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April 6, 2009

All Experimenters' Meeting

Outline:

• LHC Status
• CMS Status
• Monitoring tools and remote operations
LHC repairs and improvements are on the new (as of Feb '09) schedule

- Beam returns at end of September 2009
- First collisions late October 2009
- Gain 20 weeks of physics in 2010 by running during winter
- Small delays have less impact in the new schedule
What's Driving the Schedule?

- Enhanced protection for busbar and magnet splices
  - Reviewed by multi-lab panel of experts
  - Electronics are on the critical path
  → To be fully implemented prior to restart

- New Pressure relief valves to reduce damage from incident like last year
  - Phase 1: Install relief valves on existing vacuum ports
    → Would allow for only minor damage from a repeat incident
    → Entire ring being done in 2009
  - Phase 2: Additional relief valves to all dipole magnets
    → Further limit collateral damage to interconnects and super-insulation
    → Half of the ring being done in 2009, remainder in 2010
CMS Activities in Cavern

- ECAL Endcap Preshower detectors installed in March
- Forward pixel re-installation
  - +z side done March 31
  - -z side inserted Today
- Tracker cooling plant operational in first half of June (see next slide)
- Endcaps close: June 11
- Magnet ramps to 3.8 Tesla: June 30
Past: Original system was commercially produced and installed
- Heat exchanger failed almost immediately
- Exchanger components changed out as temporary solution

Present: Full distribution systems being rebuilt
- Several major loops being redone (taken to surface hall)
- Will provide cooling to -10°C

Future:
- Implement improvements to provide cooling to -30°C
- During next major shutdown
• Series of Mid-Week Global Runs (MWGR)
  - Most subsystems currently participating:
    - Muon systems (Drift Tubes, Resistive Plate Chambers, Cathode Strip Chambers),
    - Calorimeters (ECAL, HCAL), Luminosity scalars,
    - Trigger systems (High Level Trigger, Level1 Trigger)
    - DAQ, online & offline computing
  - Mixture of cosmic ray data and “random” triggers

• Example activities (there are many MANY more)
  - Adjust thresholds
  - Subdetector readout relative timing
  - Tests of configuration and calibration mechanisms
  - Trigger rate stress tests
  - Gaining experience isolating problems (removing single front end electronics elements from DAQ rather than entire subsystems)
CMS run plan for next few months:

- Mid-Week Global Runs continue in April and May

- Longer (~1 week) continuous running without magnetic field in June
- Longer continuous runs with magnetic field start in July and August
- Pause for about 1 month for any pre-beam CMS maintenance
- CMS ready for beam by end of September
• Fermilab Remote Operations Center
• Active participation in Mid-Week Global Runs
• Online data quality monitoring (DQM) shifts
  - We cover “our” day and evening shifts ( = CERN evening and owl )
  - Communicate closely with shift crew at CMS site
    - Continuous live high-def video, phone, chat, elogs
• Data Operations
• Tier-1 shifts
• Sub-detector expert shifts
• Available for LHC machine activities
CMS Monitoring Tools

- Valuable experience from operating Tevatron experiments
- Suite of web-based monitoring tools
  - Real-time “slow-controls” values for subsystems (temperature, voltage, ...)
  - LHC real-time status (currents, energy, luminosity, ...)
  - Run summary information (start/stop times, trigger configuration, ...)
  - ...

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CMS Operations Tools

• Developing a Runtime Logger application
  - Improve CMS data taking efficiency by keeping track of downtimes
    → Focus operational improvements on the worst offenders

Use graphical analysis tools

Downtimes from MWGRs
Conclusions

• LHC repairs and improvements are on schedule
  - Impact of any small (e.g., few week) shift has been minimized

• Highlighted examples of what CMS is doing to get ready:
  - Detector hardware
  - Commissioning
  - Operations

• Lots of progress also in areas not covered here, for example:
  - Physics preparation
  - Software development

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