

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Master Schedule and Overview  
**WBS:** All  
**Date Submitted:** 8/25/00  
**Submitted By:** Harry Weerts, Bill Freeman

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M1-Solenoid Delivered to Fermilab	5/12/97	5/12/97	0 w
X	M2-Central Preshower Module Fabrication Complete	12/16/97	12/16/97	0 w
X	M2-Central Preshower Installed on Solenoid	5/21/98	5/21/98	0 w
X	M1-Solenoid Installed and Tested	9/30/98	9/30/98	0 w
X	M3-Level Ø-South Installed	5/8/00	2/9/00	12.6 w
X	M2-Muon End Toroids Installed on Platform	8/4/00	11/15/00	-14.2 w
	M1-Begin Shield Wall Removal/Ready to Roll-in	11/1/00	11/22/00	-3 w
	M1-Detector Rolled-in and Hooked Up	2/20/01	2/2/01	2.4 w

Note: The full set of reportable milestones are collected and sorted by date at the end of this report. Also, a separate monthly report for the solenoid project will no longer be included, since that project is now formally complete. The reportable milestones associated with the solenoid project are now included in the above list.

## Areas of Concern

### Technical

Refer to the WBS level 3 system reports.

### Schedule

The remaining schedule concerns are related to the silicon subsystem and the electronics readout systems.

### Resources

None

### Cost

None

## Change Requests

None

## Progress Summary

During this month all the large pieces of the experiment: forward muon trusses, south end calorimeter and forward muon steel were positioned in their final locations in the assembly hall. They will move from these positions to their final locations in the collision hall. Assembly of detector components on their supports and hook up of these large detector systems has started, as well as the installation of the mechanical infrastructure for the inner tracking system. Progress in the installation work is very good.

# DO Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Silicon Tracker  
**WBS:** 1.1.1  
**Date Submitted:** 8/22/00  
**Submitted By:** Marcel Demarteau, Ron Lipton

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	H Half-Wedge Fabrication 20% Complete	10/15/99	10/15/99	0 w
X	3 Chip Ladder Fabrication 80% Complete	10/26/99	10/20/99	0.6 w
X	9 Chip Ladder Fabrication 20% Complete	11/4/99	11/3/99	0.2 w
X	F Wedge Assemblies 20% Complete	1/24/00	1/19/00	0.4 w
X	6 Chip Ladder Fabrication 20% Complete	1/31/00	1/3/00	3.9 w
X	H Half-Wedge Fabrication 80% Complete	3/29/00	2/23/00	5 w
X	6 Chip Ladder Fabrication 80% Complete	7/12/00	3/14/00	16.8 w
X	9 Chip Ladder Fabrication 80% Complete	7/31/00	3/27/00	17.4 w
X	F Wedge Assemblies 80% Complete	7/31/00	4/26/00	13.2 w
	M2-First Silicon Tracker Barrel/Disk Module Complete	8/21/00	1/24/00	29.6 w
	South Half-Cylinder Complete and Ready to Move to DAB	9/28/00	8/1/00	8.4 w
	South H-Disks Ready to Move to DAB	10/16/00	7/3/00	14.6 w
	M3-All Silicon Tracker Barrels/Disks Complete	11/13/00	8/25/00	11.2 w
	North Half-Cylinder Complete and Ready to Move to DAB	11/13/00	9/18/00	8.2 w
	M1-Central Silicon Complete	11/13/00	9/18/00	8.2 w
	M2-Silicon Tracker Installed in Solenoid/Fiber Tracker	1/4/01	9/25/00	13.6 w

## Areas of Concern

### Technical

- Due to concerns for failing grounding connections we have moved to using indium soldering and have retrofitted many built detectors with additional grounding safeguards. All complete barrels have the additional grounding safeguards implemented.
- There have been further studies of the cross talk observed in our signals. The main worry is the cross talk induced on the signal that validates and strobes the data bus lines. A spurious signal on this line causes additional data strobes and can completely invalidate the data readout. The cross talk is induced in the HDI and low-mass cable system. The solution adopted called for replacing an existing FPGA on the interface card with a faster chip, with more pins. Preliminary tests show that the device does not perform as anticipated and tests are continuing.
- The 10% test has been readied for reading out a full F-disk or barrel. During the month a "mini-workshop" was held to exercise all components of the readout the way it is run in the experiment, that is, centrally controlled. All steps, except for one, were successful. We did not succeed in establishing the proper protocol between the front-end calibration process and storing the calibration data in the hardware database.

### Schedule

The disk and barrel assembly for the first half cylinder is proceeding well. Three barrels have been completed and only few mechanical pieces of the end disk assembly are missing for a complete set of six F-disks. A fixture for extracting barrels from the rotating fixture, and a barrel-disk mating fixture have been built. The design of a barrel-disk insertion fixture into the silicon support cylinder was also completed this month and has been submitted for fabrication. This fixture is behind schedule and a small delay will be incurred because of this.

The exposure to scheduling delays due to lagging part deliveries is diminishing. Nearly all silicon sensors have been received and the last sets of HDIs are now being surface-mounted at Promex. Nine-chip ladder production, which is the farthest behind in schedule, has recently been boosted due to expedient and efficient surface mounting of HDIs at Promex. Six-chip ladder production is paced by the delivery of sensors. We are also monitoring the production rate of low-mass cables at the DOE Kansas City Honeywell plant, which is proceeding at an adequate rate.

A solution has been found for the cross-talk problem in the validation and strobe signal for the data lines. This implies some design changes in the interface card that will delay the delivery of the first pre-production modules that will be used for testing. Because of these problems, the 10% test will be run with earlier versions of the interface cards and not the final production modules.

# **DØ Upgrade Monthly Progress Report**

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## **Resources**

A number of experienced physicists have left the project to take other positions or to return from visiting positions at Fermilab. We have been able to find some additional personnel and we think that production and assembly will not be affected in a significant way. We are still concerned about the commissioning of the readout system for the silicon detector both at the Silicon facility and at the Assembly Building.

## **Cost**

There is continued cost exposure in the installation, cooling, and final assembly tasks.

