FIELDMAPPER PROGRESS – WEEK ENDING 05/08/98

1 Magnet Meeting

Adam, Miguel, and Rich met Wednesday and discussed fieldmapper progress:

- Miguel has calibrated Greg Schellberg's fancy table in the vertical axis – it is quite linear, and the stepper motor and encoder have 1 micron resolution. Miguel will be able to position repeatably to 1/2 mm or better without further work. Another axis uses the same lead-screw/motor/encoder so needn't be calibrated. Calibrating the rotation angle can in principle be done on another of Schellberg's fancy tables, but just how is not yet determined.

  Miguel will need a probe holder drawn and fabricated. It should incorporate the existing hall probe plates.

  There may be a need for some Labview programming; maybe the Rototrack program can serve as a base/model.

- The PC has its IP address but still needs the subnet mask numbers for its present location.

- The assembly of the z-caterpillar is underway. The last trough holder is glued on and the trough is next. All parts are on hand. Some kludge will be needed to use the cable carriage to test out the z-handler: temporarily mount the caterpillar dragger, attach the cable, and attach the limit-switch paddles.

- There has been no new hall probe work in IB4.

- The new hall probe carriage is nearly fully laid out; final design should be done by next week and all parts ordered. The "wheelbase" (distance between bearing centers has been set to 6" – this leaves ample room for the hall probes and the cable gripper. Miguel noted the cable must not rise so high that the N pully strikes the phi-handler.

- We will meet with Jim Christensen next Mon to work out the schedule; the fieldmapper cannot be assembled much before mid June, and thus tested and surveyed till the end of June. Thus the earliest it can be sent to DAB is about July 1. (It might lack the new z-encoder even then).

2 Cable Handler Redesign

- Adam has begun assembly of the z-handler. All parts are on hand to fully install the trough and caterpiller. The new cable carriage can be modified to test out the new z-handler.

3 Hall Probe Carriage

- Rich met with Pat and they increased the wheel base of the new carriage to 6", and refined the Velmex slide mounting, the cable gripper, and the encoder sub-chassis. They finalized the rail supports and changed the mounting plate from G10 to aluminum tooling plate to save time (Pat has been unable to find existing G10 to use). At a second meeting they agreed on the details of the pinion gear and shaft; Pat will check if the Berg rack she has in mind can be joined end-to-end as required. She has a scheme for the swivel pin of the encoder sub-chassis and she and Rich refined it to be workable (it will use a custom fitted brass anchor pin).

- Rich received the quote from Sterling (via Ron Gonzalez). The custom rack will be $960, 10 weeks ARO. They also quoted on an anti-backlash gear ($38, 2 weeks ARO).

- Rich talked to Nelson Sample about the rod length, and he finds the vendor can to 12' OK with no price change. So the order should have gone out. He told Rich Marsha Schmidt in TS knew about aluminum hard coat. Rich followed up on this and she got back to him re "Nituff" and gave me the address for Nimet Industries in South Bend. Rich got their info off the web (www.nimet.com), and sent them e-mail re his needs for coating aluminum rods.

- Rich talked to Gary Trotter about aluminum hard coat, got his information ("Mikes Plating") too.

- Rich talked to Harry Patel at Centerless Grinding, and he got back to Rich that they could do aluminum (any alloy!).

- Rich called GMW for Teslameter info and they faxed him the dope on what we need. Rich talked to Bob Christenson (650 802 8298, x 12) and he notes the DTM-151 will interface just like the DTM-141's we already have but it is more noise immune, etc.

- Rich talked to Marvin Johnson about encoders, learned a bit. He noted a PC counter card would be laborious to use for a readout.

- Rich called Metronics for a QC-1000 brochure, and got a fax from Ron Doherty of Metronics (probably in response to his email query of 4/30). He sent the connector pinout and RS232 port details. Rich called Ron and he gave Rich Gary Granville who said: Renco could probably put on the proper connector (male, "Acurite"), we want the LD encoder output, and there is a local vendor (Fryer Co. 847 669 2000 in Huntley IL).

- Rich called Fryer and eventually Douglas Blahunk got back to us: a QC-1000 will cost $600, we should make up the encoder connector ourselves, and he would fax us a quote and delivery. Rich received the quote and made out the req.

4 Hall Probe Arm

- Rich got a confused call from buyer Bob Johnson re the Velmex slide we ordered (with a Velmex sales person on the line), but all is well and the order was placed.

