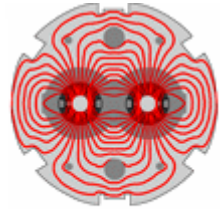
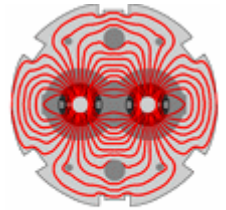


LHC@FNAL
Remote Operations

Erik Gottschalk

7 September, 2005

Overview



LARP

- Charge for our committee
- What is LHC@FNAL?
- Committee members
- Requirements document
- Recent Events
- Current Status

Charge

Charge from Fermilab Director Mike Witherell (April 2005):

- Define the high level requirements for a remote operations center for commissioning and operations of CMS and the LHC accelerator.
- Develop cost and schedule estimates for the implementation of a remote operations center.

I would like the committee to prepare a preliminary report by the end of July 2005, describing the requirements and scope of a remote operations center located at Fermilab.

The committee should prepare its final report, including a resource loaded schedule, by the end of 2005.

What is LHC@FNAL?

1) Allow experts located at Fermilab to participate in CMS and LHC commissioning and operations.

- Hardware and software necessary to participate effectively in CMS and LHC.

2) Facilitate communication and help members of the LHC community in North America contribute their expertise to CMS and LHC.

- An extension of the CERN Control Centre (CCC). For example, to assist members of US/LARP in training and data analysis.
- An extension of the CMS Control Room. For example, to provide a call center for US-CMS collaborators to access information about CMS **and** the LHC accelerator.

3) A unique opportunity to have detector and accelerator experts in close proximity to each other solving problems together.

LHC@FNAL Functions

1) A Place

- That provides access to information in a manner that is similar to what is available in control rooms at CERN
- Where members of the LHC community can participate remotely in CMS and LHC activities

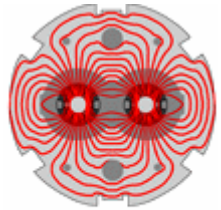
2) A Communications Conduit

- Between CERN and members of the LHC community located in North America

3) An Outreach tool

- Visitors will be able to see current LHC activities
- Visitors will be able to see how future international projects in particle physics can benefit from active participation in projects at remote locations.

LHC@FNAL Task Force

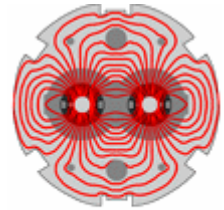


LARP

- Erik Gottschalk – Chair (PPD)
- Elvin Harms* (AD)
- Shuichi Kunori (U. of Maryland)
- Mike Lamm* (TD)
- Mike Lamont* (CERN-AB)
- Kaori Maeshima (PPD)
- Patty McBride (CD)
- Elliott McCrory* (AD)
- Suzanne Panacek* (CD)
- Jean Slaughter* (AD)
- Al Thomas (CD)

* Members of the accelerator subgroup

LHC@FNAL Advisory Committee



- Alvin Tollestrup (PPD)
- Austin Ball (CERN)
- Avi Yagil (PPD)
- Bob Mau (AD)
- Dan Green (PPD)
- David Rice (Cornell)
- Dragoslav Lazic (Boston U.)
- Frank Glege (CERN)
- Hans Falk Hoffmann (CERN)
- Hermann Schmickler (CERN)
- Jim Kowalkowski (CD)
- Jim Patrick (AD)
- Joel Butler (PPD)
- Katherine Copic (U. of Mich.)
- Lothar Bauerdick (CD)
- Margaret Votava (CD)
- Mike Church (AD)
- Mike Syphers (AD)
- Mike Tartaglia (TD)
- Roberto Saban (CERN)
- Roger Bailey (CERN)
- Sandor Feher (TD)
- Steve Peggs (BNL)
- Vladimir Shiltsev (AD)
- Wesley Smith (U. of Wisc.)
- William Trischuk (U. of Toronto)

LHC@FNAL Activities for LHC

We have developed various scenarios and envision the following types of activities for LHC@FNAL:

- Participate in LHC hardware & beam commissioning and operations
- Monitor LHC accelerator components (e.g. systems built in the U.S.)
- Analyze the monitoring data for LHC
- Develop software for the LHC
- Provide access to monitoring data and analysis results
- Provide training and data-analysis facility for members of US/LARP
- Provide a rapid response call center to get experts located in North America connected to CERN (data access, operational status, etc.)