## **Change Requests**

Six change requests were submitted during the month of July in the respective amounts of \$37,246 on wbs 1.1.1.5.3, \$16,973 on wbs 1.1.1.6.3, \$133,038 on wbs 1.1.1.5.8, \$50,716 on wbs 1.1.1.5.4, \$27,911 on wbs 1.1.1.2.1.3, and \$28,000 on wbs 1.1.1.2.1.1.

## **Progress Summary**

- The first three barrels and nearly seven disks of the DØSMT have been assembled. The assembly of the end disk assembly is underway. All individual components for one half of the silicon detector are ready and complete. We anticipate that the assembly of components for the second half will benefit from the lessons learned from assembling the first half silicon detector.
- Mechanical work on the half-cylinder assemblies is progressing well. We expect to start mounting barrel-disk modules in the silicon support structure in August.
- Ladder and wedge production and testing is proceeding smoothly, with the rate limited by parts availability and capacity of the burn-in testing systems.
- The 10% test continues to be an important system to test and debug electronics and systems and we are well underway to have a fully functioning readout system. The infrastructure to read out a disk with this system has been setup and can receive a complete assembly for full readout.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Fiber Tracker and VLPCs  
**WBS:** 1.1.2  
**Date Submitted:** 8/21/00  
**Submitted By:** Alan D. Bross

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
	<i>Detector</i>			
X	M2 - Assembly Design Complete	3/5/99	3/5/99	0 w
X	M2-First Cylinder Complete	9/2/99	9/2/99	0 w
X	M3-Fiber Tracker Ribbon Fabrication 50% Complete	11/5/99	11/12/99	-0.9 w
X	M2-Fiber Tracker Assembly Begun	2/1/00	12/6/99	6.2 w
X	M3-Fiber Tracker Cylinders 8, 7, 6, and 5 Complete	3/2/00	1/28/00	5 w
X	M3-Fiber Tracker Ribbon Fabrication Complete	5/10/00	3/6/00	9.5 w
X	M3-Fiber Tracker Ribbon Mounting Complete	5/13/00	4/20/00	3.3 w
X	M2-Fiber Tracker Assembly Complete	5/26/00	5/4/00	3.3 w
X	Waveguide Production 50% Complete	7/24/00	1/29/00	24.6 w
	M3-Waveguide Production Complete	9/1/00	6/5/00	12.8 w
	<i>VLPCs</i>			
X	M2-VLPC Production 50% Complete	8/31/97	8/31/97	0 w
X	M3-VLPC Cryo System Operational	8/18/00	6/12/00	9.6 w
	M3-VLPC Cassette Assembly 50% Complete	9/1/00	4/12/00	20 w
	M3-VLPC Cassette Assembly Complete	11/17/00	8/22/00	12.4 w

## Areas of Concern

### Technical

None

### Schedule

None

### Resources

None

### Cost

None

## Change Requests

None

## Progress Summary

- CFT waveguide installation has begun - 7 installed
- CFT waveguide production - 176 complete
- Cassette production - 34 production cassettes complete

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Forward Preshower  
**WBS:** 1.1.4  
**Date Submitted:** 8/15/00  
**Submitted By:** Abid Patwa

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M2-Forward Preshower Module Fabrication Begun	11/4/98	11/4/98	0 w
X	M3-1st Forward Preshower Detector Complete	2/24/00	1/12/00	6.2 w
X	Module Fabrication and Testing Complete	4/1/00	12/10/99	14 w
X	M3-2nd Forward Preshower Detector Complete	4/3/00	3/8/00	3.6 w

## Areas of Concern

### Technical

None

### Schedule

None

### Resources

None

### Cost

None

## Change Requests

None

## Progress Summary

- Final position measurements of the installed FPS-North and –South detectors were made to determine nominal clearances of the end-detectors with installed central detectors and solenoid services in the EC-CC inter-cryostat gap. These measurements are needed prior to nesting of the end calorimeters to the face of the central calorimeter.
- Designs for the LED monitoring/calibration pulser system continued.
- Final lengths and fiber-to-fiber mapping details for FPS clear waveguides routed from the detector to the designated VLPC location below the platform were established.
- Production of FPS clear waveguides began at Notre Dame and Indiana University.
- Machining of mounting hardware required for the FPS waveguide's cable-winder began at the Fermilab Shop. Delivery of parts is expected within the next month.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Tracking Electronics  
**WBS:** 1.1.5  
**Date Submitted:** 8/23/00  
**Submitted By:** Marvin Johnson, Fred Borcharding

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	First Readout Crate Installed & Working	11/16/99	12/2/99	-2 w
X	10 Digital Boards Available	7/28/00	3/22/00	18 w
X	Ten 8-chip Analog Boards Available	8/8/00	4/19/00	15.4 w
	Mixer Boards Ready	11/30/00	6/22/00	22.2 w
	Multichip Modules Received	1/30/01	2/23/00	47 w

## Areas of Concern

### Technical

None

### Schedule

Mixer board should not slip much further.

### Resources

None

### Cost

None

## Change Requests

None

## Progress Summary

### *Silicon Electronics*

- Installation continued. The VRB and sequencer installations, although not yet complete, are pretty well debugged. Most of the current effort is directed toward installing the cabling and interface cards between the SVX sequencers on the platform and the detector. These cables must co-exist with the clear fiber wave guides so routing has turned out to be quite complicated. We expect that the southeast quadrant will be complete by mid-September.
- All the fiber optic cables from the platform to the MCH are installed and mostly connected. We expect the south half to be done by mid-September in anticipation of the arrival of the south silicon detector.
- The fiber mixer box is behind schedule but appears not to be in any technical trouble. The FPGA code is complete and the schematic should be complete by late September. Layout has also started, so prototypes should be available in November. This is acceptable as long as it does not slip further. Also, only 20 boards are needed so an average prototype run will populate a significant part of the detector.

### *Fiber Electronics*

#### *Front End*

- The first ten pre-production AFE8 boards arrived at the end of the month. Due to vendor problems the bare PCB were shipped along with the parts. The parts are now being placed on the boards.
- Layout work on the AFE12 board set continued.
- A prototype low voltage power supply 'drawer' was assembled and temporarily mounted on the cryostat. The design of the drawer was reviewed to bring its fabrication cost down and is now ready for production. The purchase requisition for it has started.

