From: william@physics.utoronto.ca (William Trischuk)
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UEC Minutes -- April 17, 2004

Present: Bloom, Clark (GSA), Gottschalk, Hagopian, Messier,
Sheldon, Tanaka, Tschirhart, Trischuk, White, Zimmerman,
apologies: Groer.

A Visitors Centre at Fermilab (Kurt Riesselmann)

In September 2003, the Fermilab Office of Public Affairs presented a master plan on the future visitor experience at Fermilab to the lab directorate. The plan recommends the construction of a Visitor Center next to the Lederman Center. The new building would be accessible to the public under all security conditions at the lab. With funding from the URA, Public Affairs is now finalizing a project definition report and a "sales brochure" that outlines the details of the Visitor Center. The brochure will be used to solicit funding as the lab budget won't be able to provide money for construction. Funding will be sought in various places: from the Federal and State governments, educational foundations, private donors, etc. The Center will probably be operated under a nonprofit organization that is independent of the lab. Once the funding is secure Public Affairs will revisit the details of the design and the exhibits.

In 2001, Public Affairs commissioned a survey of residents in the area around the Lab. Only 50% of local residents know what the Lab does. Q: What kinds of things have been done at other labs to address this kind of problem? A: DESY has an open house every couple of years with about 10,000 visitors. CERN has a visitor center to house its MicroCosm exhibition.

The idea is to tie the Visitor Center to the Lederman Science Education Center (LSEC). Like the LSEC, the new center would be physically 'outside the security perimeter.' The Center would be the starting point for buses that take visitors on guided tours of CDF, D0, 15th-floor, Linac, MINOS, etc.

The Visitor Center will have an exhibit area with 25-foot ceilings. There will be some kind of icon in the plaza that the center shares with the Lederman Center. Currently the plan is to use the Chicago Cyclotron Magnet as a gateway. Riesselmann showed several themed zones of the center: reception area, 150-seat theater for movies and demonstrations, walkways past the theater that could be made into accelerator tunnel models that would lead to a high-bay exhibit area (like the CDF/D0 assembly areas) with astrophysics displays, accelerator and collider detector displays, and maybe a virtual control room. A separate exhibit

area at the back of the building would provide information on the prairie, and visitors could exit into the woods and grass prairie, perhaps with some bison calving pens.

Q: How was the Lederman center funded? A: It was paid for on a one-time-only basis by the DOE. It is unlikely that that would work this time. A Visitor Center is not part of the DOE mission.

Q: What other DOE supported labs have things like this? A: LANL, LBL, ORL and NREL have museums. The DOE has put capital in, but then they have been reluctant to support the on-going operations and expenses. Concerns were expressed about selling the Visitor Center as an answer to the tension between security considerations and public access. This might be bad because it gives the DOE an excuse to permanently close the rest of the site to the public.

Q: What can the UEC do to help? A: When the fund-raising plan is finalized, Public Affairs will perhaps need help advertising the campaign. For now Public Affairs wanted to inform the users community about their plans and to ask us for input on exhibit ideas and scientific equipment that could be displayed. All design and exhibit plans will be reviewed and refined when funding is available.

Status of the Laboratory (Mike Witherell)

Accelerator operations have recovered since the late March shutdown. Had 143 hours of operations during the last week. Luminosity has not been as good as we would have liked. There are issues with an anti-proton abort kicker in the Tevatron that threaten the detectors with messy aborts. This has required unforeseen downtime to re-establish safe operation.

The Director was heading to Washington later in the day for the HEPAP meeting and other discussions. Showed some data from the AAAS that shows NIH, NSF, NASA, DOD Science and DOE (with DOE Science split out separately) funding trends over the last 15 years. This data shows the clear difference in between the support for physical sciences and other forms of research. This data could be interpreted to say that although appropriations for broader scientific efforts (NIH, but also NSF) have been growing steadily, support for the Office of Science within the DOE has followed the level of funding for DOE which has been much more austere. Also showed how the DOE Science budgets have been allocated between 2000 and 2005. HEP is the only subgroup that has lagged the consumer price index.

Q: In pushing the HEP budget are there $10M-ish items that can be used as examples of what the field would do with that money? A: That is the scale of the money we need. This the Lab is using the deferred maintenance of the laboratory electrical infrastructure (specifically power feeder lines and power poles north of the lab -- remember the wood-pecker last year?) as the main item that has not been funded by the DOE despite the increasing threat that failures there will cause significant downtime.