LHC@FNAL Requirements

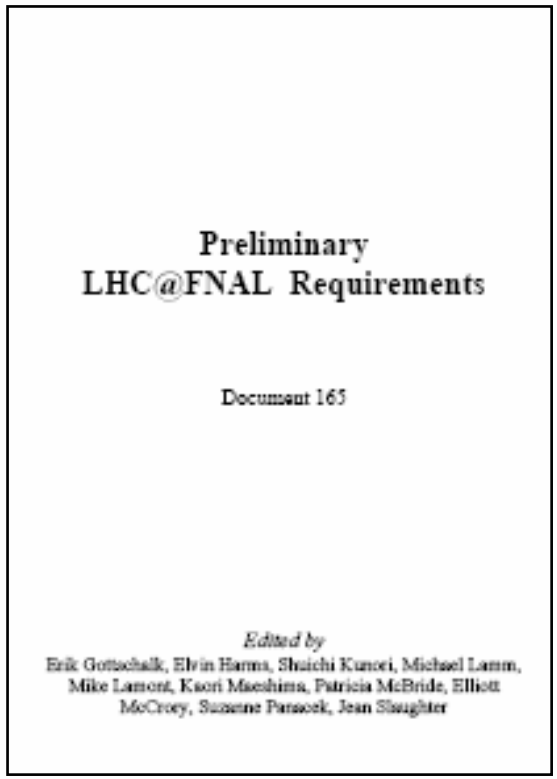
We used LHC and CMS scenarios to develop the requirements document for LHC@FNAL.

The requirements document has an Executive Summary followed by four sections:

- Section 3.1 – CMS Experiment Requirements
- Section 3.2 – LHC Accelerator Requirements
- Section 3.3 – CMS/LHC Combined Requirements
- Section 3.4 – Constraints

Recent Events

- **Requirements reviewed**
  - July 21, 2005
  - Revisions made in response to recommendations from reviewers
- **Document submitted to FNAL Director**
  - July 29, 2005
- **Meeting with Pier Oddone August 1st**
  - Enthusiastic response
  - …"comprehensive document"
  - Discussed space for LHC@FNAL (FESS)
- **Presentation to CERN AB Management**
  - August 8, 2005 (presented by Mike Lamont)
  - "…project should receive some support from CERN but in view of limited benefits to us, the level of activity should be kept to a bare minimum."


Preliminary
LHC@FNAL Requirements

Document 165

Edited by
Erik Gottschalk, Elvin Harms, Shuichi Kunori, Michael Lamm, Mike Lamont, Kaori Maeshima, Patricia McBride, Elliott McCrory, Suzanne Pasacek, Jean Slaughter

Review Recommendations

All of the material for the review and recommendations from the review committee are available on our website:

http://home.fnal.gov/~eeg/remop.html

Two of the seven recommendations:

#5: There should be a strong requirement that the Remote Operations Centre should maintain to the greatest extent possible consistency in hardware and software with CERN and CMS.

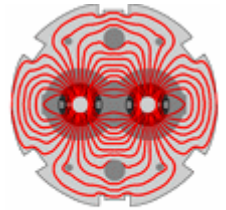
#6: More work needs to be done on the details of how this facility would be used… The project team should develop an operations model soon for both CMS and LHC that explains how the personnel at the Remote Operations Centre will interact with CERN and CMS staff (and members of the LHC community in North America).

Status & Summary

Status:

- We are working on the physical layout for LHC@FNAL and concentrating on hardware and tools needed for remote operations. This is needed for cost and schedule estimates.
- We are starting to develop an operations model for LHC.
- We are researching CERN computer and networking security issues.

Our primary focus is on defining how an operations centre can be used to help members of the LHC community (in North America) contribute their expertise to LHC activities at CERN.



LARP

Additional Slides

Scenarios

LHC requirements were developed from six scenarios for LHC accelerator commissioning and operations:

- **Hardware commissioning of a U.S./LARP deliverable**
- **Software contributions to LHC**
- **Beam studies from both CERN and U.S. perspectives (2)**
- **Diagnostics contributions to LHC via LARP**
- **First beam in the LHC**

Assumptions

For LHC

- Individuals working in a Field Control Room (FCR) in the LHC tunnel will have access to telephone communications with international calling capabilities.
- Individuals working at the CERN Control Centre (CCC) will have access to telephone communications with international calling capabilities.
- US/LARP personnel will be at CERN to coordinate activities between the CCC and LHC@FNAL.
- The degree to which LHC@FNAL users have access to the LHC control system will be determined by LHC management.
- The LHC will have a shift schedule and a protocol that defines the roles and responsibilities of CCC shift personnel.
- The LHC will have a protocol that defines how machine commissioning and development activities are scheduled and carried out.

For both CMS & LHC

- LHC@FNAL will comply with all CERN and Fermilab safety and security standards.

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CMS/LHC Requirements

LARP

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