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- The fiber optic cable links from the CTT sequencer racks to the VRB racks was bundled, labeled, and installed. These cables will be routed within the racks and connected to the boards as they are installed.
- The production of the MCMs was seriously impacted by problems with the vendor and their subcontractor for the substrate. The resulting delay has pushed the delivery of the first production MCMs into late September and will also cause a delay in the AFE8 production.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Calorimeter Electronics  
**WBS:** 1.2.1  
**Date Submitted:** 8/14/00  
**Submitted By:** Mike Tuts

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	SCA Testing Complete	11/23/99	12/15/99	-2.8 w
X	Shaper Hybrid 50% Complete	2/22/00	5/9/00	-11 w
X	M2-Calorimeter Preamp System Test Complete	7/13/00	3/31/00	14.4 w
	M3-Calorimeter CC,ECN Preamp Installation Complete	10/6/00	3/31/00	26.4 w
	Timing System Installed	11/13/00	8/18/00	12 w
	Daughterboard Vendor Production Complete	11/29/00	6/16/00	22.8 w
	BLS Motherboard Assembly Complete	12/12/00	8/7/00	17.6 w
	M2-Calorimeter BLS Assembly Complete	1/8/01	9/26/00	13.6 w

## Areas of Concern

### Technical

We have significantly improved the observed coherent noise with additional filtering. We will proceed with production orders based on our early results; we feel that the risk is acceptable given the need to meet the schedule.

### Schedule

- We have encountered delays in the installation of preamps, preamp power supplies, and preamp cooling infrastructure. This is due in part to slower than estimated progress, and the loss of access to the preamp platforms during the move of the detector to pick up the end irons. These delays in the preamp system still leave us far from critical path.
- The delays in the BLS system have been caused by the time necessary to understand and fix the observed coherent noise problems in the BLS system. We are also concerned about deliveries of the full production boards based on slower than scheduled deliveries. We are in contact with the board production and assembly vendors to try and ensure timely deliveries of the production orders. We have modified the schedule to reflect the present delivery schedule.

### Resources

We have replaced the contract tech with a new one because of poor quality control work. We expect to see significant improvement with the replacement. We have lost the equivalent of 2 FTEs of summer help which we will need to replace, at least in part, in order to maintain the present schedule. Shifters may help, but cannot cover the shortfall.

### Cost

None.

## Change Requests

None

## Progress Summary

- We have built and populated 50 pre-production BLS motherboards with daughtercards. These are being studied in our test stand.
- We have partially cabled the South End Calorimeter, in preparation for the detector move.
- BLS power supply rework is underway.
- The completed preamp power supplies are undergoing final acceptance tests before installation.
- The BLS system ORC documentation has been completed and undergone the first review. We are addressing the issues raised by the committee.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Intercryostat Detector  
**WBS:** 1.2.2  
**Date Submitted:** 8/21/00  
**Submitted By:** Andy White

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M3-ICD Tile Modules/Boxes Ready	4/19/00	1/18/00	13.2 w
X	M2-ICD Modules Arrive at Fermilab	4/24/00	1/25/00	12.8 w
X	M3-InterCryostat Detectors Installed	5/5/00	2/1/00	13.6 w
	Drawers Ready	10/6/00	12/14/99	40 w

## Areas of Concern

### Technical

- Testing of prototype fiber cables revealed that the tubing used by Probit Electronics is partially translucent. We are exploring the use of black tubing with external color-coding.
- The final routing for fiber cables on the end cryostats must still be determined.
- MIP calibration of ICD tiles will require individually dismounting each box and testing it with cosmic-rays - this will require close interaction with the Forward Preshower group.

### Schedule

- We expect to install the two North end crate/block/backplane assemblies in September. The interaction of this work with tracker/calorimeter cabling is not yet clear.
- Commissioning of the North end will begin in October. Installation of the South end systems will follow in November.

### Resources

- We will need limited Fermilab technical support to install the crate/block/backplane assemblies under the cryostats.
- We will also need support (welder/tech) to install links for the fiber cables on the faces of the EC's.

### Cost

None

## Change Requests

None

## Progress Summary

- The Louisiana Tech electronics drawers are 80% complete. 10% of the completed drawers have been LED tested.
- All components for the assembly of the first fiber backplane at University of Texas-Arlington are ready.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Muon Central  
**WBS:** 1.3.2  
**Date Submitted:** 8/16/00  
**Submitted By:** Tom Diehl

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
	CFA Commissioning Complete	1/4/01	7/10/00	24.3 w
	PDT Commissioning Complete	1/16/01	6/9/00	29.8 w

## Areas of Concern

### Technical

- The installation of the on-detector components of the gas system is 75% complete. John Krider (FNAL, PPD) has agreed to design and implement the system components, such as pumps, recirculators, and filters that will allow us to flow gas to all of the PDTs. In the meantime, we are operating a limited number of PDTs on bottled gas.
- Progress on connecting the Cosmic Cap and A- $\phi$  counters remained at 50% during the month because of the late delivery of SFEs.

### Schedule

None

### Resources

Commissioning manpower was 6.0 FTE's for the month of July. There was no participation by post-docs in any of the three subsystems that make up the central muon detector.

### Cost

None

## Change Requests

None

## Progress Summary

- We have made progress in commissioning the scintillation counter system. Data-taking with 50% of the final version scintillator electronics has become routine.
- Progress continued on the commissioning of the PDT system, using bottled gas.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Muon Forward Trigger Detectors  
**WBS:** 1.3.3  
**Date Submitted:** 8/19/00  
**Submitted By:** Dmitri Denisov

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M2-Muon Forward Trigger Counter Assembly 10% Complete	10/12/98	10/12/98	0 w
X	All Pixel Octants Assembled	2/23/00	4/4/00	-5.8 w
	All Muon Forward Trigger Detector Planes Installed	12/15/00	8/25/00	15.4 w

## Areas of Concern

### Technical

None

### Schedule

Installation of the forward trigger detectors is driving the schedule for commissioning of the forward muon system in time for the start of Run II. While design of A- and B-layer mounting hardware has been finished and most of the parts procured, transportation and installation of forty remaining octants is a task requiring good planning and appropriate manpower resources.

