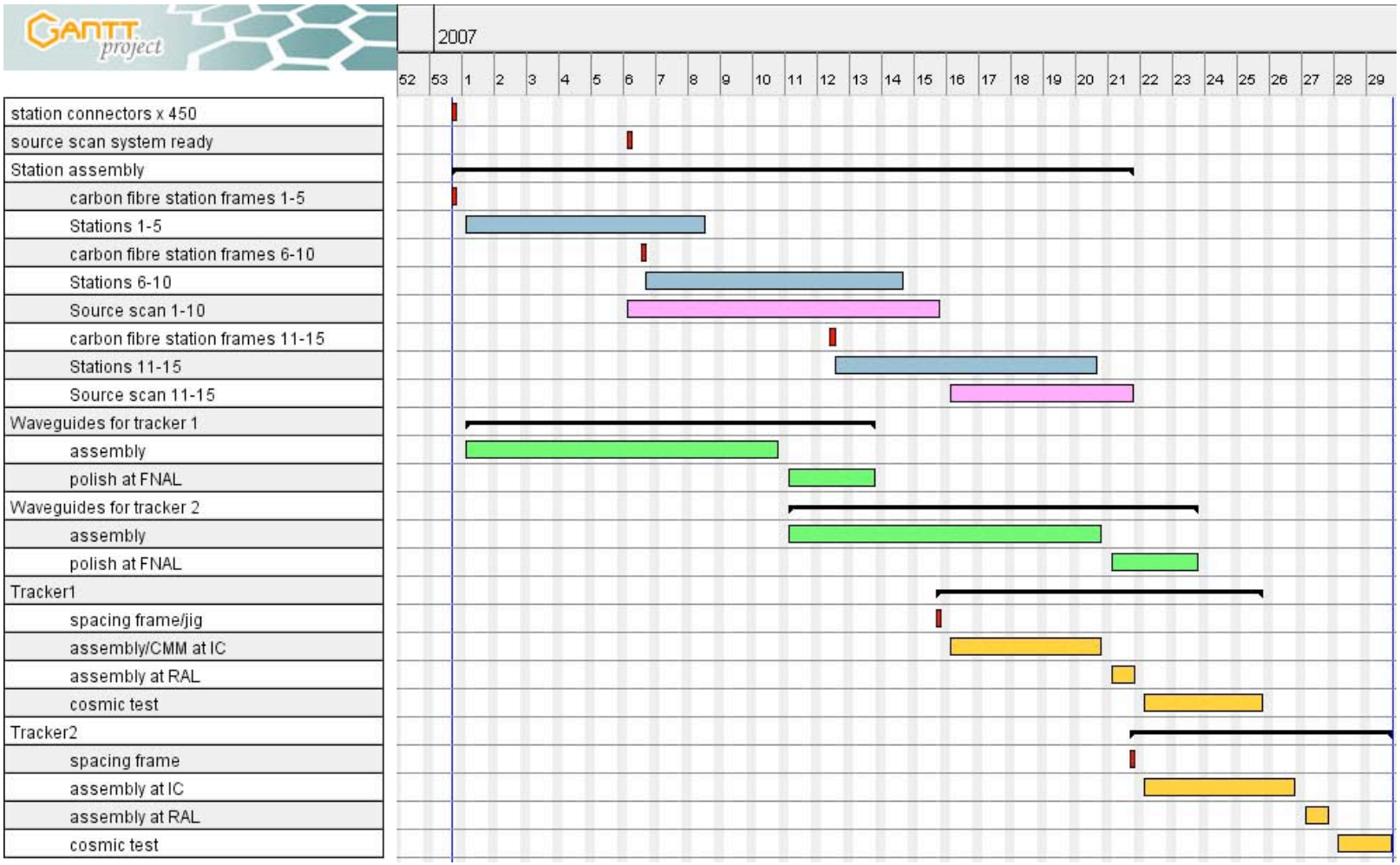
Gannt chart for 5 tracker stations:



(from Takashi Matsushita, ICL)