Q: The Director had offered a comment on security following up on the discussion of siting a new visitors' center and whether this was potentially bad strategy with regards to security overall. What is new on the site-security front? A: We worried about this even before Sept. 2001. We still have a number of exemptions for functions in the auditorium, visiting the buffalo, etc. We negotiate a plan with the Office of Science to maintain the security of our people and facilities while maintaining reasonable access to the general public. We think we probably can do this more effectively without putting the security perimeter at the boundary of the site. We are preparing a proposal on how to do this and will use it as the basis of a new discussion with the Office of Science.

Locating the visitor center near the Lederman Center is the kind of thing one would want to do anyway. Prior to 2001, getting people to the 15th floor was a hurdle that many visitors never got over. Having something near the gate will help with this. The siting is not just a capitulation to the security issues.

Recycler Commissioning and Electron Cooling (Sergei Nagaitsev)

Sergei's slides presented at the meeting can be found at:

http://beamdocs.fnal.gov/DocDB/0011/001136/001/recycler_status.ppt

Described the overall source of antiprotons at the Lab. The traditional target, Debuncher and Accumulator have been around since the 1980s. Added the Recycler for additional antiproton storage as part of the Main Injector project. The Recycler is made of permanent magnets that store antiprotons at 8.9 GeV/c. This turns out to be 30 MeV lower than the 8 GeV/c^2 kinetic energy of protons in the Booster and original anti-proton complex. Since the Recycler is made of permanent magnets it can't be adjusted. The rest of the injector complex will be tuned to better match the Recycler momentum during the summer shutdown.

Working to bring the Recycler into HEP operation with electron cooling by the end of the 2005 fiscal year. This in turn means beginning to install electron cooling on June 1 to be able to do first tests with beam in the spring of 2005. A series of milestones to put the Recycler in a position to begin electron cooling studies later this year have been followed since the Fall 2003 shutdown. The next of these is to commission Recycler transfers this month. They are working on antiproton extraction from the Recycler and injection into the Tevatron. The hope is to achieve 90% transfer efficiency when this is in routine operation.

The Recycler could be included in routine operation today, as storage for anti-protons (without further cooling) allowing the Accumulator to continue stacking at lower currents -- where it is more efficient. But the additional transfer efficiencies and times would still be a penalty for the overall integrated luminosity of the complex. The Pbar tax has been a success for

commissioning but adding electron cooling will be necessary to allow fast/efficient/frequent transfers from the Accumulator to the Recycler moving past the break-even point. Sergei showed a typical design operating pattern with the electron cooling system that would result in 600 E10 pBars being accumulated in the Recycler over a 16 hour period -- almost 3x what the Accumulator can do now.

Initially (before the Fall 2004 shutdown) will try to run in a mixed-mode where shots of pBars are taken from both the Recycler and the Accumulator. Transfer efficiencies and shot times are now very close to the break-even point where the pBar tax could be repaid with a mixed-mode shot, ie. the Collider would see no penalty in integrated luminosity. With incremental improvements mixed-mode operation could provide 30% more luminosity, than if there had been no pBar tax.

The electron cooling beam equipment is being commissioned and conditioned in the WideBand lab. The MI-31 building is complete and ready to receive electron cooling system in about one month. They will break into the Main Injector tunnel and couple the two machines in the Fall 2004 shutdown. The plan is to commission the cooling system early in the 2005 calendar year.

Q: What is the relative transfer efficiency for an anti-proton that goes directly from the Accumulator into the Tevatron vs. one that makes the trip from the Accumulator, through the Recycler and ends up in the Tevatron? A: The direct transfer now has routinely an efficiency of 80%. An additional 10% is lost for the pBars that make the trip through the Recycler. Operationally this 10% will be more than compensated by the additional stacking phase-space in the Accumulator provided by moving pBars into the Recycler. Q: Do we have a milestone for the 'proof' of electron cooling? A: No firm plan, but clearly sometime in the summer of 2005 will be the earliest we could expect to see dividends from this programme.

UEC/SLUO DC trip post-mortem (Eric Zimmerman)

Members of the UEC, GSA and SLUO visited 34 senatorial and 69 congressional offices during their Washington trip in the last week of March. This is about a quarter of all the offices. There seems to be a lot of support for the physical sciences, in principle, but we were warned that there is no money (for much of anything) in the current fiscal climate in Washington. We need to find ways to increase the President's budget requests for physical science and HEP in future years.