### Resources

None

### Cost

None

## Change Requests

None

## Progress Summary

- Design of the A-layer octants mounts was completed.
- The A-layer South plane was installed.
- Four crates of front-end electronics (2,000 TDCs) were commissioned. For the first time, a front-end crate was read out all the way through the DØ DAQ to Level 3, and data was written to disk.
- An EXAMINE program was used to analyze and plot the data, which agreed with expectations.
- Software is being developed for front-end DSPs, on-line, and off-line muon data processing.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Muon Forward Tracker  
**WBS:** 1.3.4  
**Date Submitted:** 8/19/00  
**Submitted By:** Dmitri Denisov

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M2-Muon Forward Tracker MDT Assembly 10% Complete	1/29/99	1/29/99	0 w
X	Arrival Of C-Layer MDT Modules At FNAL	11/3/99	10/22/99	1.7 w
X	M2-All Muon Forward Tracker MDT Modules At Fermilab	3/30/00	3/10/00	2.8 w
	B-Layer Octants Assembled	9/1/00	4/18/00	19.2 w
	All MDT Octants Assembled	9/1/00	7/14/00	7 w
	Muon Forward Tracker B-Layer Planes Installed	11/9/00	6/15/00	20.6 w
	All MDT Planes Installed	11/9/00	8/4/00	13.6 w

## Areas of Concern

### Technical

None

### Schedule

The design and construction of the forward muon gas system was delayed, which is causing delays in forward muon tracker commissioning. Transportation and installation of remaining C and B layers detectors in order to be on schedule requires particular attention, planning, and adequate manpower resources.

### Resources

None

### Cost

None

## Change Requests

None

## Progress Summary

- All 16 A-layer octants are installed in their final locations and surveyed.
- Production of B-layer octants continued at Lab F, with six out of sixteen B-layer octants assembled by the end of July.
- Design of B-layer mounting hardware began.
- Production of C-layer mounts was finished and installation of mounts on the EMC trusses started.
- Four crates with 8,000 TDCs for the forward muon tracker are installed and commissioned. The full data collection path was tested for the first time - cosmic ray data from an MDT A-layer octant were collected and passed through the front-end electronics and DØ DAQ to Level 3, and written to disk.
- The on-line data analysis program has been developed and the collected data has been analyzed.
- The installation of monitoring hardware and development of on-line software for the mini-drift tube gas system is in progress.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Muon Electronics  
**WBS:** 1.3.5  
**Date Submitted:** 8/21/00  
**Submitted By:** Boris Baldin

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	MDT ADB Fabrication Complete	12/2/99	12/2/99	0 w
X	MDC Fabrication Complete	1/31/00	12/13/99	5 w
X	M2-Muon Electronics Preproduction Installation Complete	1/31/00	12/13/99	5 w
X	FEB, CB Production Complete	4/10/00	1/3/00	14 w
	SFE, SRC Fabrication Complete	8/16/00	2/3/00	27.5 w
	MRC, MFC Production Complete	11/6/00	3/27/00	31.4 w

## Areas of Concern

### Technical

None

### Schedule

None

### Resources

None

### Cost

None

## Change Requests

None

## Progress Summary

SFE production should be finished by 08/18/00 (due to vendor delay)

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Trigger  
**WBS:** 1.4.1-1.4.5  
**Date Submitted:** 8/19/00  
**Submitted By:** Gerald C. Blazey and Nikos Varelas

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	SLICs Received	12/10/99	11/10/99	4 w
X	M3-Establish Single Crate Internal Data Movement	2/17/00	1/6/00	6 w
	M3- Cal Readout Available to L2	8/15/00	2/11/00	26 w
	MBTs Received	8/28/00	3/16/00	23 w
	M3-L3 Operational (One Full Chain)	9/1/00	6/1/00	13 w
	Preproduction MTCxx, MTFB, and MTCM Complete	9/7/00	1/24/00	32 w
	M3-Muon Level 1 Trigger Preproduction Testing Complete	10/20/00	4/18/00	26 w
	Global Installation Complete	10/24/00	7/12/00	14.6 w
	L2 Cal Installation Complete	10/24/00	8/21/00	9 w
	L2 CTT Installation Complete	10/24/00	8/9/00	10.6 w
	L2 Muon Installation Complete	11/7/00	7/26/00	14.6 w
	Alpha Cards Received	12/18/00	5/15/00	30 w
	Production MTCxx, MTFB, and MTCM Complete	2/2/01	6/27/00	30 w
	M3-Trigger Level 2 Commissioned	3/28/01	9/21/00	25.6 w

## Areas of Concern

### Technical

None

### Schedule

There is a delay on the delivery of VRCs and Segment Bridges for the Level 3 system. There are delivery problems with Level 1 Muon and Level 2 power supplies and with the Level 2 Alpha boards.

### Resources

None

### Cost

None

## Change Request

None

## Progress Summary

### *Luminosity Monitor*

Work continued on the development of the VME readout boards for the Luminosity Monitor, with effort focused on layout of the TDC board and FPGA design for the vertex board.

### *Framework*

Progress on the Level 1 and Level 2 trigger framework continued. A new FPGA design that will support tagging all events with a luminosity interval ID was implemented and tested. The readout of a single crate to a VRB was successfully tested. Arrangements for upgrading Rev A (non-PTerm) And-Or Network cards into Level 1 Cal Trig Readout cards were completed this month. A new analog circuitry for CTFE Mezzanine Board was tested and the schematic of CHTCR Mezzanine Board to support Quadrant and Region triggering was completed.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

## *Level 1*

The layout of the Level 1 muon trigger crate manager card was completed and submitted for fabrication. Work started on the production designs of the MTCxx and MTM cards. Layout of the pre-production MTC05 card was completed. All production VME backplanes and crates for the Level 1 muon system were received. The testing of the prototype crate manager (MCCM) board was completed and design of the pre-production version initiated. Progress was made on integration of the Level 1 muon trigger into the DAQ system. The design work on the mixer box for the Level 1 tracking system continued. The front-end tracking daughter boards (DFEA-DB) were finally delivered near the end of the month. Full production of the motherboards and transition modules are underway. The testing of the prototype DFE controller board was successfully completed and the production of a few boards has begun. A test of the link from the Level 1 tracking DFE board to the Level 2 FIC board was conducted with limited success. The development of the Level 1 DFE algorithm for the forward preshower system progressed satisfactory this month. The development of VHDL code for the Collector board algorithms for reporting the cluster counts by Quadrant to the Broadcaster boards was started.