- Takes 7.5 weeks

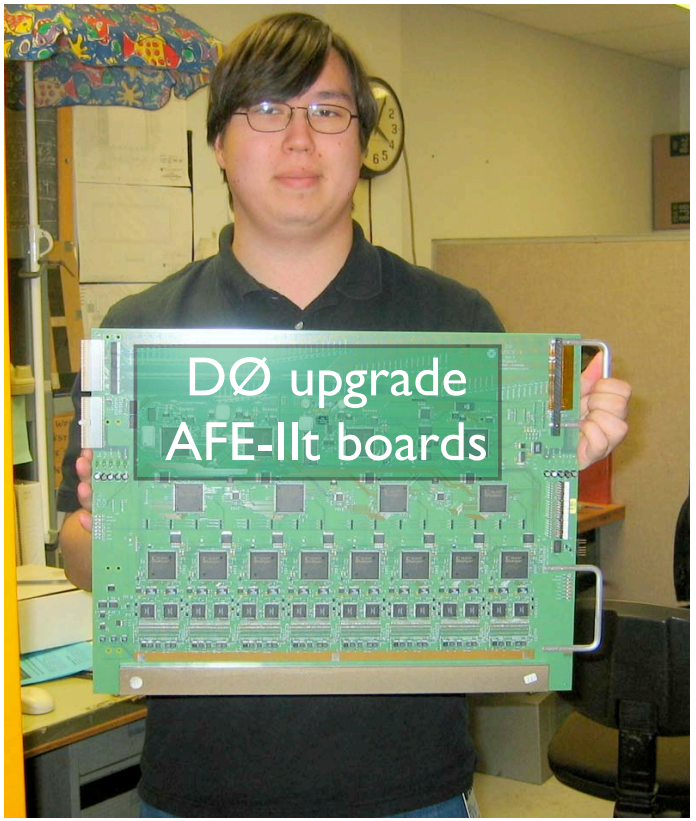
...and for 15 stations:



⇒ Finish Tracker 1 in June '07, Tracker 2 in July

Tracker Front-End DAQ

FNAL + IIT

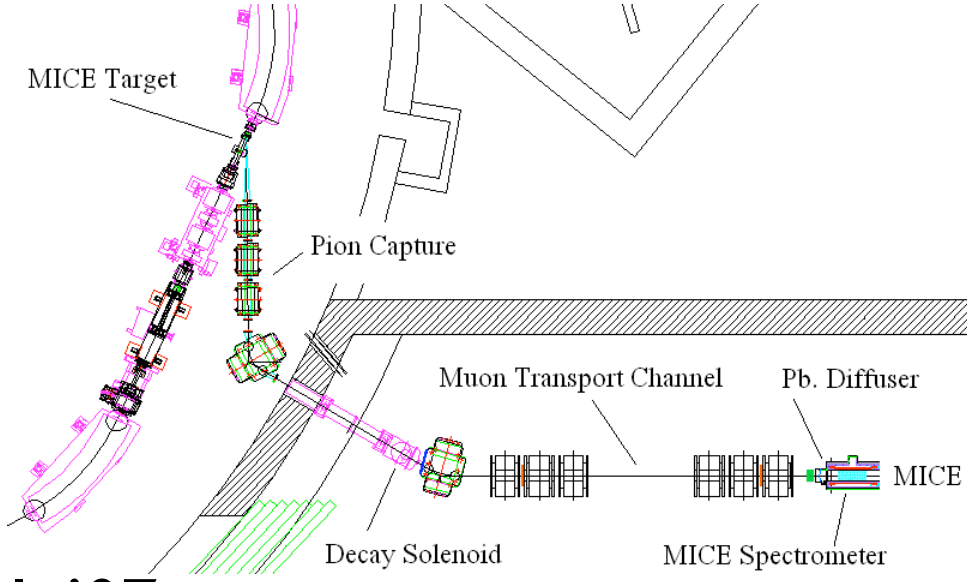


- All F.E. boards now in hand
  - IIT summer students tested all 375 boards (MICE+DØ)
  - some in need of minor repair
- Use of DØ electronics has yielded *very* substantial savings in cost & effort $$→solenoids
- Challenge: speed up DØ readout microcode to enable 600 kHz muon rate during spill