Gregory Dubois-Felsmann of SLUO joined us on the phone to continue the discussion. Eric elaborated on the joint meeting with OMB and OSTP and the SLUO/UEC representatives. There were 3 representatives from SLUO and 3 from the UEC. They met with Pat Looney of OSTP, Joel Parriott and Mike Holland for OMB. This was the first opportunity for the high energy physicists who were at the meeting to compare their notes. Several messages emerged. They

were told that OMB/OSTP has been focusing on research that drives technology and HEP is not seen as a leading candidate in that regard. Further OMB/OSTP is not being asked for additional support for the DOE Office of Science. The OMB/OSTP representatives suggested we needed to improve the quality of our sales pitch in Washington. Though we have been successful in lobbying Congress we need to step up efforts on the executive side. For example, we could approach state Governors to raise our concerns with the White House. We were told that among our best 'products' are the people who are trained in our field. We should consider bringing former high energy physicists who have gone into industry to explain how their training in our field was crucial to where they have ended up. In fact it was a far-ranging and fruitful discussion with several salient points but no over-arching theme.

The OMB/OSTP would be interested in hearing about the physics of our field ("spin free information") -- on field-wide topics ("neutrinos", "energy frontier", "particle astrophysics"). For future UEC/SLUO trips we should try to enlist the help of constituents in districts other than those covered by members of the visiting party. Ideally all lab users should maintain some relationship with their elected representatives putting them in a position to provide a letter of introduction when their user representatives are in Washington. To help with this we should develop a list of key constituencies (homes of influential committee members) and provide it to users who might self-identify with connections to those offices. We also realised that we could improve our use and communications with our lobbyists in Washington.

Fermilab LHC Physics Center (Avi Yagil)

Has been thinking about how to make the transition from Tevatron physics to the LHC in the coming decade. Some of this has been discussed in the context of the Lab's long range plan. Want to find a way to make Fermilab attractive to LHC physicists. Did a survey of the LHC community and the overlap with the FNAL users community. Obviously there is an overlap with CDF/D0. Had a 1/2 day meeting in February with 10 users and 4 FNAL staff members. Has been working with Sarah Eno to organise this further. Wanted to understand why someone would send a student or postdoc to FNAL to work on CMS rather than to CERN.

Physics on day-one is crucial. Have to start getting something in place now. Want to take advantage of the people who actively working on physics at FNAL and get them thinking about the overlap with LHC physics. Access to Tevatron data is an important advantage that FNAL users will have over members of the physics community at CERN which is currently more hardware oriented.

Have asked questions like: Do we only cluster at the Lab because of operations, shifts and detector maintenance? No. People come to interact with their colleagues, pursue complex algorithms, attend presentations and meetings and to train students and

postdocs. The fraction of collaborators who will be involved in the day-to-day maintenance of the LHC experiments will be even smaller, while the other reasons to establish critical mass will remain at least as important. The goal of Avi's efforts are to foster physics output through remote clustering -- for example at FNAL. Set something up over the next 2-3 years, try to build it with people who are coming to the Lab for other reasons during that period. Show them what would be available to them at Fermilab in the LHC era. Forty University groups on CMS (largely on CDF and D0 now) are being surveyed and all but a few have been receptive. It has become clear that this is potentially a win-win situation. University groups are being pressured to move their effort to LHC experiments. The collider programme at the Lab is in jeopardy if we can't find ways to facilitate closer cooperation between Tevatron experiments and LHC preparations if only to ensure continued operation of CDF/D0.

The lab management has been receptive to this idea and is working to dedicate some lab staff to make this a reality.

Fermilab Director Search (Chris White)

The second meeting of the search committee took place this past week at Fermilab. The primary purpose was to gather input from the lab community. Three additional meetings are foreseen, one in May and two in July. The committee has not reached any conclusions about the ranking of candidates and has no preconceived notions about who should be director. More than 40 people have been nominated. Additional nominations will be accepted through mid-May. The committee has decided not to rank or otherwise eliminate candidate nominations prior to the May meeting. There have been discussions on the relative merit of having a Director who is currently part of the Lab staff versus someone from the HEP community outside the lab, versus someone from beyond the HEP community. There has even been discussion as to whether the Director is required to be a US Citizen. All nominations of individuals who are not currently on the search committee remain under consideration. The winnowing of candidates will begin at the May meeting (May 29-30).

Report from the Users Meeting Planning Committee (Chris White)

The poster is ready, need to bring the website online so that users can register when the posters appear. The catering is being lined up. A taste testing was provided by the candidate caterer -- it was a tough assignment but someone had to do it.

The schedule for the meeting is filling with names. Will make another pass through the collaborations to pin down the last few names. Still working on having someone from outside the FNAL/HEP community to give a public talk on the Thursday evening after the GSA reception. Are working to compile a list of PhDs that have been granted and soliciting nominations for the URA Graduate

Thesis Award and URA Tollestrup Award for Postdoctoral Research. Also still working to get representatives from Washington and Springfield (IL) to come to the meeting.

Next meeting May 22, 2004