## *Level 2*

Testing of various Level 2 boards continued this month. A thorough list of CIC integration tests with the muon front-end system were performed and showed satisfactory results. The layout of the production SFO card was completed at the end of the month. The production MBT boards have been sent out for stuffing. Four new SLIC boards were completed and tested. Progress was made on getting the device drivers code to function under Linux for the Level 2 Alpha board. An important bug in the Alpha FPGA was diagnosed and fixed during MBT-Alpha integration tests. All necessary parts for the installation of the Level 2 racks at the MCH have arrived, except some of the power supply units. All Level 2 hot link cables arrived at DØ. There was significant progress made on Script Runner code development for the Level 2 Global and on the trigger simulator.

## *Level 3*

Work on the Level 3/DAQ system integration continued on all fronts. Most of the Level 3 readout cables were installed in the MCH. Progress on the Level 3 Script Runner and Filtering Tools continued.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

**Subsystem:** Online  
**WBS:** 1.5.1  
**Date Submitted:** 8/11/00  
**Submitted By:** Stuart Fuess

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	Steady DAQ Running	3/17/00	3/31/00	-2 w

## Areas of Concern

### Technical

Evaluation of the existing computing hardware performance has lead to possible concerns whether the currently proposed 3rd and final host system will have sufficient capacity. Performance studies continue and hardware options are being considered.

### Schedule

None. Technical issues noted above determine what to purchase, but do not effect the schedule for acquisitions.

### Personnel

None

### Cost

Technical concerns noted above could potentially require more costly solutions. Alternative systems might require \$50K to \$100K in additional funds

## Change Requests

None

## Progress Summary

- The DØ Online Critical Systems Report was submitted to the Computer Security Committee.
- The 10% test system at SiDet was read out into the Online system and logged to tape in FCC. This allows testing to proceed in the final system configuration.
- There was continued progress on specific control system applications needed by subdetector groups.
- A summer student created version 1 of an Alarm Display.

# **DØ Upgrade Monthly Progress Report**

for the month of July, 2000

## **July '00 Financial Summary**

The month of July fiscal year 2000 closed with obligations for the DØ Upgrade Project totaling \$4,073K on equipment M&S funds. Obligations on Solenoid AIP Plant funds will no longer be reported since the project closed during the month of April 2000. The spending plan shows that spending continues to be slightly lower than plan for FY00. At this stage of the Project, it seemed only crucial to plan for the future, thus the spending plan for October through April was made equal to spending. On the other hand, planned spending from May through September is a best estimate. The Project was allocated an M&S budget of \$3,104K during November. To cover Operating expenditures, the M&S budget was reduced by \$400K early in the fiscal year and an additional \$200K reduction occurred during April. DØ expects to spend the full FY00 budget, which is now \$2,504K. In addition to the Project's DoE funding, forward funding will be instituted to cover expenditures beyond the current fiscal year budget. A \$1,000K forward funding agreement has recently been established with SUNY Stony Brook. Additional forwarded funding support is expected from Michigan State (\$800K), the University of Notre Dame (\$200K), and Northern Illinois University (\$200K) during August 2000. The remaining DoE funding of \$3,708K will be allocated during fiscal year 2001.

The M&S Upgrade Project balance is currently \$3,531K, excluding contributions and contingency. Contributions to the Upgrade currently total \$1,442K. These contributions reduce the M&S balance. DØ Upgrade Spokespersons are in the process of negotiating additional contributions of approximately \$385K, but at this time, these funds are still unspecified. A new Cost Estimate is now being used in the determination of Project's estimate to complete (ETC), which remains equal to the Project's M&S balance. The overall cost of the Project has increased. A contingency estimate was developed as a result of a PPD Cost Review, which took place during March. The contingency, which is held by the Directorate, further increases the total Project cost. The total Cost Estimate increased by \$71K during April as a result of contingency usage requests approved by the Directorate.

The Solenoid Project is now complete. The unobligated AIP balance of \$282.4K has now been transferred to Upgrade M&S Equipment as budget dollars to be spent this fiscal year.

The Project currently has commitments with universities and other institutions in the DØ Collaboration, via active Memoranda of Understanding (MoU), totaling \$4,915K. These funds represent an obligation on the part of the DØ Upgrade Project and are regularly costed each month via invoices received from these institutions as work is completed. In addition, several institutions have made significant contributions to the DØ Upgrade. A list of the universities and other institutions involved, as well as a more detailed breakdown of the commitments and costs, follows.

