

## **LHC@FNAL Task Force Meeting 9/8/05**

Attendees:

FNAL: Erik Gottschalk, Suzanne Gysin, Elvin Harms, Michael Lamm, Kaori Maeshima, Elliott McCrory, Jean Slaughter, Mike Tartaglia

OTHER LOCATIONS:

### **Committee News – Erik Gottschalk**

I was invited to give a 15 minute presentation to the LARP Executive Committee on Sept. 7. The presentation lasted 50 minutes, including discussion and questions. This served as preparation for a meeting next week with members of LARP at CERN, where one of the agenda items is “Remote Operations.”

During the presentation I emphasized two of the recommendations that resulted from our review (on July 21) of the LHC@FNAL requirements document. The recommendations were:

- 1) There should be a strong requirement that the Remote Operations Centre at Fermilab should maintain to the greatest extent possible consistency in hardware and software with CERN and CMS.
- 2) More work needs to be done on the details of how LHC@FNAL would be used. The project team should develop an operations model soon for both CMS and LHC that explains how the personnel at the Remote Operations Centre at Fermilab will interact with CERN and CMS staff.

Members of the LARP Executive Committee expressed an interest in participating in the development of an operations model for LHC.

One of the questions that was raised during the discussion was the issue of one remote center versus multiple centers. Erik explained that while the plan for LHC@FNAL appears to be Fermi-centric, the plan does not exclude the possibility of multiple centers and could serve as a model for other centers. Furthermore, LHC@FNAL has requirements for communication with multiple locations (e.g. multiple CMS control rooms), so hardware and software that supports multiple locations is part of the plan. However, the operations model may be different if there is one remote center in the U.S. compared to multiple centers.

One of the comments in the minutes from an August 8 meeting of the CERN AB Management Board states the following: “It was agreed that this project (LHC@FNAL) should receive some support from CERN but in view of the limited benefits to us, the level of activity should be kept to a bare minimum.” In light of this comment, a single center in the U.S. is more likely to succeed at this time than multiple centers all attempting to connect to CERN.

Vladimir Shiltsev e-mailed some questions to Erik after the presentation to the LARP Executive Committee regarding the cost of LHC@FNAL. Erik answered the questions by giving a very approximate range of the cost, since the LHC@FNAL Task Force has only just started to look at the cost of a center.

### **Remote Participation in Installation and Hardware Commissioning of US-LHC Deliverables – Mike Lamm**

(<http://docdb.fnal.gov/CMS-public/DocDB/ShowDocument?docid=412>)

Mike described what commissioning involves. BNL, LBNL, KEK and FNAL have all built hardware with funding that ends in the Fall of 2005. One of the reasons that LARP was formed was to help with hardware commissioning.

Mike explained that the US is responsible for delivering elements for the final focus for each of the 4 interaction regions, plus separation dipoles for the RF region. For the final focus quadrupoles, ½ of the high gradient quadrupoles are built at Fermilab and other half are built by Toshiba with oversight from KEK. These quadrupoles are combined with parts from CERN and the US to make the final cryostated magnetic elements. All the quadrupole element with US quadruples are cold tested at Fermilab, two of the KEK quadrupole packages are tested at Fermilab, with room temperature tests performed on the remaining elements. It is FNAL's job to be involved in integration efforts so that magnets can be installed in CERN's infrastructure. So far one third to one half of the shipments have gone out, with everything being shipped by early next year.

The US is providing installation instructions, interconnect parts and interconnect installation tools, as part of the original US LHC accelerator agreement. Because there are high/low luminosity regions, because of the variations in the slope of the tunnel and because of the differences in each magnet element type, each inner triplet interconnect is different. This complicates the interconnect process and is part of the reason and motivation for the US to be involved with the installation. The first inner triplet is scheduled to be installed in November, 2005, and for this we expect to have people from the U.S. at CERN to help oversee the installation and train CERN personnel. The remainder of the installation is not expected to involve a large U.S. presence.

The US is also very interested in participating in the hardware commissioning. The first time a string of final focusing magnets will be cooled to superfluid will be in the LHC tunnel. The powering of the quadrupole elements uses nested high current power supplies; it is viewed by all as the most complicated magnet powering circuit in the LHC. Our participation will speed up the commissioning process which should translate into a shorter wait for LHC HEP. US personnel will benefit from this once-in-a-decade commissioning experience.

Erik: Do you imagine having someone there all the time?

Mike: We decided to send people for the commissioning rather than the installation. We hope to send 5-6 people there for three-week intervals for the installation of the first triplet. We will try to have somebody there for every installation, but only for a week or two.

In early Spring 2006 expect to start sending people for 1 year. The plan is to send 3 people with staggered starting times. All of these people are from FNAL, but one person from Berkley is also interested. FNAL appears to be the most interested in the commissioning, and having the center at FNAL makes sense.

Kaori: We have the infrastructure for remote access on the 11<sup>th</sup> floor, we should be able to start using it next week.

Mike: There is an interest in using a webcam to be able to look at equipment at CERN. During most of the installation, the US interconnect experts will be at Fermilab or their home institution. This webcam could allow US engineers and scientist to support the installation process remotely, especially if there is an unanticipated problem (since each interconnect is different).

Erik: Elliott has volunteered to look into cameras. We will purchase a camera to try out.

(N.B. A webcam was purchased on 9/9/2005.)

Elvin/Jean: It would help to find out what the architecture for retrieving data from the Field Control Room is.

(Mike Lamm will look into this.)

#### **Site Visit Status – Suzanne Panacek**

<http://docdb.fnal.gov/CMS-public/DocDB/ShowDocument?docid=408>

The date for the trip to Jefferson Lab has been set for Tuesday, Sept. 27. Elvin, Elliott, and Mike Lamm will go on this trip. Erik will provide a project/task code that can be used for the trip.

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Next meeting: September 22, 2005 in the **Hornet's Nest (WH 8X)**  
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