➡see Hart talk

Beamline

RAL + IIT



- ISIS shut down for new tgt-station construction
  - startup scheduled Aug 1, '07
- MICE tgt and pion-transport inst'n scheduled April
- Decay-solenoid installation scheduled May–June
- Muon-transport installation scheduled June–July
- Intermittent MICE beam possible starting Aug 1
- MICE Step I scheduled to begin September 15, 2007

Beamline Design Status

- Response to Beamline Review completed
- Collimator found for possible use upstream of TOF0 or Q4
- Haven't filled in 3x3 emittance-momentum matrix
  - main problem: staffing
  - everybody has other high-priority tasks

p_μ \ ε	1(mm.mrad)	6	10
140 (MeV)	?	?	?
200	?	?	?
240	?	?	?

- Material in muon transport problematic
  - may need helium bags
  - possibly remove TOF0, rely on CKOV for pion rejection

Beamline Issues

(from K. Tilley and T. Roberts)

- Diffuser radius
  - Consensus is that it needs to be bigger than current 10 cm radius
  - Possibly mechanical constraints though
  - Plan is to draw up a specification, taking these into account
  - **Currently a hot topic of discussion!**
- Discussion topics for CERN CM17 Meeting
  - Staffing
  - Diffuser radius
  - MICE beamline commissioning
  - MICE beamline instrumentation
- Beamline Conference Call February 4 to work on these issues and prepare for CM17

Funding / Support

- UK: large (£10M) host contrib
- US: NFMCC ($5M DOE) + IIT ($0.3M NSF base + $0.75M MRI)
- CH: PSI decay solenoid + few-100k€ + Bulg supp't
- NL: Magnetic probes in production
- IT: 0.2M€ short, RAL £→TOF/Cal offer in process
- JP: proposal this year not successful - trying again for next year
- UCR NSF proposal (MICE implementation & exploitation) "pending"
- UMiss NSF PIRE preproposal (for travel, postdocs, & students) not selected - plan to try again next year
- UK bid for Phase 2 funds in process
- In-kind Phase 2 contributions (RF power refurb) proceeding at DL & CERN (US, UK, & CERN equip't)
- ICST Harbin request for CC fab in process

Phase I

Phase 2

Progress on the Ground

- Target test
- Linac-side stairs built
- Trench strengthened
  & new access installed
- Floor cleaned & painted
- Holes (almost) all drilled – last two to go
- Solenoid in hall
- Linde cryoplant delivered to hall (not tested)
- Q35s stripped down; coils tested – ready to rebuild

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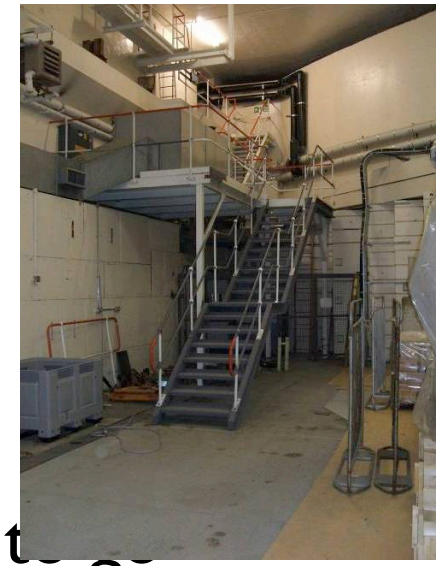

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Collaboration News

- Analysis Forum Convenor: Torun (IIT) → Cobb (Ox)
- VC Coordinator: Long (ICL) → Graulich (Gen)
- Spokesmouse mandate expires 30 April 2007 – to be extended if needed until election process is finished
  - Search Committee selected: Gamet (Liv), Gregoire (Louvain, ret), Kuno (Osaka)
- CB Chair mandate was extended accordingly – will elect new one after Spokesperson election
- Marx AARD subpanel: "support the MICE project as a critical feasibility demonstration for muon storage rings and colliders."

"concerned that the support for muon cooling is below what is needed to sustain momentum in this program."

Next...

2:10	Cooling Modules/Magnets	S. Virostek
2:35	Tracking Detectors	M. Ellis
3:00	Coffee	
3:30	DAQ	T. Hart
3:55	Particle ID	L. Cremaldi
4:20	Analysis	M. Ellis