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

## FY00 Financial Report as of 7/31/00

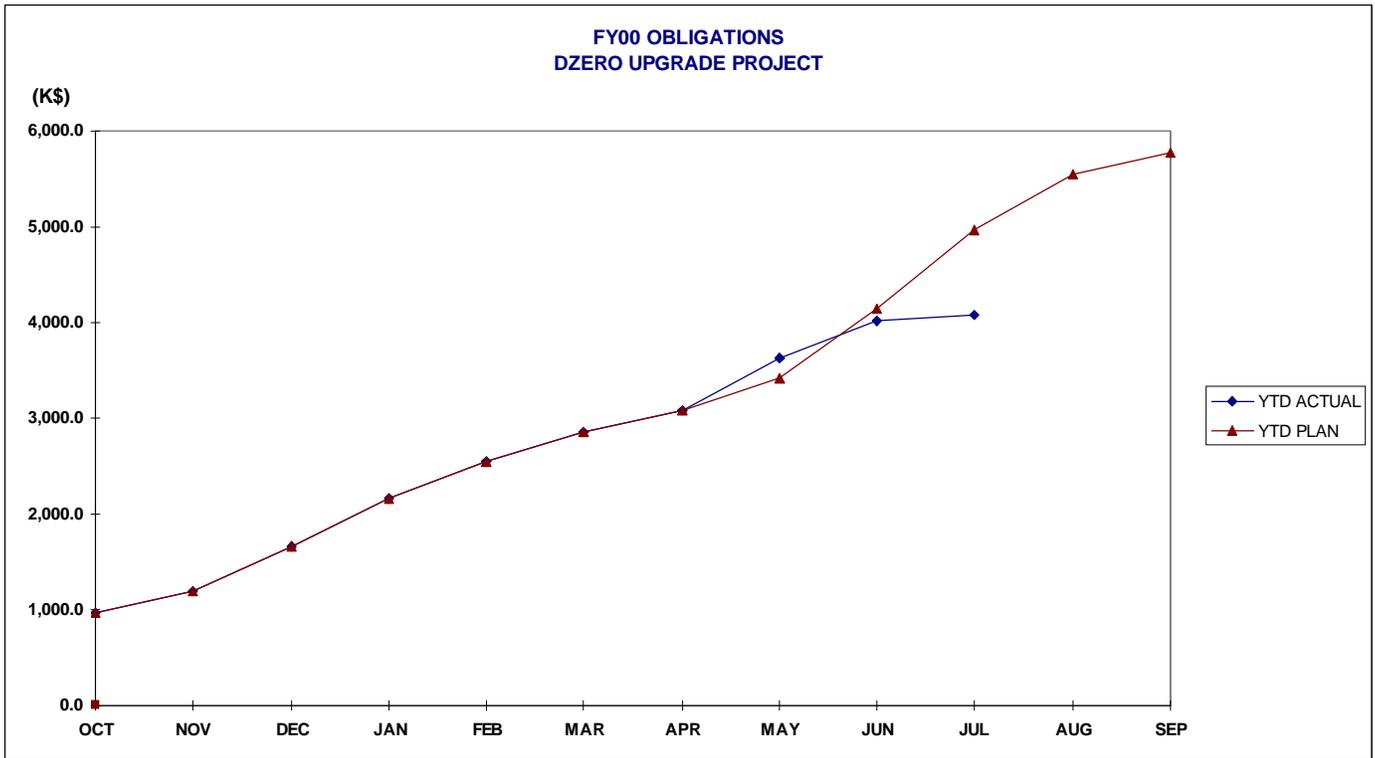
	<u>COST</u> <u>ESTIMATE</u>	<u>PRIOR YR</u> <u>OBLIG</u>	<u>FY 00</u> <u>YTD OBLIG</u>	<u>PROJECT</u> <u>BALANCE</u>
1 <i>TOTAL DZERO UPGRADE PROJECT</i>	41,593.2	33,989.2	4,073.1	3,530.9
1.1 TRACKING DETECTORS	20,097.6	16,773.0	2,740.5	584.1
1.1.1 SILICON TRACKER	7,857.1	6,166.1	1,597.0	93.9
1.1.2 FIBER TRACKER	7,774.3	6,976.3	694.8	103.3
1.1.3 CENTRAL PRESHOWER DETECTOR	238.2	228.2	0.5	9.5
1.1.4 FORWARD PRESHOWER DETECTOR	524.3	500.3	14.6	9.4
1.1.5 TRACKING ELECTRONICS	3,703.7	2,902.1	433.6	368.1
1.2 CALORIMETER	4,656.8	4,163.4	135.6	357.8
1.2.1 FRONT-END ELECTRONICS	4,347.6	3,915.5	92.6	339.5
1.2.2 INTERCRYOSTAT DETECTOR	309.2	247.9	43.0	18.3
1.3 MUON DETECTORS	9,493.1	7,839.9	699.3	953.9
1.3.1 COSMIC RAY SCINTILLATOR	1,223.2	963.2	0.0	260.0
1.3.2 CENTRAL TRIGGER DETECTORS	951.9	713.6	70.9	167.5
1.3.3 FORWARD TRIGGER DETECTOR	2,133.3	1,673.1	90.9	369.3
1.3.4 FORWARD TRACKING DETECTOR	1,410.8	953.8	337.1	119.9
1.3.5 FRONT-END ELECTRONICS	3,773.9	3,536.2	200.5	37.2
1.4 TRIGGER	6,599.6	4,919.5	324.6	1,355.6
1.4.1 FRAMEWORK	1,859.4	1,859.4	0.0	0.0
1.4.2 LEVEL 0	136.4	124.2	6.4	5.8
1.4.3 LEVEL 1	1,515.1	1,120.0	207.9	187.2
1.4.4 LEVEL 2	2,039.8	1,002.3	100.9	936.6
1.4.5 LEVEL 3	1,049.0	813.7	9.3	226.0
1.5 ONLINE EQUIPMENT	746.0	293.4	173.2	279.5
1.5.1 ON-LINE EQUIPMENT	746.0	293.4	173.2	279.5
<hr style="border-top: 1px dashed black;"/>				
3.1 <i>TOTAL SOLENOID PROJECT</i>	5,168.0	4,848.2	37.4	282.4
3.1.1 SOLENOID	5,168.0	4,848.2	37.4	282.4

**DEFINITION OF TERMS:**

Funds: DØ Upgrade = M&S Equipment Funds; Solenoid = AIP Plant Funds.  
 Cost Estimate: Total Project and Sub-Project Budgets without contingency.  
 Prior Year Obligations: Obligations for fiscal years '92 through '99 as applicable.  
 FY 00 Year-to-Date Obligations: Obligations for fiscal year '00.  
 Project Balance: Cost Estimate - (Prior Year Obligations + Fiscal 00 YTD Obligations)  
 DØ FY 00 Plan: The M&S funds allocated to the Project/Sub-Projects as extracted from the current schedule.  
 DØ FY 00 Balance: DØ FY 00 Plan - FY 00 Year-to-Date Obligations

# DØ Upgrade Monthly Progress Report

for the month of July, 2000



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
<b>YTD ACTUAL</b>	962.6	1,199.8	1,664.6	2,169.3	2,546.1	2,855.8	3,077.4	3,623.2	4,009.5	4,073.1		
<b>YTD PLAN</b>	962.6	1,199.8	1,664.6	2,169.3	2,546.1	2,855.8	3,077.4	3,421.4	4,141.4	4,975.4	5,555.4	5,775.4

