



US LHC Accelerator Research Program

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Remote Monitoring for Hardware & Beam Commissioning

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Remote Monitoring Outline

- Why Remote Monitoring?
- Endorsements
- The Fermilab Experience
- Current Status
- Next Steps
- Summary

*Remote Monitoring is defined as read-only access –
no settings!*



Remote Monitoring Why?

- Full-time U.S presence during LHC commissioning – prepare for visit
- Commission and train CERN personnel on U.S.-provided Instrumentation
- Remote troubleshooting of Instrumentation
- Share expertise of commissioning and operating superconducting accelerators
- Enhance U.S. accelerator expertise



Remote Monitoring Why?

- Alvin Tollestrup proposal to access data from CMS detector and LHC
 - CMS
 - It has always been planned to have remote access to the detector.
 - It provides convenient access for the experts that are here to monitor the various components of the detector. Students and post docs can take shifts. The time shift makes it convenient to have wide awake people monitoring the operation.
 - It is easy to involve students and even undergraduates in the excitement of commissioning and running a big experiment.
 - It allows training of new students and postdocs here before they actually spend time at CERN.
 - Accelerator
 - There has always been a plan to have people from the AD involved in the commissioning phase of the LHC. A remote access of the type that we are contemplating would our involvement much easier and more productive.
 - It is assumed that there will always be a few physicists from the AD present at CERN during commissioning. However, if it is possible to set up a realistic connection with the machine, it would be easy for a person here to actively participate in machine experiments.
 - Two uses: training people before they go to CERN and their continued involvement when they return.
 - Not proposing that any control functions be implemented....
 - public
 - Fermilab must become a center for LHC activity if we are to reap the rewards of our investment.
 - A highly visible and functional connection to LHC and CMS located near the cafeteria makes a public statement that can't be missed. Summer students will be exposed to the activity as well as the visiting public.



Remote Monitoring Endorsements

- Support expressed by
 - Fermilab Director
 - Fermilab Accelerator Division Head
 - LHC Project Leader
 - LHC Ops principals
 - Fermilab Machine/Operations people
 - LARP



Remote Monitoring the Fermilab Experience

- Fermilab Accelerator Division
 - Endorsement of Director
 - Remote Access Committee formed by AD Head, Roger Dixon
 - Members: *Valeri Lebedev; Stephen Pordes; Elvin Harms; Alvin Tollestrup; Mike Syphers; Tanaji Sen*
 - The purpose of this committee is to outline the requirements for a remote data access center. The goal is to construct a center that will allow convenient participation of the FNAL Accelerator Division personnel in the commissioning of the LHC.
 - Short report that summarizes such things as the space required, the communication bandwidth required, and the bandwidth required for the data connection. This first stage would be followed later by collaborating with the CMS detector group that is also planning remote access to the detector. It is hoped that the integrating the requirement of the two groups will be mutually beneficial.
 - First Meeting held on 14 September
 - Meeting with the Director
 - Plan/implement rudimentary proof of principle link to CERN



Remote Monitoring Status

- Ongoing low level efforts between CERN and Fermilab accelerator Division
- Discussion between CMS and Accelerator Division at Fermilab
- Fermilab visits to CERN
 - Computer privileges obtained at CERN
 - *Demonstration of orbit correction application from desktop*
 - *Remote access to elogs accomplished*
- *CERN visits to Fermilab*
 - *Elog access refined (sped up)*
 - *Access to LHC applications in progress*
 - *More follow-on work in progress and to continue during visits from CERN people*
- *Interest in CERN – US interchange*
 - *Standards*
 - *Schedules*
 - *etc.*



Remote Monitoring Next Steps

- Complete 'proof-of-principle'
- Identify hardware and space needs
- Locate 'public' area
- Refine network links
- Identify additional needs/capabilities



Remote Monitoring Summary

- Interest and rationale for remote (read-only) Monitoring expressed
- Fermilab idea for public RADAC
- Idea supported at various levels of food chain on both sides of Atlantic
- Proof of Principle demonstration in process
- Plans for dedicated 'Center' developing
- Demonstration!