- Gene suggested we consider rotating the probe cube to check for systematics.

5 Hall Probe Calibration

- See minutes of Wed meeting above,

6 Field Calculations

- Adam fixed his script so one can run Mapplot from a subdirectory.

7 NMR R & D

8 Schedule

9 Installation

- Rich drafted a commentary note intended to prompt thinking about the magnet commissioning task expected to occur in the fall. It is appended:

  MAGNET COMMISSIONING TASKS

  The following schedule lists activities pertinent to the commissioning of the solenoid magnet system. In general it begins after everything is ready to run, and when it ends, fieldmapping can begin. It is success-oriented, that is, it assumes all elements of the system will perform as designed.

  The times given are "elapsed", and can be turned into days by dividing by 8. Manpower is not estimated.

  1. CRYO SYSTEM

     (Assumes all magnet-pertinent components installed and ready to operate, system vacuum leaktested, system piping backfilled with clean He gas, cryo safety review completed).

a	Start compressors, start #1 engine cool down system	18 hrs
b	Start # 2 engine, fill system He dewar	24 hrs
c	LHe dewar heater tests	12 hrs
d	Cooldown magnet system (Note most of cooldown can proceed in parallel with a/b/c above since a separate heat exchanger is used and excess compressor capacity exists above that required for a/b/c.)	80 hrs
e	Fill magnet system with LHe	4 hrs
f	Tune operation of system as required	during magnet tests

2. ENERGIZATION/CONTROL SYSTEM

   (Assumes solenoid system fully connected, final testing complete, and all is ready to operate. Note it will also be necessary to have the muon toroid system ready to operate also).

a	Final safety checkout of installation	8 hrs
b	Tune operation of protection system	during quench tests

3. MAGNET SYSTEM

   (Assumes system fully installed, backfilled with clean He gas, all electrical cabling complete and "wrung out", and final safety sign-off complete for both solenoid and toroids).

a	Cooldown magnet system	80 hrs
b	Fill magnet system with LHe (note a and b already listed above in I)	4 hrs
c	Final checkout of control/protection system	during a/b above
d	Review/analysis of cooldown data	during a/b above
e	Begin energization/dump testing (charge to 500, 1500, 2500, 4000, 4825 A with slow and fast dumps and toroid discharges after each; repeat at opposite polarity of solenoid; repeat three with opposite polarity of toroids; review/analyse all cryogenic and electrical logged data).	36 hrs

4. ICD SYSTEM

   (Assumes four iron blocks mounted, one partially instrumented, led calibration and readout system fully operational).

a	Monitor PM outupt at various field levels (activity continues in parallel to item III.e above)	0 hrs

10 New Collaborators

- Rich sent a note to Frank re radiation damage. Gene suggested Rich check the D33 document too. Rich's note to Frank is appended:

  To: Frank Linde <flinde@mail.cern.ch>
  cc: rpsmith, hefisk@fnal
  Subject: Re: B-field
  In-reply-to: Your message of "Wed, 29 Apr 1998 09:35:46 CDT."
  <199804290735.JAA29743@atlas08.cern.ch>

Date: Mon, 04 May 1998 17:44:34 CDT
From: Rich Smith <rpsmith>

Hello Frank,

Gene mentioned to me earlier that you were interested in helping with the installation of some hall probes near our magnet, and your contributions will be most welcome.

We have yet to discuss how we will want to deploy hall sensors about the magnet, and how/when we will read them out, but I can make a few remarks about the radiation levels we expect.

From D0 Note 2394 (Chung and Margulies, 11/94) the estimate for 10 years of running at 2 fb^{-1} per year (2×10^7 seconds at 10^{32} luminosity) gives about 135 Gy (13.5 kRad) charged particle dose at a radius just inside the magnet cryostat vacuum vessel, and a neutron flux of $2.4 \times 10^{12} cm^{-2}$.

These life-time numbers might be higher than you prefer.

The charged particle flux which gave the quoted energy deposition is $2.3 \times 10^{11} cm^{-2}$. And the gamma flux (inside the preshower/ magnet radiator) is the same (assuming 1/3 of the cross section produces neutrals and all neutrals are pi-naughts).

Outside the magnet/preshower radiator the gamma flux generates intense electromagnetic cascades which increase the charged-particle fluxes substantially but I guess we won't put hall probes there.

Regards,

Rich