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

## Active MOUs as of 7/31/00

<u>INSTITUTION</u>	<u>EQUIPMENT</u>	<u>R&amp;D</u>	<u>COSTED</u>
Boston University	298,200	5,200	35,093
Brookhaven National Laboratory	236,439		181,247
Brown University	820,076	106,000	161,319
California State University, Fresno	26,160		4,083
Columbia University, Nevis Labs	140,000		107,937
DAPNIA / Saclay	0	0	0
IN2P3	0	0	0
Indiana University	65,000		31,585
Institute for High Energy Physics (IHEP)	270,433		107,838
Kansas State University	113,300	92,512	107,789
Louisiana Tech University	80,854		56,917
Michigan State University	226,087		68,744
Moscow State University	23,250		0
NIKHEF / Amsterdam	0	0	0
Northern Illinois University	133,000	28,000	130,872
SUNY at Stony Brook	1,105,750	20,000	490,133
University of Arizona	820,598	78,100	474,299
University of Calif, Davis		9,720	0
University of IL, Chicago	129,103	22,000	91,042
University of Kansas, Center for Research, Inc.	16,000		1,889
University of Maryland	0		0
University of Nebraska, Lincoln	0		0
University of Notre Dame	190,500	77,000	102,097
University of Oklahoma	43,000		33,210
University of Texas, Arlington	126,764		116,623
<u>University of Washington</u>	<u>50,640</u>	<u>5,250</u>	<u>38,538</u>
Total Fermilab Funds:	<u>\$4,915,154</u>	<u>\$443,782</u>	
Total Costed:	2,112,677	228,577	<u>\$2,341,254</u>
Total Open Commitments:	<u>\$2,802,477</u>	<u>\$215,205</u>	

# DØ Upgrade Monthly Progress Report

for the month of July, 2000

## Reportable Milestones Summary

<u>Done</u>	<u>Reportable Milestones</u>	<u>Project</u>	<u>Date</u>	<u>Baseline</u>	<u>Var.</u>
X	M1-Solenoid Delivered to Fermilab	Solenoid	5/12/97	5/12/97	0 w
X	M2-VLPC Production 50% Complete	VLPCs	8/31/97	8/31/97	0 w
X	M2-Central Preshower Module Fabrication Complete	Central Preshower	12/16/97	12/16/97	0 w
X	M2-Central Preshower Installed on Solenoid	Central Preshower	5/21/98	5/21/98	0 w
X	M1-Solenoid Installed and Tested	Solenoid	9/30/98	9/30/98	0 w
X	M2-Muon Forward Trigger Counter Assembly 10% Complete	Muon Forward Trigger	10/12/98	10/12/98	0 w
X	M2-Forward Preshower Module Fabrication Begun	Forward Preshower	11/4/98	11/4/98	0 w
X	M2-Muon Forward Tracker MDT Assembly 10% Complete	Muon Forward Tracker	1/29/99	1/29/99	0 w
X	M2 - Assembly Design Complete	Fiber Tracker	3/5/99	3/5/99	0 w
X	M2-First Cylinder Complete	Fiber Tracker	9/2/99	9/2/99	0 w
X	H Half-Wedge Fabrication 20% Complete	Silicon Tracker	10/15/99	10/15/99	0 w
X	3 Chip Ladder Fabrication 80% Complete	Silicon Tracker	10/26/99	10/20/99	0.6 w
X	Arrival Of C-Layer MDT Modules At FNAL	Muon Forward Tracker	11/3/99	10/22/99	1.7 w
X	9 Chip Ladder Fabrication 20% Complete	Silicon Tracker	11/4/99	11/3/99	0.2 w
X	M3-Fiber Tracker Ribbon Fabrication 50% Complete	Fiber Tracker	11/5/99	11/12/99	-0.9 w
X	First Readout Crate Installed & Working	Silicon Electronics	11/16/99	12/2/99	-2 w
X	SCA Testing Complete	Calorimeter Electronics	11/23/99	12/15/99	-2.8 w
X	MDT ADB Fabrication Complete	Muon Electronics	12/2/99	12/2/99	0 w
X	SLICs Received	Trigger	12/10/99	11/10/99	4 w
X	F Wedge Assemblies 20% Complete	Silicon Tracker	1/24/00	1/19/00	0.4 w
X	6 Chip Ladder Fabrication 20% Complete	Silicon Tracker	1/31/00	1/3/00	3.9 w
X	MDC Fabrication Complete	Muon Electronics	1/31/00	12/13/99	5 w
X	M2-Muon Electronics Preproduction Installation Complete	Muon Electronics	1/31/00	12/13/99	5 w
X	M2-Fiber Tracker Assembly Begun	Fiber Tracker	2/1/00	12/6/99	6.2 w
X	M3-Establish Single Crate Internal Data Movement	Trigger	2/17/00	1/6/00	6 w
X	Shaper Hybrid 50% Complete	Calorimeter Electronics	2/22/00	5/9/00	-11 w
X	All Pixel Octants Assembled	Muon Forward Trigger	2/23/00	4/4/00	-5.8 w
X	M3-1st Forward Preshower Detector Complete	Forward Preshower	2/24/00	1/12/00	6.2 w
X	M3-Fiber Tracker Cylinders 8, 7, 6, and 5 Complete	Fiber Tracker	3/2/00	1/28/00	5 w
X	Steady DAQ Running	Online	3/17/00	3/31/00	-2 w
X	H Half-Wedge Fabrication 80% Complete	Silicon Tracker	3/29/00	2/23/00	5 w
X	M2-All Muon Forward Tracker MDT Modules At Fermilab	Muon Forward Tracker	3/30/00	3/10/00	2.8 w
X	Module Fabrication and Testing Complete	Forward Preshower	4/1/00	12/10/99	14 w
X	M3-2nd Forward Preshower Detector Complete	Forward Preshower	4/3/00	3/8/00	3.6 w
X	FEB, CB Production Complete	Muon Electronics	4/10/00	1/3/00	14 w
X	M3-ICD Tile Modules/Boxes Ready	Intercryostat Detector	4/19/00	1/18/00	13.2 w
X	M2-ICD Modules Arrive at Fermilab	Intercryostat Detector	4/24/00	1/25/00	12.8 w
X	M3-InterCryostat Detectors Installed	Intercryostat Detector	5/5/00	2/1/00	13.6 w
X	M3-Level Ø-South Installed	Luminosity Monitor	5/8/00	2/9/00	12.6 w
X	M3-Fiber Tracker Ribbon Fabrication Complete	Fiber Tracker	5/10/00	3/6/00	9.5 w
X	M3-Fiber Tracker Ribbon Mounting Complete	Fiber Tracker	5/13/00	4/20/00	3.3 w
X	M2-Fiber Tracker Assembly Complete	Fiber Tracker	5/26/00	5/4/00	3.3 w
X	6 Chip Ladder Fabrication 80% Complete	Silicon Tracker	7/12/00	3/14/00	16.8 w
X	M2-Calorimeter Preamp System Test Complete	Calorimeter Electronics	7/13/00	3/31/00	14.4 w
X	Waveguide Production 50% Complete	Fiber Tracker	7/24/00	1/29/00	24.6 w
X	10 Digital Boards Available	Fiber Electronics	7/28/00	3/22/00	18 w
X	9 Chip Ladder Fabrication 80% Complete	Silicon Tracker	7/31/00	3/27/00	17.4 w
X	F Wedge Assemblies 80% Complete	Silicon Tracker	7/31/00	4/26/00	13.2 w
X	M2-Muon End Toroids Installed on Platform	Master	8/4/00	11/15/00	-14.2 w
X	Ten 8-chip Analog Boards Available	Fiber Electronics	8/8/00	4/19/00	15.4 w
	M3- Cal Readout Available to L2	Trigger	8/15/00	2/11/00	26 w
	SFE, SRC Fabrication Complete	Muon Electronics	8/16/00	2/3/00	27.5 w
X	M3-VLPC Cryo System Operational	VLPCs	8/18/00	6/12/00	9.6 w

## DØ Upgrade Monthly Progress Report

for the month of July, 2000

M2-First Silicon Tracker Barrel/Disk Module Complete	Silicon Tracker	8/21/00	1/24/00	29.6 w
MBTs Received	Trigger	8/28/00	3/16/00	23 w
M3-VLPC Cassette Assembly 50% Complete	VLPCs	9/1/00	4/12/00	20 w
M3-Waveguide Production Complete	Fiber Tracker	9/1/00	6/5/00	12.8 w
B-Layer Octants Assembled	Muon Forward Tracker	9/1/00	4/18/00	19.2 w
All MDT Octants Assembled	Muon Forward Tracker	9/1/00	7/14/00	7 w
M3-L3 Operational (One Full Chain)	Trigger	9/1/00	6/1/00	13 w
Preproduction MTCxx, MTFB, and MTCM Complete	Trigger	9/7/00	1/24/00	32 w
South Half-Cylinder Complete and Ready to Move to DAB	Silicon Tracker	9/28/00	8/1/00	8.4 w
M3-Calorimeter CC,ECN Preamp Installation Complete	Calorimeter Electronics	10/6/00	3/31/00	26.4 w
Drawers Ready	Intercryostat Detector	10/6/00	12/14/99	40 w
South H-Disks Ready to Move to DAB	Silicon Tracker	10/16/00	7/3/00	14.6 w
M3-Muon Level 1 Trigger Preproduction Testing Complete	Trigger	10/20/00	4/18/00	26 w
Global Installation Complete	Trigger	10/24/00	7/12/00	14.6 w
L2 Cal Installation Complete	Trigger	10/24/00	8/21/00	9 w
L2 CTT Installation Complete	Trigger	10/24/00	8/9/00	10.6 w
M1-Begin Shield Wall Removal/Ready to Roll-in	Master	11/1/00	11/22/00	-3 w
MRC, MFC Production Complete	Muon Electronics	11/6/00	3/27/00	31.4 w
L2 Muon Installation Complete	Trigger	11/7/00	7/26/00	14.6 w
Muon Forward Tracker B-Layer Planes Installed	Muon Forward Tracker	11/9/00	6/15/00	20.6 w
All MDT Planes Installed	Muon Forward Tracker	11/9/00	8/4/00	13.6 w
M3-All Silicon Tracker Barrels/Disks Complete	Silicon Tracker	11/13/00	8/25/00	11.2 w
North Half-Cylinder Complete and Ready to Move to DAB	Silicon Tracker	11/13/00	9/18/00	8.2 w
M1-Central Silicon Complete	Silicon Tracker	11/13/00	9/18/00	8.2 w
Timing System Installed	Calorimeter Electronics	11/13/00	8/18/00	12 w
M3-VLPC Cassette Assembly Complete	VLPCs	11/17/00	8/22/00	12.4 w
Daughterboard Vendor Production Complete	Calorimeter Electronics	11/29/00	6/16/00	22.8 w
Mixer Boards Ready	Fiber Electronics	11/30/00	6/22/00	22.2 w
BLS Motherboard Assembly Complete	Calorimeter Electronics	12/12/00	8/7/00	17.6 w
All Muon Forward Trigger Detector Planes Installed	Muon Forward Trigger	12/15/00	8/25/00	15.4 w
Alpha Cards Received	Trigger	12/18/00	5/15/00	30 w
M2-Silicon Tracker Installed in Solenoid/Fiber Tracker	Silicon Tracker	1/4/01	9/25/00	13.6 w
CFA Commissioning Complete	Muon Central	1/4/01	7/10/00	24.3 w
M2-Calorimeter BLS Assembly Complete	Calorimeter Electronics	1/8/01	9/26/00	13.6 w
PDT Commissioning Complete	Muon Central	1/16/01	6/9/00	29.8 w
Multichip Modules Received	Fiber Electronics	1/30/01	2/23/00	47 w
Production MTCxx, MTFB, and MTCM Complete	Trigger	2/2/01	6/27/00	30 w
M1-Detector Rolled-in and Hooked Up	Master	2/20/01	2/2/01	2.4 w
M3-Trigger Level 2 Commissioned	Trigger	3/28/01	9/21/00	25.6 w